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*Original Article*

# Dermatoses among patients aged 60 years and above attending a tertiary referral center: A cross-sectional study from North Kerala

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## ABSTRACT

**Objectives:** With the rise in life expectancy at birth, geriatric population contributes to a significant proportion of those seeking medical aid. Skin problems in the elderly are very common and vary according to region and ethnicity. It is essential for dermatologists to have a better understanding of the pathophysiology of geriatric skin disorders to formulate quality management guidelines. This study was undertaken to document the frequency and the clinical pattern of various physiological and pathological changes in the elderly skin.

**Materials and Methods:** A cross-sectional study was carried out in 200 consecutive patients aged 60 years and above and who attended the Dermatology outpatient clinic of a tertiary referral center in North Kerala. A pre-set pro forma was used to document the patient characteristics, the comorbidities, the medications used, and the clinical findings.

**Results:** All the study participants (100%) had one or more dermatoses. The age of the study population ranged from 60 to 89 years (mean 67.7 ± 6.2 years). This was a female preponderant study with a female to male ratio of 1.4:1. Hypertension (36%), hyperlipidemia (27%) and diabetes mellitus (26%) were the common comorbidities observed. Graying of hair was the most common physiological change, followed by wrinkling. Pruritus was the most common presenting complaint (136, 68%). Statistically significant association was noted between xerosis and generalized pruritus. Fungal infections (30.5%) outnumbered other infections and infestations. Changes of severe photoaging were less frequent. One patient had skin malignancy (basal cell carcinoma). Significant association was noted between photoaging and male sex, smoking, and sun exposure.

**Limitations:** Study conducted in a tertiary referral center not reflecting the status in the community was the major limitation.

**Conclusion:** Photoaging and skin cancers are less frequent in darker skin type. Healthy lifestyle, nutritious diet, frequent application of emollient, better skin care, and judicious use of sunscreen can delay the process of cutaneous aging. More prospective studies in different population groups may go a long way in improving the current knowledge about the less known aspects of geriatric dermatoses.

**Keywords:** Aging skin, Geriatric skin, Geriatric dermatoses, Physiological aging, Photoaging

## INTRODUCTION

With the rapid strides made in the medical field, the average life expectancy at birth has increased considerably in recent years and this has brought with it the unique challenge of finding solutions to the physiological and pathological changes associated with aging. In comparison with the other states in India, Kerala has witnessed a dramatic demographic transition. 4.2 million people

in the state are aged above 60 years as per 2011 census. More importantly, while the general population is growing at a rate of 0.5%, elderly population of the state is growing at a rate of 2.3%. The old age dependency ratio of Kerala at 19.6% is higher than the rest of the country (14.2%), highlighting the importance of estimating the disease burden in the elderly in the state.[1]

Geriatric dermatoses contribute to a significant proportion of the diseases seen in the elderly.[2-4] Diagnosis, management and follow-up of geriatric dermatoses pose a great challenge to the health care providers. History taking can be difficult in patients, who may be suffering from multiple medical problems. Furthermore, socio-economic status, gender, skin color, climate, culture, nutrition, personal habits, hygiene, and systemic diseases can contribute to the skin manifestations in the elderly, which may not present as classically as they do in younger population.[2,3] Information on the dermatoses in the elderly may be useful to understand the extent of the disease burden and to plan future strategies so as to ensure medical aid to the needed. In this scenario, we attempted to study the frequency and manifestations of dermatoses among patients aged 60 years and above who attended a tertiary referral center in Kerala.

## MATERIALS AND METHODS

Cross-sectional study of consecutive 200 patients, (minimum sample size calculated was 100, based on the frequency of generalised pruritus in a previous study) aged 60 years and above and who attended the dermatology outpatient department of a tertiary referral center during a period of 1 year was carried out, after obtaining clearance from institutional ethics committee.[4] Patients with skin changes due to genodermatoses or other congenital causes, inherited disorders of DNA stability, premature aging, photosensitivity disorders, albinism, and chronic medical disorders which were likely to produce skin aging were excluded from the study. Individual study participant gave written informed consent.

Using a pre-set pro forma, we collected data regarding age, gender, occupation, history of present illness, personal history, and information on comorbidities and medications used. A thorough clinical examination including general, dermatological, and systemic examinations were carried out. Relevant investigations were done wherever indicated and were documented.

Graying of hair, fine wrinkles, xerosis, and androgenetic alopecia were considered as physiological changes of ageing.[4] Deep wrinkles, solar elastosis, cutis rhomboidalis nuchae, senile comedones, senile lentigines, senile purpura, colloid milia, Favre–Racouchot syndrome, and telangiectasia were considered as changes related to photoaging.[4]

Patients with generalized pruritus without any cause attributable to it (either a skin or a systemic disease that could manifest with pruritus) were diagnosed to have senile pruritus.

The data were analyzed using EPI-INFO 7 statistical package. Categorical variables were analyzed using Chi-square test and $P < 0.05$ was considered significant.

## RESULTS

The age of the study population ranged from 60 to 89 years with a mean of 67.7 ± 6.2 years. Maximum number of patients belonged to the age group of 60–69 (143, 71.5%) years, followed by 70–79 (42, 21%) and 80-89 (15, 7.5%) years. Among the study participants, there were 115 (57.5%) females and 85 (42.5%) males (female to male ratio 1.4:1).

Out of the 200 patients, 116 (58%) did predominantly indoor work while 84 (42%) did outdoor work. Most of the patients were house wives (99, 49.5%). The other job categories were manual laborers (40, 20%), agricultural workers (36, 18%), and people doing office job (9, 4.5%). The rest of the patients (16, 8%) had occupations other than these.

Of the 85 males, 58 were smokers (68.2%) and 35 consumed alcohol (41.1%). Thirty males had both these habits (35.3%). None of the females smoked or consumed alcohol. Thirteen females (11.3%) and ten males (11.8%) had the habit of pan chewing.

The most common comorbidity documented in the study group was hypertension (72, 36%), followed by dyslipidemia (54, 27%). The other systemic illnesses noted were diabetes mellitus (52, 26%), chronic obstructive pulmonary disease (33, 16.5%), ischemic heart disease (22, 11%), internal malignancy (22, 11%), hypothyroidism (7, 3.5%), collagen vascular disorders (3, 1.5%), and one case (0.5%) each of discoid lupus erythematosus, dermatomyositis and systemic sclerosis. Internal malignancies observed were lung cancer (three patients, 1.5%), breast cancer (one patient, 0.5%), and adeno-carcinoma stomach (one patient, 0.5%). One patient with bronchogenic carcinoma had dermatomyositis as a paraneoplastic phenomenon.

Pruritus was the most common presenting complaint (136, 68%). Eighty patients (40% of total) had generalized pruritus. Three female patients (1.5% of the total) with generalized pruritus without any cause that could cause the same were diagnosed to have senile pruritus.

Cutaneous changes were observed in all patients [Table 1].

Graying of hair was the most common physiological change and was seen in all the patients, followed by wrinkling (197, 98.5%). Androgenetic alopecia was observed in all the male patients and 48 (41.7%) female patients. Thirty seven (84.1%) of the 44 women with hirsutism had androgenetic alopecia as well.

**Table 1:** Cutaneous manifestations in patients aged 60 years and above attending the dermatology department of a tertiary referral center.

| Cutaneous manifestation | Number (percentage of the total) *N*=200 |
|---|---|
| Graying | 200 (100) |
| Wrinkling | 197 (98.5) |
| Androgenetic alopecia | 133 (66.5) |
| Hirsutism | 44 (22) |
| Xerosis | 113 (56.5) |
| Changes of photoaging | |
| Solar lentigines | 45 (22.5) |
| Senile comedones | 43 (21.5) |
| Colloid milium | 42 (21) |
| Solar elastosis | 10 (5) |
| Favre–Racouchot | 3 (1.5) |
| Syndrome | |
| Telangiectasia | 36 (18) |
| Senile purpura | 31 (15.5) |
| Deep wrinkles | 15 (7.5) |
| Cutis rhomboidalis nuchae | 7 (3.5) |
| Eczema *n*=65 (32.5%) | |
| Asteatotic dermatitis | 19 (9.5) |
| Stasis dermatitis | 16 (8) |
| Neurodermatitis | 14 (7) |
| Nummular eczema | 4 (2) |
| Photodermatitis | 4 (2) |
| Allergic contact dermatitis | 4 (2) |
| Seborrheic dermatitis | 2 (1) |
| Irritant contact dermatitis | 1 (0.5) |
| Atopic dermatitis | 1 (0.5) |
| Vesiculobullous diseases *n*=7 (3.5%) | |
| Bullous pemphigoid | 4 (2) |
| Pemphigus vulgaris | 2 (1) |
| Pemphigus foliaceus | 1 (0.5) |
| Psoriasis *n*=17 (8.5%) | |
| Psoriasis vulgaris | 7 (3.5) |
| Palmoplantar psoriasis | 5 (2.5) |
| Erythrodermic psoriasis | 4 (2) |
| Scalp psoriasis | 1 (0.5) |
| Lichen planus | 8 (4) |
| Erythroderma *n*=11 (5.5%) | |
| Psoriasis | 4 (2) |
| Air born contact dermatitis | 2 (1) |
| Paraneoplastic (lung cancer) | 2 (1) |
| Drug induced (phenytoin) | 1 (0.5) |
| Idiopathic | 1 (0.5) |
| Fungal infections *n*=61 (30.5%) | |
| Candidal intertrigo | 25 (12.5) |
| Tinea versicolor | 23 (11.5) |
| Dermatophytosis | 12 (6) |
| Chromoblastomycosis | 1 (0.5) |
| Bacterial infections *n*=49 (24.5%) | |
| Secondary pyoderma | 18 (9) |
| Furuncle | 14 (7) |
| Cellulitis | 8 (4) |
| Folliculitis | 4 (2) |
| Leprosy | 3 (1.5) |
| Erysipelas | 2 (1) |
| Viral infections *n*=11 (5.5%) | |
| Verruca vulgaris | 7 (3.5) |
| Herpes zoster | 4 (2) |
| Parasitic infestation | |
| Pediculosis capitis | 4 (2) |
| Scabies | 3 (1.5) |
| Drug reaction | 10 (5) |
| Cutaneous tumors | |
| Seborrheic keratosis | 109 (54.5) |
| Skin tag | 69 (34.5) |
| Dermatosis papulosa nigra | 67 (33.5) |
| Cherry angioma | 56 (28) |
| Syringoma | 16 (8) |
| Milia | 10 (5) |
| Sebaceous cyst | 10 (5) |
| Others | 9 (4.5) |
| Actinic keratosis | 1 (0.5) |
| Basal cell carcinoma | 1 (0.5) |
| Pigmentary changes | |
| Idiopathic guttate hypomelanosis | 79 (39.5) |
| Melasma | 31 (15.5) |
| Freckles | 12 (6) |
| Vitiligo | 5 (2.5) |

Xerosis was seen in 113 (56.5%) patients [Figure 1]. The most common site affected was lower extremity and associated asteatotic eczema was noted in 19 (9.5%) patients. Xerosis showed a significant association with sun exposure ($P = 0.04$) and smoking ($P = 0.002$). Sixty-three of the eighty (78.8%) patients with generalized pruritus had associated xerosis. Statistically significant association was noted between xerosis and generalized pruritus ($P = 0.001$).

Senile comedones showed significant associations with smoking ($P = 0.02$) and sun exposure ($P = 0.003$). Telengiectasia showed a statistically significant association with smoking ($P = 0.04$). Senile purpura showed a significant association with smoking ($P < 0.001$), alcoholism ($P = 0.03$), and sun exposure ($P < 0.001$). Solar elastosis and Favre Racouchot Syndrome were seen exclusively in males doing outdoor work and all except one were smokers (9/10, 90%).

Eczema was observed in 65 (32.5%) cases with asteatotic eczema being the most common (19, 9.5%). Psoriasis was

seen in 17 (8.5%) patients. Fourteen patients (7%) had associated nail pitting and seven (3.5%) had onycholysis. Psoriasis was significantly associated with coronary artery disease ($P = 0.03$) and smoking ($P = 0.001$). Six out of eight (75%) patients with lichen planus had cutaneous lesions while two patients (2/8, 25%) presented with lacy white reticulate lesion in the oral mucosa. All the cases of psoriasis and lichen planus were histologically confirmed.

Eleven patients (5.5%) in the study had erythroderma and the most common disease causing erythroderma was psoriasis (4/11, 36.4%). One patient (0.5%) developed drug induced erythroderma following phenytoin prescribed for seizure prophylaxis. No cause for erythroderma could be identified in one 73-year-old male patient even after extensive evaluation.

Among infections, fungal infections outnumbered others (61, 30.5%). Fungal infections did not show any significant association with diabetes mellitus in this study. One patient (0.5%) who was a farmer had chromoblastomycosis. Twenty-eight (14%) and eighteen patients (9%) had primary and secondary pyodermas, respectively. Furuncle was the most common primary pyoderma (14/28, 50%). No significant association was noted between pyoderma and diabetes. All three patients with leprosy (one female and two males) had borderline tuberculoid disease and all the three required multibacillary multidrug therapy. No household contacts were detected for the leprosy patients. Among the four patients with herpes zoster, three had lesions in the thoracic segment and one in the cervical segment. All the seven patients with parasitic infestation had affected family members.

The most common drug reaction observed was lichenoid eruption (5 cases, 2.5%), of which three followed indigenous treatment for joint pain. There were three cases of maculopapular drug rash secondary to nonsteroidal anti-inflammatory drugs. Phenytoin-induced toxic epidermal necrolysis (TEN) and drug reaction with eosinophilia and systemic symptoms were seen in one patient each (0.5%).

**Figure 1:** Xerosis of skin in an elderly.

Seborrhoeic keratosis was the most common benign cutaneous tumor observed in the study (109, 54.5%). Almost all the patients had multiple lesions. Statistically significant association was found between seborrhoeic keratosis with male gender ($P = 0.01$) and sun exposure ($P < 0.001$). One patient with adenocarcinoma of stomach had multiple seborrhoeic keratosis associated with severe pruritus suggestive of the sign of Leser-Trelat [Figure 2].

Skin tags showed a statistically significant association with diabetes mellitus ($P < 0.001$) and dyslipidemia ($P = 0.02$). Actinic keratosis was seen in one (0.5%) vitiligo vulgaris patient who was receiving systemic PUVASOL therapy (psoralen, followed by sunlight exposure). One (0.5%) 65-year-old female patient had basal cell carcinoma of face [Figure 3].

The most common pigmentary change observed among the study participants was idiopathic guttate hypomelanosis (79, 39.5%). Only two (6.5%) out of the 31 patients with melasma were males.

**Figure 2:** Eruption of multiple seborrheic keratoses in a patient with adenocarcinoma of stomach.

**Figure 3:** Basal cell carcinoma.

Other cutaneous manifestations noted were melanocytic nevi (120, 60%), fissure feet (92, 46%), varicose veins (58, 29%), callosity of palms and sole (53, 26.5%), ichthyosis (39, 19.5%), xanthelasma (18, 9%), diffuse hair loss (14, 7%), leg ulcer (7, 3.5%), corn (6, 3%), urticaria (3, 1.5%), insect bite reaction (3, 1.5%), lichen amyloidosis (3, 1.5%), small vessel vasculitis (2, 1%), and one (0.5%) each of alopecia areata, sweet's syndrome, and pyoderma gangrenosum.

Nail and oral mucosal changes observed are shown in Table 2.

Most common nail change seen was longitudinal ridging (194, 97%) [Figure 4]. Nail pitting was seen in patients with psoriasis, eczemas, lichen planus, bullous pemphigoid, erythroderma, and onychomycosis. Various types of altered nail contour seen were platyonychia (65, 32.5%), koilonychia (13, 6.5%), increased transverse curvature (45, 22.5%), nail dystrophy (9, 4.5%), pincer nails (8, 4%), and downward bent distal nail plate (1, 0.5%). Toenails were more frequently involved. Various types of chromonychia were seen in 107 (53.5%) patients. Transverse melanonychia bands were seen in a patient with carcinoma breast on 5-fluorouracil, adriamycin, and cyclophosphamide. Half and half nails were seen in two (1%) patients with lichen planus and bullous pemphigoid, respectively. Investigations ruled out any abnormalities of renal function in both. Transverse leukonychia was seen in one patient with TEN and in one patient with psoriasis. Neapolitan nail was not observed in this study.

Glossitis (47, 23.5%) and angular cheilitis (21, 10.5%) were the most common oral mucosal changes observed [Figure 5]. Five (29.4%) and six (35.3%) of the 17 patients with oral thrush had diabetes mellitus and chronic obstructive pulmonary disease, respectively. The latter six were on steroid inhalers.

**Table 2:** Nail and oral mucosal manifestations in patients aged 60 years and above attending the dermatology department of a tertiary referral center.

| Nail manifestations | Number | Percentage |
|---|---|---|
| Longitudinal ridging | 194 | 97 |
| Loss of luster | 164 | 82 |
| Subungual hyperkeratosis | 142 | 71 |
| Altered nail color | 124 | 62 |
| Chromonychia | 107 | 53.5 |
| Loss of cuticle | 79 | 39.5 |
| Lunula | 44 | 22 |
| Onychomycosis | 40 | 20 |
| Beau's line | 39 | 19.5 |
| Onycholysis | 38 | 19 |
| Thickening of nail plate | 37 | 18.5 |
| Pitting | 32 | 16 |
| Paronychia | 28 | 14 |
| Clubbing | 27 | 13.5 |
| Shiny nails | 9 | 4.5 |
| Thinning | 9 | 4.5 |
| Subungual hematoma | 7 | 3.5 |
| Splinter hemorrhage | 4 | 2 |
| Pterygium | 1 | 0.5 |
| **Oral mucosal manifestations** | **Number** | **Percentage** |
| Glossitis | 47 | 23.5 |
| Angular cheilitis | 21 | 10.5 |
| Hyperpigmentation of oral mucosa | 34 | 17 |
| Oral thrush | 17 | 8.5 |
| Nicotine palate | 16 | 8 |
| Denture stomatitis | 8 | 4 |
| Oral lichen planus | 2 | 1 |
| Pemphigus vulgaris | 2 | 1 |

## DISCUSSION

Different studies have adopted different parameters to define elderly using a cutoff of above 50 to above 65 years.[4-7] Durai *et al.* used a cutoff of 50 years for females and 60 years for males suggesting that postmenopausal changes accelerate aging in females.[4]

**Figure 4:** Longitudinal ridging, onychomycosis with paronychia of finger nails in an elderly housewife.

**Figure 5:** Glossitis, angular cheilitis, and dental caries in an elderly female.

The common age group of study participants (60–69 years) was comparable to the previous studies on geriatric dermatoses.[5,7] This could be a reflection of the difficulty faced by older individuals to travel to a tertiary care center situated away from home.

The female predominance observed by us was discordant to most other studies, but few studies have reported comparable findings to ours.[4-9] This could be attributed to the high female literacy and better health-care opportunities available to female population in Kerala. Furthermore, females outnumber males among the elderly population of Kerala.[1] The majority of the study participants being house wives, manual laborers or agricultural workers as noted by us were consistent with the patient profile seeking care in a government institution. Hypertension and diabetes mellitus being the common comorbidities observed in the study were comparable to literature.[5,7] We also noted dyslipidemia as a common comorbidity in elderly. Many of these patients were on lipid lowering agents which could have contributed to the xerosis of skin.

Pruritus being the most common complaint among the study participants were similar to the previous studies.[4,5,7] Dryness of skin itself can produce pruritus which, in turn, can lead to constant scratching. This may cause break in the continuity of the epidermis, predisposing the patient to infections and dermatitis.[3] Statistically significant association noted between xerosis and generalized pruritus and the manifestation of asteatotic eczema in 16.8% of those with xerosis suggest that early detection and management of xerosis can prevent subsequent progression to dermatitis/eczema.

Chronological/physiological aging and photoaging are the two types of skin aging described. Chronological aging is due to physiological alteration in skin function while photoaging results from ultraviolet radiation which mainly affects exposed parts. Skin changes in the elderly can be due to intrinsic and extrinsic changes. Intrinsic changes include thinning of epidermis, decreased vascularity, fragmentation of collagen and elastic fibers, compromise in skin's inherent capacity to repair and nourish cells and reduction in immunity while extrinsic changes result from ultraviolet radiation, pollutants, addictions, and poor nutrition.[3] Graying of hair being the most common physiological change in geriatric age group was similar to the observation of Grover and Narasimhalu, while several others observed wrinkling to be the most common change in the elderly.[4,5,7] Durai *et al.* noted photoaging and physiological aging to be more common in males and females, respectively, despite using a lower age limit for females.[4] All our study participants showed features of physiological aging (graying in 100% cases) while individual dermatoses associated with photoaging predominated in males with the exception of melasma. The associations of photoaging with smoking, male sex, and sun exposure were as reported earlier.[4]

The frequency of bullous pemphigoid observed was similar to the literature.[5] Frequency of psoriasis and lichen planus was consistent with the previous reports.[5,7] Psoriasis being the most common cause of erythroderma as observed by us was consistent with available literature.[5] Predominance of fungal infections among dermatoses of infective etiology was similar to certain studies, but discordant to the findings of Agarwal *et al*. who observed a predominance of bacterial infections.[4-7] Many of the patients with skin infections were normoglycemic. Immunodeficiency associated with old age coupled with the break in the skin barrier could have contributed to the cutaneous infections**.** Three patients (1.5%) manifesting Hansen's disease as reported by us was comparable to the frequency of 2% noted by Agarwal *et al*. and suggest the importance of household surveys in leprosy elimination, since there is a higher risk of asymptomatic skin lesions going unnoticed in the elderly and even when noted, there may be a delay in seeking medical care.[3] Moreover, multidrug therapy may require closer monitoring in elderly who might already be receiving other drugs for different ailments. The adverse effects of multidrug therapy may need to be closely watched for since the hepatic metabolism in old age differs from that in younger age.

Frequency of idiopathic guttate hypomelanosis seen in our study (39.5%) was much lower than the 76.5% noted by Grover and Narasimhalu, but was comparable to certain other studies.[4,8,10]

Drug reactions noted in 2.5% of the study participants were comparable to the literature.[11] Polypharmacy for multiple medical problems and impaired drug metabolism in the elderly increase the chance of adverse drug reactions. Use of indigenous medications, over the counter medications, homeopathic medications, and herbal supplements are very common in our population which should be specifically asked for while taking history.[3]

Seborrheic keratosis being the common benign neoplasm noted by us was similar to the observations of others.[4-7] The only premalignant and malignant conditions noted in the study were actinic keratosis and basal cell carcinoma, respectively, whereas Agarwal *et al*. had reported squamous cell carcinoma, basal cell carcinoma, mycosis fungoides, chronic actinic reticuloid, and leukemia cutis.[5] Low prevalence of skin cancers indicates the photoprotective effect offered by the high melanin content of dark skin. Manifestation of actinic keratosis following systemic PUVASOL as observed in one of our patients was consistent with the literature.[12] This underscores the importance of avoiding unnecessary sun exposure of vitiliginous skin especially in the elderly, as old age itself is an independent risk factor for malignancies.

Nail and the oral mucosal changes observed were comparable to literature.[4,5,7] Increased frequency of glossitis, cheilitis, and oral thrush observed by us could be attributed to malnourishment and poor oral hygiene along with comorbidities like diabetes, as most of them belonged to low socio-economic status.

### Limitations

Study conducted in a tertiary referral center not reflecting the status in the community was the major limitation.

## CONCLUSION

We found that most individuals aged 60 years or above suffer from one or more of dermatoses**.** Higher prevalence of xerosis and asteatotic eczema emphasizes the role of liberal application of emollients and the need to avoid harsh soaps in elderly. Although photoaging and skin malignancies are less prevalent in darker skin type, we believe that judicious use of sunscreen along with photoprotective measures may play an important role in delaying the process of aging. The increased frequency of dermatoses in smokers and those with lifestyle diseases confirms the deleterious effect of oxidative stress on aging body. Healthy lifestyle and nutritious diet rich in antioxidants may improve the quality of life in elderly. The increased prevalence of cutaneous infections even in normoglycemic, aged individuals underscores the importance of maintaining skin barrier function by promoting healthy skin care practices in the elderly, with their weakened immune system. As the proportion of geriatric population continues to increase, the health-care system should build effective strategies to provide care and support to the elderly.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

### Conflicts of interest

Dr. Sarita Sasidharanpillai and Dr. Naeeba Riyaz are on the editorial board of the Journal.

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