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Review Article

Major contributions to dermatology from India

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ABSTRACT

Over the years, India has made significant contributions for the advancement of science and technology. Ancient literature on various skin disorders by Indian scholars and philosophers attest to the early work carried out in this field in the country. Indians have played a significant role in contributing to the growth of dermatology, venereology, and leprology. In this article, we have attempted to compile the significant contributions made by Indians in the field of Dermatology, which we hope would inspire the coming generations.

Keywords: History of Indian dermatology, Contributions by Indian dermatologists, Dermatology in India, Indian leprology, Indian venereology

INTRODUCTION

India, the land of scholars and philosophers, has made ground breaking contributions in the field of science and technology and medical science is no exception. In fact, it is one of the earliest fields to develop in the history of Indian civilization. Although the term dermatology came in use in the 18th century, skin diseases already had a place in Indian literature since ancient times. Modern dermatology was introduced in India by the British, so the growth of Indian dermatology took place much earlier when compared to the rest of the Asian countries. And since then, many great contributions have been made by Indian doctors in the field of dermatology.

The Vedic period: Historical material about skin and its diseases are available in the Rigveda, the earliest texts of Indo-Iranian Aryans. The various Ayurvedic texts detailed not only about diseases but also about the daily care of the normal skin such as oil massage, trimming and care of hair, beards and nails, as well as the use of perfumes and toiletries.[1]

In Charaka Samhita, the concept of anatomical structure including various layers of the skin has been mentioned, which says that the skin formed the outer boundary of the body, is composed of six layers, and is also the residence of touch sensation. Among the various diseases of the skin, dialogues on leprosy, vitiligo, cellulitis, smallpox, acne, melasma, fungal infections, etc., are quite fascinating.[1]

In Sushruta Samhita, which deals with the surgical aspect of disease management, approximately 121 surgical instruments and more than 300 procedures are mentioned, which included different types of incision and drainage procedures of abscesses and infected wounds, various types of cauterization, and dermabrasion.[1]

The term Kustha was probably used to represent a number of skin ailments along with leprosy of the modern sense. The classification of Kustha into seven types in the Charaka Samhita and

18 types (seven Mahakustha and 11 Kshudrakustha) in the Sushruta Samhita represents the astute observation of the ancient Indian physicians.[1]

Later on, the Siddha system came and skin diseases were grouped under the term Kuttam. There are ample discussion on various skin ailments such as thinvup-pun (urticaria), paru (acne), and sarumap-pun (dermatitis).[1]

Coming to modern dermatology, the major contributions from India can be discussed under dermatology, venereology, and leprology.

DERMATOLOGY

Major contributions in dermatology were made by:

Dr. Ganapati Panja

- 1927 – Association of seborrheic dermatitis with *Malassezia ovale*.[2]
- 1946 – Cultivation and speciation of *Malassezia*.[3]
- 1955 – First editor of the Indian Journal of Dermatology.[4]

Dr. A. K. Dutta

1969 – Classification of vitiligo; Dr. Ajit Kumar Dutta mainly worked in the field of vitiligo which won him the "Award of Merit" from the Skin Institute, New Delhi, and the "Certificate of Honor" by the Scientific Committee of the Castellani-Reiss Award at the Fifth International Congress of Dermatology at Mexico.[5]

Dr. L. K. Bhutani

1974 – A pigmented variant of lichen planus (LP) was first reported from India in 1974 by Bhutani *et al.* who coined the term LP pigmentosus (LPP).[6] His other equally important contributions were in fields of leprosy, pigmentation, porphyria, and STDs.

Dr. B. M. Ambady

The first independent conference of the Indian Association of Dermatologists and Venereologists was held in 1975 at Trivandrum under the chairmanship of Dr. BM Ambady.[7]

Dr. R. K. Pandhi

1977 – A widely cited seminal study on cutaneous tuberculosis.[8]

Dr. A. B. Gupta

1979 – Comparison of the tensile properties of human scalp hair with and without natural pigment.[9]

Dr. Lalit Mohan

1982 – Genetic studies on prognosis in vitiligo.[10]

Dr. K. C. Saha

1984 – The landmark study by Saha that blew the lid off the silent epidemic of arsenicosis in Bengal, a study of enormous importance in public health in recent memory and an excellent example of public health investigation where a dermatologist has played a leading role.[11]

Dr. J. S. Pasricha

His multiple contributions include:

- 1988 – Contact dermatitis[12]
- 2000 – The concept of pulse therapy to achieve cure in pemphigus, systemic sclerosis, systemic lupus erythematosus, and other autoimmune diseases.[13,14]

Dr. R. G. Valia and Prof. Leslie Marquis

Planned the IADVL Textbook project and its first edition was published in 1994.[15]

Dr. Dhar S and Kanwar AJ

1995 – Dr. Dhar and Dr. Kanwar's landmark article on atopic dermatitis.[16]

"INDIAN" SIGNS IN DERMATOLOGY[17]

Premalatha Sign[18]

By Premalatha *et al*. in 1981,

In patients with pemphigus vegetans, there are characteristic cerebriform changes seen on the tongue. Cerebriform tongue is characterized by a pattern of sulci and gyri on the dorsum of the tongue and has been reported in up to 50% of cases of Neumann type.

Patrick Yesudian Sign[19]

By Yesudian *et al*. in 1984,

This sign is seen in neurofibromatosis Type 1. Multiple melanotic macules of palms with varying sizes from 2 to 4 mm may be noted in 90% of Indian cases. Around 50 cases have been studied in detail and recorded in literature in 1984.

Nose Sign (Pavithran's Nose Sign)[20]

By Pavithran K in 1988,

It is seen in exfoliative dermatitis in which there is a complete absence of erythema and scaling of the nose and perinasal

areas. It is hypothesized that the sparing of nose in exfoliative dermatitis could be due to greater sun exposure of the nose or it could be explained by the mechanism of island of normal skin.[21]

Hanging Curtain Sign[22]

By Dhar S and others in 1995,

It is seen in patients with pityriasis rosea. When the skin is stretched across the long axis of the herald patch, the scale is noted to be finer, lighter, and attached at one end, which tends to fold across the line of stretch.

Fountain Sign[23]

By Dhar S in 1997,

This sign is mostly seen in LP hypertrophicus lesions of <2 years duration. While injecting intralesional steroids by a 26G needle, it has been often found that the medicine comes out through the follicular openings in a jet mimicking a "fountain."

Reverse Namaskar Sign[24]

By Premalatha *et al*. in 2010,

In patients with Ehlers-Danlos syndrome, there is hyperextensibility and fragility of the skin with easy bruisability due to disorder in collagen. Patients are able to fold the forearms at the back and palms facing each other in a way to do Namaskar. This sign is known as reverse Namaskar sign.

Chik Sign[25]

By Riyaz *et al*. in 2010

In Chikungunya fever, a characteristic brownish hyperpigmentation involving the centrofacial area, especially the nose, is commonly seen. This is a unique feature not usually seen in other viral exanthems. This striking feature was named "Chik sign" by Riyaz *et al*.

Punshi's Sign[26]

In young women and girls having vitiligo, the original white color of vitiligo macules turns to red-pink during menstruation and after the menstruation, it turns to the original color.

DERMATOLOGICAL DISEASES[1]

Kangri cancer

A type of squamous cell carcinoma of the skin due to ceramic pot "Kanger" described by surgeons at Kashmir Mission Hospital.[27]

Madura foot (eumycetoma)

It was described in ancient writings of India as padavalmika (anthill), the first modern description was made in 1842 from Madurai by Gill. The fungal etiology was established in 1860 by Carter.[28]

Gopalan syndrome

Gopalan in 1946 described this condition which he observed chiefly in females between the ages of 20 and 40 years, among the poor in South India. It consists of severe burning and aching of the feet, hyperesthesia, pain, elevated skin temperature, and vasomotor changes of the feet, associated with excessive sweating and general body wasting. It is frequently observed in India and in Africa.[29]

Mudichud[30]

Typically seen in southern India where females have long hairs and regularly use hair oils. It was first described by Sugathan and Nair in 1972.

LPP

It was first described by Bhutani *et al*. in 1974.[6]

Cerebriform tongue

It was described by Premalatha in pemphigus vegetans in 1981.[18]

Blue neck syndrome

A distinct non-inflammatory type of bluish-black pigmentation of the neck involving the surface of the skin and sparing the folds, which are visible as non-pigmented grooves, associated with nematode larvae on the affected skin was described by Sugathan and Jayaram in 2000 and was named the "Blue neck syndrome."[31]

MYCOLOGY IN DERMATOLOGY

New species of pathogenic fungi

Arthrographis kalrae

The first strain of *A. kalrae* (named after S.L. Kalra) was isolated (by Ram P. Tiwari, a visiting worker) from a laboratory in AIIMS, New Delhi. It is an ascomycetous fungus responsible for human nail infections.[32]

Saksenaea vasiformis

Saksena discovered in 1953 a new genus, with *S. vasiformis* as the type species (also the only known species) associated

with cutaneous or subcutaneous zygomycosis and is one of the few fungi known to cause necrotizing fasciitis or "flesh-eating disease."[33-35]

Apophysomyces elegans

Misra with his associates Srivastava and Latas (1979) discovered a new mucoraceous fungus, with *A. elegans* as the species (the only known species of the genus) causing zygomycotic necrotizing fasciitis even in immunocompetent individuals.[36]

Novel pathogenic fungi implicated in mycotic infections

First report of systemic mycosis (cerebral phaeohyphomycosis) caused by *Chaetomium globosum*.[37]

Cylindrocarpon sp. was reported as an etiological agent of mycetoma.[38]

Emericella quadrilineata (anamorph *Aspergillus tetrazonus*) was reported as an etiological agent of onychomycosis.[39]

Development of rapid/novel diagnostic techniques in mycology

Sesame oil was used as a substitute for olive oil in isolation of *Malassezia furfur*.[40]

Paraffin bait technique was applied for isolation of *Nocardia asteroides* from clinical specimens.[41]

Cottonseed agar was reported as an inexpensive but efficacious medium for *in vitro* conversion of *Blastomyces dermatitidis* to yeast form.[42]

Contributions to the epidemiology of endemic and emerging mycoses

Dermatophytosis

Soil was demonstrated as a natural source and rodents as animal reservoirs for *Trichophyton simii*.[43]

Arthroderma simii recovered from monkeys imported to England from India was first described as a new species.[44]

Epizootic of dermatophytosis in poultry due to *T. simii* was reported for the first time.[45]

Association of *Trichophyton mentagrophytes* with the bark of Eucalyptus tree (*Eucalyptus camaldulensis*) was reported.[46]

Histoplasmosis

Isolation of *Histoplasma capsulatum*, the etiological agent of histoplasmosis from one of the three samples of soil admixed with bat guano collected from an abandoned room of a 350-year-old palatial building infested with an insectivorous bat, *Scotophilus heathii*.[47]

Blastomycosis

Recovery of *B. dermatitidis* from the visceral organs of bats (*Rhinopoma hardwickei*) thus implicating these flying mammals as an additional host or a vector of this dimorphic pathogen.[48,49]

Penicilliosis marneffei

Detection of the first four autochthonous cases followed by the detection of numerous cases of the disease from Manipur State in Northeast India.[50,51]

Coccidioidomycosis

The first authentic case (originating from Arizona in the USA) was reported from India (Baruch *et al*., 1996) followed by another such case.[52]

Infections due to yeasts and yeast-like fungi and their ecology

The first report of cutaneous infection due to *Cryptococcus laurentii*.[53]

The first report of a nosocomial outbreak of candidemia due to *Candida tropicalis* in neonates documenting the clonal origin of isolates.[54]

M. furfur was reported as a possible etiological agent of onychomycosis.[55]

VENEREOLOGY[56]

- 1881: Donovanosis was first recognized by Kenneth McLeod in Madras.[57]
- 1902: Caddy was the first to record cases of LGV in India under the title "Climatic bubo," a disease that was thought to be due to climatic influences (mainly tropical).[58]
- 1905: Colonel Charles Donovan identified the causative organism of Donovanosis in Madras. He described the intracellular "Donovan bodies" in the exudates from an oral lesion of the disease in a ward boy of a general hospital in Madras.[59]
- 1954: Dr. Rajam RV and Dr. Rangiah PN of Institute of Venereology, Madras, wrote the WHO monograph series on Donovanosis (granuloma inguinale and granuloma venereum).[60]
- 1956: Madras Medical College, VD department was redesignated as Institute of Venereology in 1956 and later renamed as Institute of STD (first of its kind in Southeast Asia), which was recognized by the WHO as

a teaching and training center for the whole of India and Southeast Asia. Dr. RV Rajam, an international figure known for his research works on venereal diseases, was the founding director of the institute.[60]

- 1989: Chacko and Nair introduced an enriched egg-beef selective medium, for the culture of gonorrhea, which is equally efficacious as the Thayer-Martin medium, but much cheaper and easily made from locally available ingredients in India.[61]

LEPROLOGY[1]

The first known asylum for leprosy patients was established in Calcutta early in the 19th century.

- 1869: Dr. Bhau Daji Lad claimed effective treatment of leprosy with hydnocarpus oil.[1]
- 1883: Carter made the first demonstration of lepra bacilli in India.[62]
- 1941: Dharmendra described the "Lepromin" antigen.[63]
- 1942: Dr. RG Cochrane used oral DDS in the management of leprosy in Madras.[1]
- 1956: Reconstructive surgery was started in Vellore by Dr. Paul Brand for leprosy.[1]
- 1959: Dr. Gopal Ramu, whose pioneering work, was the discovery of the use of chloroquine for the treatment of reactions in leprosy.[64]
- 1976: Dr. R. Ganapati founded the Bombay Leprosy Project in September 1976 and was considered Mahaguru of Leprosy Workers. He contributed with his research works on various aspects of leprosy including nerve function assessment, reactions, relapse, and resistance, and in 1983, he was honored with the prestigious "Padma Shri" award by the Govt. of India.[65]
- 1979: ICRC vaccine was developed by Dr. M.G. Deo in 1979 at the Cancer Research Institute, Mumbai, which contains ICRC bacilli (which are cultivable leprosy derived mycobacteria probably belonging to mycobacterium avium-intracellulare complex).[66]
- 1980: *Mycobacterium indicus pranii* (MIP) vaccine was developed by Dr. G.P. Talwar, the Founder-Director of the National Institute of Immunology in 1980.[67] The vaccine was originally called *Mycobacterium* w (M.w) and later renamed as MIP (indicus referring to India and pranii referring to Prof. Pran and National Institute of Immunology). MIP vaccine has also been found useful in the treatment of Category II "Difficult to treat" tuberculosis patients, for anogenital warts, preventive and therapeutic action on SP2/O myelomas and as an adjunct to HCG-LTB vaccine for preventing pregnancy.
- 1993: Dr. Charles K Job was the recipient of the prestigious Damien-Dutton Award in 1993, which is given to those who do outstanding work in leprosy globally. He was both a pathologist and a dermatologist and has published the maximum (314) number of papers on leprosy.[68] His main research was on pathology and immunology of leprosy, the transmission of leprosy and electron microscopic studies and he was also a consultant to the World Health Organization.
- 1977: Dr. KV Desikan reported the survival of *Mycobacterium leprae* in nasal secretion under tropical conditions for up to 9 days. He received Damien-Dutton Award in 2000.[69] His original work on survey, education, and treatment was the basis of the national as well as global leprosy control programs.

CONCLUSION

There are many more noteworthy contributions by Indian dermatologists that have not been included here since it is beyond the scope of an article with a preset word limit. The recent expansion of dermatology into different super specialty branches such as dermatopathology, dermatosurgery, pediatric dermatology, and cosmetic dermatology offers enormous scope for further research works, scientific studies, advancements, and discoveries to be made in dermatology. We can expect many more innovations and significant contributions from our Indian doctors and researchers in the coming years.

Declaration of patient consent

Not required as there are no patients in this article.

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Conflicts of interest

Dr. Anuja Elizabeth George is on the Editorial Board of the Journal.

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