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Inside

Article
Scabies: An overview
Publications
Conference/Workshop/ Meeting attended
Workshops/Training/Meeting conducted
Joining/Termination
Events

Scabies: An overview

Tapas Chakma & P. Vinay Rao

Scabies, an infestation by the itch or scabies mite, *Sarcoptes scabiei* has remained a major public health problem throughout the developing world. Scabies has now become a significant reemerging ectoparasitosis in its most severe form, crusted or Norwegian scabies, in the developed world, especially among the homeless, institutionalized older adults, mentally retarded, and immunocompromised.[1]


Scabies mite

Epidemiology

Detailed figures on the epidemiology of scabies are scarce. An accurate epidemiologic assessment does not exist.[2] The Royal Infirmary of Edinburgh has stored data on infectious diseases from 1815 to 2000. Their statistics showed that roughly 5% of patients with skin disease in the entire period had scabies with sharp increase in incidence during wartime, when prevalence reached more than 30%.

By contrast with theories that there are fluctuations of scabies every 7-30 years (scabies is also termed "7-year itch"), Seasonality trends of scabies have been documented over a period of 20-year period in a large military population in the Israeli Army.[3] The results showed an overall risk ratio of 1:31 for scabies, with a higher incidence in winter than in summer. The more frequent incidence in autumn and winter might be partly because of biological characteristics of mites. Mites survive longer away from the body in cooler weather. Further more, colder weather encourages over crowding in human beings. Mites also might be sensitive to antimicrobial peptides contained in human sweat, leading to reduced infestation in summer. An epidemiological study by general practioners in England and Wales, where data of about 5 million patients were collected over a 10-year period from 1994 to 2003, showed an incidence of scabies of 351 per 100000 person per year in males and 437 per 100000 person per year in females.[4] Reports from northern Australia indicate that up to half of the population in some remote aboriginal communities has scabies. The same was reported from Delhi.[5,6] Global estimates account for about 300 million cases of scabies (about 5% of the world's population) towards the end of the 20th century.

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Regional Medical Research Centre for Tribals
(Indian Council of Medical Research)
Nagpur Road, Garha
Jabalpur - 482 003
Madhya Pradesh, India
Ph: 0761-2370800/818, Fax: 0761-2672835
Email: rmrctjabalpur@rediffmail.com
www.rmrct.org

Scabies is most common in young children, possibly reflecting both increased exposure and, in endemic situations, lack of immunity. Scabies affects both sexes similarly. Ethnic differences in scabies epidemiology are most likely to be related to differences in overcrowding, housing and socioeconomic and behavioral factors, rather than racial origin. Poverty, poor nutritional status, homelessness, dementia and poor hygiene are associated risk factors.[7,8] Evidently, health care workers are at an increased risk for scabies. Outbreaks frequently occur in institutions such as hospitals, nursing homes, ashram schools, prisons or old age homes.

Transmission and pathogenesis

Person to person body contact was generally necessary for transmission of scabies. The research finding suggested that clothing or mites shed on the floor were an unlikely means of infestation with the exception of patients with hyper infestation (crusted or Norwegian scabies), who can shed thousands of mites daily.

Interfamily transmission as the most common means of infestation is supported by molecular studies showing the genotypes of mites from household members to be more homogeneous than those from separate households within a community.[7] In adults, sexual contact is an important method of transmission.

Clinical features

The signs of scabies are burrows. Burrows are whitish lines in the upper epidermis of several millimeters in length but are only infrequently present in patients in the developing world. Burrows are typically located on the interdigital spaces of the hand, the flexure surface of the wrist, elbows, genitalia, axillae, umbilicus, belt line, nipples, buttocks and penis shaft. The pruritus results from a delayed type-IV hypersensitivity reaction to the mite, its saliva, eggs, or excrements.Therefore symptoms usually occur with a delay of up to 3 weeks after initial infestation and usually within few days upon reinfestation.[9] The secondary lesions are more prominent than burrows, especially when the infestation has been present for some time. The rash does not correlate with the number of mites.

The diagnosis of classic scabies is straightforward, it may also present atypically. In infants scabies usually affects the axillae, head, face, diaper region, and occasionally the palms and soles. Children, especially in poor countries, frequently present with scabies super infected by group A streptococci or staphylococcus aureus, which should be treated first.

Nodular scabies is a clinical variant occurring in about 7% of scabies cases. The nodules are reddish to brown and because they do not contain mites, are thought to represent intense hypersensitivity reactions to mite productions. They can persist for weeks after treatment and patients might require corticosteroid.

Norwegian or crusted scabies: this is an unusually severe and extensive variety of scabies that occurs in immunocompromised individuals (HIV infection, steroid therapy, malignancies), mentally retarded persons (particularly Down's syndrome), and in old debilitated persons unable to respond to the infestation by scratching. Crusted scabies is characterized by thick scaling and crusted lesions on the sites of preference of the mites. In contrast to the more usual variety of the disease, the palms and soles may be affected and the nails may be thickened and dystrophic. Facial involvement may also occur. The condition may give rise to a generalized erythroderma. Thousand, even millions of mites may be present in a patient.

Nodular Scabies



Diagnosis

Every individual with intense pruritus should raise a suspicion of scabies, especially if there is a family report of similar symptoms.

The usual method of scabies diagnosis is skin scraping. An oil-covered scalpel blade should be scraped across burrows, the oil helps the scraped material to adhere to the blade. Scrapings are then placed on a slide with a cover slip for microscopic examination. It is best for scraping to take place at fresh, non-excoriated burrows in the interdigital areas of the hand. Direct microscopic examination of skin scrapings is ideal for identifying the mite and its products. Potassium hydroxide dissolves the keratin and provides a clear visualization of the mite and eggs but may dissolve the scybala, which are best seen using saline or mineral oil.

An alternative method is the burrow ink test, where burrows will absorb the ink and be readily apparent. Video-dermatoscopy, with magnifications of up to 600 times is especially suitable for making a diagnosis in children.[10]



Treatment

Topical or oral scabicides should be used to treat infested persons and their close personal contacts simultaneously, regardless of the presence of symptoms. Currently recommended treatment options for scabies are listed in Table-1.In a review on the treatment of scabies, Strong and Johnstone noted that both topical 5% permethrin and oral ivermectin appear most effective for individual infections.[11]

The topical treatment for scabies may not be well accepted or tolerated by some patients for many reasons, including severe burning and stinging (with benzyl benzoate and 5% permethrin) in case of secondary excoriated or eczematous infections, and in demented or disabled patients, who may not be able to comply with application regimens. In such cases, a single oral dose of Trial, compared the effectiveness of oral ivermectin, ivermectin, 200µg/kg, may offer a more acceptable and equally effective alternative. In a prospective trial, compared the effectiveness of oral ivermectin, µg/kg, with topical 25% benzyl benzoate and monosulfiram soap in 210 patients aged 5 to 65 years withScabies.18 Subjects with persistent lesions received a second course of therapy after 2 weeks. The investigators observed resolution of all lesions in 77 of 98 (79%) treated with ivermectin and 60 of 102 subjects (59%) treated topically. The scabies cure rate at 4 weeks was 95% in the ivermectin group and 86% in the topical treatment group. It was concluded that oral ivermectin is as effective as topical treatment with benzyl benzoate in scabies and lead to more rapid improvement. Centers for Disease Control and Prevention (CDC) recommends topical permethrin lotion or cream as first- line therapy for scabies, especially in initial classic infestations.

Scabies in tribal

The Tribal Welfare Department of Madhya Pradesh intend to initiate health and morbidity profile in different tribal predominate district through Regional Medical Research Centre for Tribal Jabalpur.The finding of the study indicate that scabies infection is an important problem in tribes of Madhya Pradesh. The prevalence of scabies in Mandla, Baihar and Patalkot area was found to be 10.6%,9.9% and 21% respectively. In all the above areas the cases of scabies were concentrated in Ashram School. On verification it was observed that, these schools are highly congested and over crowded. As per Government of India minimum living space is 50 sq ft/person. However, in these Ashram Schools about three to four children are living in 50 sq. ft area. As a result if one child is affected with any contagious disease like scabies, it rapidly spreads to other children. When these children go home they spread it to other family members and due to lack of awareness regarding personal hygiene and medical facility the disease remain there.

Currently Recommended Treatment for Scabies

Scabicides	FDA Approved	Dosing Schedule	Safety Profile	Contraindications
5% permethrin	Yes	Apply from neck down; wash off after 8-14 hr.	Excellent; itching on application	Allergic reactions
1% Lindane lotion	Yes	Apply 30-60 ml from neck down; wash off after 8-12 hr.	Potential for CNS toxicity, usually manifesting as seizures	Preexisting seizure disorder; infants and children <6 mo of age; pregnancy; breast feeding
10% crotamiton crem or lotion	Yes	Apply from neck down on two consecutive nights; wash off 24 hr after second application	Excellent; not very effective	None
2%-10% sulfur ointment	No	Apply for 2-3 days, then wash	Excellent; not very effective	Preexisting sulfur allergy
10%-25% benzoyl benzoate lotion	No	Two applications for 24 hr with 1-day to 1-wk interval	Irritant; exacerbates pruritus; can induce contact irritant,dermatitis and pruritic cutaneous xerosis	Preexisting eczema
0.5% malathion lotion	No	95% ovicidal; rapid (5 min) killing; good residual activity	Increasing drug resistance; organophosphate poisoning risk with over application and ingestions	Infants and children <6 mo of age; pregnancy; breast feeding
Ivermectin	Yes	200 µg/kg single dose, may be repeated in 14-15 days recommended for endemic or epidemic scabies in institutions	Excellent; may cause nausea and vomiting; take on empty stomach with water	Safety in pregnancy uncertain; probably safe during breast-feeding; not recommended for children weighing <15 kg.

Scabies control

The obvious first step in global scabies control is for health authorities to set up national reporting systems, such as the one in Denmark. This epidemiological foundation is a prerequisite for the start of an elimination process. There is evidence that health education combined with improved diagnosis and improved drug supply will result in a greater reduction in scabies. Simple mass treatment with scabicides will produce little long-term effect. Even after long-term surveillance and treatment programmes, any interruption of vigilance or logistics will result in a significant increase in incidence.[12]

Progress in scabies molecular research and the identification of mite homologues of house dust mite allergens have fuelled the potential for novel strategies aimed towards prevention, diagnosis, treatment, control and immunotherapy of this important but neglected parasitic disease.

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Dr. Tapas Chakma - Scientist 'F'
Mr. P. Vinay Rao - TA (R)

Publications

1. Agrawal MC, **Rao VG**. Indian Schistosomes: A need for further Investigations. ***Journal of Parasitology Research***. 2011; doi:10.1155/2011/250868.
2. Barde PV, Godbole S, Bharti PK, Gyan Chand, Agarwal M, Singh N. First report of detection of dengue virus 4 from central India. ***Indian Journal of Medical Research*** (In press).
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Conference/Workshop/ Meeting attended

Dr. Neeru Singh

1. Attended Tribal Sub Plan meeting at ICMR Delhi on 8th April 2011 and reviewed projects.
2. Attended and delivered a lecture at annual Meeting of the RBM Malaria in Pregnancy Working Group Addressing malaria in pregnancy in low transmission settings at WHO Headquarters, Salle C, Geneva during 18th -20th April 2011.
3. Attended Director's Meeting at National Institute of Pathology, New Delhi on 8th & 9th May 2011.
4. Attended meeting at NARI Pune regarding HIV and malaria and presented paper on 28th May 2011.
5. Attended DBT meeting regarding project funding on 10th June 2011.
6. Attended meeting with state health officers regarding malaria and other vector borne diseases on 29th -30th June 2011 at Raipur.
7. Attended WHO meeting regarding forest malaria at Gurgaon on 18th -23rd July 2011.
8. Attended DBT meeting at Pune on 8th July 2011 and delivered a lecture on malaria diagnostics.
9. Attended meeting with state health officers regarding state malaria situation on 2th-4th August 2011 at Raipur
10. Attended TAC meeting on 8th August 2011 at Delhi regarding new diagnostic.
11. Attended Tribal Health forum meeting on 9th-10th August 2011 at Dibrugarh.
12. Attended meeting in Planning commission on 13th September 2011 at Delhi as steering committee member.
13. Attended IDVC SAC meeting on 24th September 2011 at NIMR Delhi
14. Attended Malaria vaccine meeting on 26th September 2011 at ICGEB Delhi.

Dr. V. G. Rao

1. Attended workshop to discuss the TB prevalence and ARTI survey reports. Organized by the Central TB Division, DGHS, Ministry of Health & Family Welfare, Govt. of India at LRS Institute, New Delhi on 5th & 6th April 2011.
2. Attended National DOTS Plus Training under RNTCP organized by Central TB Division, Govt. of India at State TB Demonstration and Training Centre, Thiruvananthapuram, Kerala during 23rd - 27th May, 2011.
3. Attended Conference on the consultation for Identification of Public Health Research Priorities in India organized by National Institute of Epidemiology at Chennai on 13th & 14th August, 2011.

Dr. T. Chakma

1. Attended Meeting on ICMR forum on tribal health held at RMRC Dibrugarh on 8th & 9th August 2011.
2. Attended meeting on expert group on Hypertension at ICMR Head quarter on 24th August 2011.
3. Attended meeting on project collaborators of UNICEF under sanitationprogramme in Guna district on 7th September 2011 at Bhopal.
4. Organised a workshop and delivered a lecture on the “Health effects of fluorosis” to medical officers and PHED engineers of Chhindwara District on 5th May 2011 in collaboration with UNICEF Bhopal.
5. Organised a workshop and delivered a lecture on the “Role of Nutrition on fluorosis mitigation” to medical officers and PHED engineers of Chhindwara District on 5th May 2011 in collaboration with UNICEF Bhopal.
6. Attended a workshop on “Mitigating effects of Geogenic Contaminants” and delivered a lecture on the “Role of nutrition on fluorosis mitigation” on 20th June 2011, at Seoni organized by NEERI, Nagpur.

Dr. K.B.Saha

1. Attended an orientation programme on PG Diploma course on Bioethics from ICMR-IGNOU supported by NIH, USA at National Institute of Epidemiology (ICMR), Chennai on 3rd - 5th May 2011.

Dr. Jyothi Bhat

1. Attended training on 'Lucipherase reporter phage assay' at NIRT, Chennai on 8th -10th September 2011.

Dr. Surendra Kumar

1. Attended health camp and awareness program delivered a lecture on Tobacco related disease and its prevention in the village Mahespuri, Kundam block Jabalpur on 27th July 2012.
2. Attended health camp and awareness program and delivered a lecture on Tobacco related disease and its prevention and malaria in village Jhurmura Kundam block Jabalpur on 3rd September 2011.
3. Attended health camp and awareness program and delivered a lecture on Tobacco related disease and its prevention and malaria & its prevention in the village Ghugari Patha Nala, Jabalpur on 16th September 2011.

Workshops/Training/Meetings conducted

- Training, workshops were conducted for the Malaria Workers of Mandla and Seoni District, at RMRC on 14-23 July 2011.



- Training, workshops were conducted for the Malaria Workers of Panna District, at RMRC on 5-14 September 2011.



- Training, workshops were conducted for the technicians on External quality Assurance Scheme (EQAS) linked with ICTC's and blood banks, at RMRC on 25th August 2011.



- Director, RMRCT along with District Collector, Shri Gulshan Bamra at the distribution ceremony of mosquito nets at Kundam Block of District Jabalpur on 23rd June 2011.



- ICMR Centenary lecture delivered by Dr. V. P. Sharma, former ADG (ICMR), at RMRCT on 11th April 2011.



- ICMR Centenary lecture delivered by Dr. D. A. Gadkari, Scintific Conceltant ICMR, at RMRCT on 14th June 2011.





- ICMR Centenary lecture delivered by Dr. Das, ...at RMRCT on 12th September 2011.



- ICMR Centenary lecture delivered by Prof. M. C. Nahta, MGM Medical College Indore, at RMRCT on 30th September 2011.

Laboratories news

State Reference Laboratory (HIV)

The main responsilbility of the laboratory is to conduct the External Quality Assurance Scheme (EQAS) for the linked ICTC's and blood banks. Under this activity samples from these centres are retested at SRL. Total of 565 samples from different ICTC's and samples 115 from blood banks were retested. Discordant samples were followed up for corrective action. Trainings and workshops were also conducted for the technicians.

Joining/Promotion/Termination

- Rohit Agarwal joined as Assistant on 19th August 2011.

Services of the following staff of institute were terminated

- Ramanuj Kumar, Technician 'B' on 18.05.11
- Dev Prakash Dubey, Attendant (S)on 26.08.11

Events

1. Independence day was celebrated with great fervor on 15th August 2011. Director, RMRCT, hosted the National flag.



2. During 'Hindi Fortnight' various Hindi Competitions were organized for the scientists/officers and employees Hindi Typing and Hindi Shrutlekh, Hindi Essay Writing, 'Hindi Kavita Path' and 'Hindi Vad-Vivad (Debate)'. After the closing of the 'Hindi Fortnight', 'Rajbhasha Prize Distribution Programme' was organized on 29th September 2011. Cash prizes were distributed to the winners.





Painting on tribal art made on rocks at RMRCT Campus