Review Article

Crusted Scabies as Neglected Tropical Disease

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ABSTRACT

Scabies is still a health problem in the world, including Indonesia. The World Health Organization (WHO) in 2017 stated that scabies is included in the Neglected Tropical Disease (NTD) which requires large-scale control. In Indonesia, according to data from the Ministry of Health Republic of Indonesia the prevalence of scabies in 2017 is 6% of the total population in Indonesia. Discussion on the incidence and prevention of scabies from various regions in Indonesia so far is still not comprehensive. This review will provide an overview related to crusted scabies as neglected tropical disease in Indonesia.

Keywords: Scabies, Neglected tropical disease, crusted scabies, *Sarcopted scabiei*

INTRODUCTION

Scabies is also called the itch, parch itch, seven year itch because of intense itching that lasts for years. In Indonesia, scabies is called scurvy, scabies, or buduk. Scabies is found throughout the world with varying prevalence, but it is commonly found in tropical and subtropical regions in developing countries. Anyone who contacts with S.scabiei can be infected with scabies, however scabies is more prevalent in the population who have a high risk factor for scabies infestation. In communities that have a high risk of scabies the prevalence can reach 80%.(Sungkar S, 2016)

The number of people with scabies in the world is estimated at more than 300 million each year, causing economic burdens for individuals, families, communities and the health system. The cost of treating scabies is quite expensive because scabies usually infects poor people who cannot afford medical expenses. The cost becomes more expensive if the patient has severe scabies with complications of secondary infection by bacteria. At the household level, funds used for medical treatment result in a reduction in costs for basic needs, for example for food, thus increasing the burden on the family. At the institutional level, a significant amount of funds is spent to cope with outbreaks of scabies.(WHO, 2017)

Scabies has a close relationship with personal hygiene and neighborhoods so that it often occurs in people who live together in densely populated settlements, for example in densely populated settlements or in boarding schools with high population densities. Scabies outbreaks are often found in densely populated environments with close and prolonged skin contact such as in day care centers, orphanages, care centers for the elderly, prisons, refugees, and pesantren even in hospitals.(Kemenkes, 2017)

Scabies has a long incubation period so people who are exposed to scabies do not realize it before clear clinical lesions arise and can be diagnosed as scabies. In healthy young people, scabies is

considered a more annoying disorder due to intense itching. In the elderly or people with low immunity, scabies is often undiagnosed because the lesions resemble other diseases. Therefore scabies is often diagnosed late, treatment is inadequate or wrong, and the follow-up is inadequate so that it often causes outbreaks and endemic endeavors in areas that have a high risk factor for scabies infestation.(Sungkar S, 2016)

CRUSTED SCABIES

In scabies, there is a special form that has clinical manifestations different from the classic scabies, namely crusted scabies. This disease previously known as Norwegian scabies because it was found for the first time in people with Leprosy / Morbus Hansen in Norway. crusted scabies is caused by the same mites as classic scabies namely *Sarcoptes scabiei variety hominis* however different clinical manifestations. Boecks successfully transfer mites living from crusted scabies sufferers to healthy volunteers and yet have had scabies to find out the pathogenesis of scabies crustose. The experimental results showed that scabies mites can live on volunteers but manifest as classic scabies, not crusted scabies.(Sungkar S, 2015)

crusted scabies is a major source of scabies outbreaks in hospitals, nursing homes and mental hospitals. This fact is supported evidence from molecular studies showing that the genotype of mites of the hosts living in the same house are more homogeneous than genotypes mites from different homes even though they are in the same community. crusted scabies usually occurs in sufferers immunocompromised for example a patient who is undergoing long-term immunosuppressive treatment, organ transplant, infected with HIV or a viral infection that attacks T lymphocytes. Another group that is vulnerable to crusted scabies infestation is those who have mental retardation or physical disabilities such as paralysis, sensory neuropathy or neuropathy such as morbus hansen especially lepromatous leprosy.(One Disease, 2019)

The number of mites infesting one person with scabies crustosa many; varies from thousands to millions of mites while in classical scabies there are usually only about 11 mites on one sufferer. In crusted scabies there are about 4,700 mites every 1gram of hyperkeratotic skin peeling and mites too found on items around the sufferer. Because of the number mites are very abundant so the crusted scabies is very infectious and often causes outbreaks in the institutions where the patient is treated.(David JS, 2013)

Clinical Manifestation

Symptoms of crusted scabies are thick, crusted lesions on the cells keratin layer of the stratum corneum occurs thickening of its layer abnormal (hyperkeratosis) mixed with thousands of *S.scabiei* eggs, feces, and skins. The lesions in crusted scabies can be scattered over the the entire surface of the skin or focal confined to the scalp, face, palms or soles of the feet. Complaints of itching are rare usually found there is usually no itching at all. There are differences between classic scabies and clinical manifestations crusted scabies (Table 1).(Sungkar S, 2016)

Table 1. Differences of Clasical Scabies and Crusted Scabies

Characteristic	**Clasical Scabies**	**Crusted Scabies**
Lesion	Papule, vesicle, pustule Between the fingers and toes,	Thick and large hyperkeratotic.

Predilection	folds skin such as elbows, armpits, breasts, and buttocks, shoulders, back, inguinal and genital.	Palms and feet, scalp, ears, elbows and knees
Pruritus	Heavy itch, especially at night	Light itchy
Amount of Mite	<20 mites from all over skin surface	4000 mites per gram skin especially in the lesions crusted

Epidemiological data shows the number of cases of scabies crustosa suffered by sufferers with neurological defects major such as Down's syndrome or neuropathy due to Hansen's morbus and diabetes mellitus. This fact is one of the basics theory of massive *S.scabiei* proliferation in crusted scabies is a consequence neglect of sufferers who have impaired perception sensory to stimuli itching and immune system deficiency. Defects sensory in lepers prevents the effective elimination of mites because scratching can remove mites mechanically. In addition, secondary infection by bacteria also produces pus which are acaricides so that it can limit the number of mites. Because of the large number of mites in people with scabies crustosa, no surprisingly, there are frequent epidemics in people in around it. Cause of death in crusted scabies sufferers is a secondary infection by bacteria. (CDC, 2018)

crusted scabies is related to the effectiveness of the immune system. Patients generally have high serum IgA levels low, high levels of IgE and IgG and peripheral eosinophilia. Levels low serum IgA is associated with secretory IgA levels in skin and predisposes and supports the environment conducive to scabies infestation. Another possibility is vulnerability host unique or specific to mites. Skin hypersensitivity against mites is also a predisposing factor for its unusual manifestation. crusted scabies is more prominent in lepers lepromatose compared to other types of leprosy due to deficiency immunology in leprosy, especially lepromatous type. Sufferers Lepromatous leprosy usually gets corticosteroid therapy further suppress the immune system. The number of mites is more on lepromatous leprosy patients, but there is no significant difference on the number of mites among the three types of leprosy.(David JS, 2013)

Diagnosis

The clinical diagnosis of crusted scabies is based on clinical manifestations and distribution types of the lesions are therefore clear and characteristic, however the definitive diagnosis remains based on the finding of mites from scraping the lesions. The characteristics of crusted scabies are crusted skin lesions, hyperkeratosis, together, mild itching or even no itching complaints. The most common locations are the hands, feet, elbows and armpits. Colored scale typical like creamy color. Skin scrapings for the diagnosis of crusted scabies are performed using the following way. Initially identify the location of the marked crusted lesion with thickened and scaly skin then disinfection is carried out using 70% alcohol. Gently scrape the skin using sharp scalpels to form an angle of 90 degrees. Noteworthy that when doing scrapings, the skin should not bleed because can cause infectious complications. The results of skin scrapings are accommodated in containers such as petri dishes. If the location of the skin is properly crusted, it will be easy to collect. Do not scrape the skin rush, the more samples collected, the more increased accuracy of diagnosis. Next, send a sample of skin scrapings to the laboratory to be checked. If on microscopic examination found mites then a definite

diagnosis of scabies can be made but if the test result is negative, it hasn't been ruled out diagnosis and examination will need to be repeated for multiple lesions specific for crusted scabies.(Walter B, 2018)

To make a diagnosis of crustose it is important to pay attention medical records. Patients who have had or are being infected with scabies crustosa is susceptible to disease throughout his life. Sufferers are often hospitalized for frequent crusted scabies relapse. Therefore, it is important to read medical records carefully to find out the history of diagnosis and hospitalization as well know the history of the severity of the patient with scabies crustosa. Sufferers crusted scabies is a source of transmission, therefore if there is an outbreak of scabies or a family history of recurring scabies it is necessary to suspect the possibility of crusted scabies. The differential diagnosis of crusted scabies is generally a disease another skin that manifests as hyperkeratosis on the sole hands and feet. The differential diagnosis is psoriasis, keratoderma blenorrhagic, follicular keratosis, dermatitis chronic eczematous, pityriasis rubra pilaris, lymphoma and erythroderma crusted.(Sungkar S, 2015)

Treatment

crusted scabies therapy is using 5% permethrin cream or 1% benzene hexachloride gamma. How to use the same with the classic scabies treatment it is necessary to convey that cream applied not only from the neck down but throughout the body including the head, the back of the ears, face, palms, the soles of the feet and the skin under the toenails. crusted scabies usually not immediately cured with one treatment takes 3-4 treatment times until the patient is completely cured and mites were no longer found. The important thing regarding crusted scabies treatment is administration antibiotics to treat frequent secondary infections by bacteria accompanying or when there are comorbids. Keratolytic drugs such as sour cream 5-10% salicylates can be used as an adjunct to scabicide therapy. With proper use of keratolytics, thick crusts will soften and easier to peel off.(Sungkar S, dkk, 2015)

To increase the effectiveness of the drug, a rating scale for crusted scabies sufferer. The scale was developed on year 2002 based on skin examination then classified into the light, medium, and heavy categories. Rated aspect includes the distribution and area of crust, thickness of crust, degree of fissure and pyoderma, as well as a history of previous episodes. Values 4-6 are categorized degrees 1, grades 7-9 degrees 2, and grades 10-12 degrees 3.(Sungkar S, dkk, 2015)

Table 2. Rating Scale for Crusted Scabies Patients

Distribution and Area of Crusts 1. Wrist, between the fingers, and soles of the feet (<10% of the area body surface area) 2. To the forearms, lower legs, buttocks, torso, or 10-30% of body surface area) 3. Up to the scalp or> 30% of body surface area
Crusts 1. Light crusts (thickness <5mm) 2. Medium (5-10mm thickness) 3.High (thickness> 10mm)
Skin Conditions 1. No fissure or pyoderma 2. Multiple pustules and / or pain and / or superficial fissures 3. Deep fissures to bleeding and purulent exudates large
Previous Episode History 1. Never experienced 2. Hospitalized 1-3 times for crusted scabies OR depigmentation in the elbows and knees

3. Was hospitalized more than 4 times because of scabies crusted OR depigmentation to upper limbs, back or there is a history of ichthyosis

People with scabies crustosa often suffer from pain for a lifetime life because of stigma and often avoid health workers. Therefore, for the therapy to be successful there are things that are necessary be noticed. The first action that needs to be done is to identify sufferer's worry because worry can hinder treatment compliance. Anxious sufferers are placed in a ward isolated in hospital, feeling a burden on the family because of the whole family members must be treated, fearing that it will cost a lot and worry that the treatment will fail again because they have experienced it therapy failure.(Sianturi I, 2014)

The second action is to cooperate with the sufferer and family to plan treatment accordingly. Error which often occurs in the management of crusted scabies are officers health seldom or do not take the time to visit family at home. Another mistake is not focusing on the protocol treatment clinic before establishing a good relationship with family, did not explain in detail about the disease, severity, and the importance of adherence to preventing relapse. Other than that, health workers do not approach the maker decisions in the sufferer's family to ensure compliance treatment of all family members.(Sianturi I, 2014)

The third action is to start therapy. Ideally all sufferers crusted scabies was hospitalized for therapy especially 2-3 severity levels because of the risk of sepsis and infection. For sufferers who are first diagnosed, it is important to look immune deficiency or other underlying disease. For treatment crusted scabies at home, topical therapy should be under supervision health workers. The treatment given for crusted scabies is acidic lactate and topical urea cream. How to use the drug is given daily to moisturize the skin but not given along with scabicide cream. After being given lactic acid and urea cream, the next day the patient takes a shower and soaks in water warm then rubbed with a sponge to remove crusts. After it was given permethrin daily in the first week. In the child on under 12 years of age given diluted benzyl benzoate. Therapy it is applied after bathing and after drying the skin. Every day clothes, bed sheets, pillowcases, bolsters, clothes and linens others should be washed and dried in the hot sun.(Sianturi I, 2014)

Whole Home Treatment

To build trust, understanding and success therapy, health workers need to make home visits. crusted scabies sufferers were treated every day for one week whereas people who had contact with people with scabies crustosa were only given scabisida on the first day. First-line scabies therapy crustose as follows.

1. Permethrin 5%. Awarded for people with aged crusted scabies more than 2 months until adulthood. Cream is applied thinly onto whole body including head and face except eyes and mouth, then left for the night. For babies less than 2 months can be given krotamiton and should not be given permethrin.(Sungkar S, dkk, 2015)

2. Benzyl benzoate. This drug kills the mites faster than permethrin is thus preferred, but benzyl benzoate has a side effect of a burning sensation will disappear by itself within 15 minutes so sufferers should be educated before use and tried a little first on the skin. Benzyl benzoate is given to children aged 2-12 years and adults. People with scabies who are less aged from 2 years old can be given permethrin and those aged less than 2 months given krotamiton. Benzyl benzoate is applied from the neck down and left overnight.(Anderson BM, 2015)

Factors to consider in the treatment of crusted scabies

Good relationship between health workers and sufferers as well families can be built by taking the time to talk and explain the benefits of treatment that will be obtained such as reduce pain and improve sleep quality. Explanation especially aimed at senior family members who often become decision maker on the family. Choose the right day where everyone family members can attend for example in the afternoon after school or work. Treatment was started at the first visit with gives an example of applying cream in the right way. Young children generally feel afraid of initial treatment so treatment should be started from an older person or mother who gives medicine to her child. Family members are asked to help each other smear or remind when to taking drugs. Next is to convince the sufferer that what what health workers do is confidential because every time families may not want family members to be found out undergoing scabies therapy.(Sungkar S, 2016)

Before starting therapy, the patient must be informed consent. Scabicide application to children should be done by his parents. Make sure you apply the cream between your fingers hands and feet, under the nails, soles of the feet, and buttocks. Medicine is left on overnight and if washed in water, the basting needs to be repeated. Use scabicide cream all over the body overnight is uncomfortable so sufferers and their families need to be convinced that the key treatment success is adherence to treatment by the rules. After that, it is necessary to screen every child and other family members. Take note of the person who has scabies then referred to a health service for therapy. If family agrees, plan for community service at home. Each member families are encouraged to dry clothes, sheets and mattresses underneath sunshine regularly.(Sungkar S, 2016)

Long term planning is important for maintaining the plan prevention of recurrence so that sufferers and their families are free from scabies. Make sure the availability of drugs according to patient needs because withdrawal of medication can be the cause of patient recurrence. Therapy regular prophylaxis should only use benzyl benzoate because use of permethrin as regular prophylaxis can cause resistance. Patients should not share a bed with other people other. (Sungkar S, 2016) A description of continuing therapy in crusted scabies is summarized in Table 3.

Table 3. Continuing Treatment for Crusted Scabies

Relaps Risk and Severity	**Assessment**	**Re-examination**	**Prevention**
Mild-medium	- Location of skin crusted <5% area body surface - Score score 0-3 before being treated	Each month (check all skins including the buttocks)	- Use of acids lactate / urea in the area crust every day - Applying benzyl benzoate if needed after exposure scabies. Watch it drug administration
High	- Location of crusts at legs, buttocks, torso or> 10% area body surface - Score> 3 and or depigmentation of the legs or back or residual	Every 2 weeks (check all skins including the buttocks)	- Use of acids lactate / urea in the area crust every day - Applying benzyl benzoate starting from neck down

	thickening of the skin with / ichiosis		every 2 weeks - Applying benzyl benzoate asap after exposure scabies

Recurrence is common with scabies crustose. Therefore, it detects, provides treatment immediately, and not giving up easily is necessary prepared. Don't forget to involve your family in solutions problems because family is part of the treatment. Cause most frequent recurrences are not all family members get and do therapy, don't or forget to apply the infested areas, especially the buttocks, are out of stock cream for treatment, as well as guest visits that turned out to be too have scabies. This situation can spread scabies to the whole household so that the availability of scabies cream and promotions treatment for the family needs to be further improved. If scabies there is still a report to the response team so that you can monitored more closely. If until this stage the treatment has not been also successful don't blame the family. Every action controls that don't work should be corrected immediately and when one of the identified causes of failure, it is necessary re-administration of scabbicides. Apart from that the level of awareness towards hygiene, population involvement, government monitoring role, provision of clean water, and failure of health programs had a major effect on the increase in cases of scabies.(CDC, 2018)

Decontamination

In decontamination crusted scabies is very important because the number of mites is very much so it has a high potential to become medium of transmission. In the case of crusted scabies in a house sick in Glasgow collected dust samples from nightwear sufferers, sheets, floors, and furniture as much as two bags ago counted the number of S.scabiei and eggs found per gram dust. The predominant dust sample contained skin epithelial flakes humans following crusting found 6312 mites per gram of dust. Almost all stages of mite development, starting from eggs until gravid female mites are found in the sample and most of the mites are in the epithelial pile. Sample other dusts containing less skin epithelial flakes and crusting obtained 472 mites per gram of dust. Mites inside the dust sample is dead because the mites cannot survive for long after being released from the host. Human scabies mites can live and remains infectious for up to 96 hours outside the host environment with conducive temperature and humidity but at a temperature of 25OC mites generally die after 24 hours outside the host.(Fernandez, 2012)

Health workers need to be instructed on how to decontaminate comprehensive coverage for crusted scabies and contacts nearby as part of therapy. Decontamination needs to be controlled by those who better understand and are authorized to guarantee cessation of the scabies transmission process. All clothes and fabrics who have been in contact with sufferers before and during therapy must be sterilized by heating. A sofa, chair, or mattress coated fabrics should be ironed, vacuumed and steam cleaned hot. When shaking the fabric, mites can fly off and direct contact with skin so it is better to use personal protective equipment such as gloves, aprons and masks. Furniture made from other than fabric, such as leather or plastic, can wiped and sprayed with insecticide. If using a vacuum cleaner, for example to decontaminate floors and walls, spray it insecticide to the area to be cleaned so that the vacuum cleaner not infested with scabies and a medium of transmission. The outside part the vacuum cleaner must also be sprayed with insecticide.(Fernandez, 2012)

CONCLUSION

Based on the description above it can be concluded that scabies is still a public health problem in Indonesia. The existence of scabies is influenced by various things namely age, sex, level of cleanliness, use of personal tools together, density of occupants, level of education and knowledge about scabies, local culture, and socio-economy. However, this can be avoided by primary, secondary and tertiary prevention.

REFERENCES

1. Sungkar S. Norwegian Scabies. Maj Kedokt Indon. 2015;39(3):169–71
2. One Disease. Managing crusted scabies in remote aboriginal communities. 2019. [diakses 3 September 2020]. Diunduh darihttp://1disease.org/ wp-content/uploads/2019/07/ Crusted-Scabies-guide-2019_final1.pdf
3. Davis JS, Mcgloughlin S, Tong SYC, Walton S, Currie BJ. A novel clinical grading scale to guide the management of crusted scabies. Plos Negl Trop Dis. 2013;7(9):E2387.
4. Sungkar S. Skabies: Etiologi, Patogenesis, Diagnosis, Pencegahan dan Pemberantasan. 2016. Jakarta: Balai Penerbit Universitas Indonesia.
5. California Department of Public Health Division of Communicable Disease Control. Prevention and control of skabies in California long-term care facilities. 2018 [Diakses pada 3 September 2020]. Diunduh dari:http://www.cdph.ca.gov/pubsforms/guidelines/documents/ prevconofskabies.pdf
6. Walter B, Heukelbach J, Fengler G, Worth C, Hengge U, Feldmeier H. Comparison of dermoscopy, skin scraping, and the adhesive tape test for the diagnosis of scabies in a resource-poor setting. Arch Dermatol.2018 ;147(4):468-73.
7. Sungkar S, Agustin T, Menaldi SL, Fuady H, Herqutanto, Angkasa H, et al. Effectiveness of permethrin standard and modified methods in scabies treatment. Med J Indones. 2015;23(2):93-8.
8. Sianturi I, Sungkar S. The relationship between hygienic practices towards scabies infestation in a boarding school of East Jakarta.EJKI. 2014;2(2):357-41.
9. Anderson BM, Haughen H, Rasch M, et al. Outbreak of scabies in Norwegian nursing homes and home care patients; control and prevention. J Hosp Infect. 2015;45:160–4.
10. Fernández-Sánchez M, Saeb-Lima M, Alvarado-de la Barrera C, Reyes-Terán G. Crusted scabies-associated immune reconstitution inflammatory syndrome. BMC Infect Dis. 2012;12(1):323.