

CLINICAL CHARACTERISTICS AND TREATMENT OUTCOMES OF ADULT PATIENTS WITH SCABIES INFECTION: A RETROSPECTIVE COHORT STUDY

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Abstract. Scabies infestations are relatively common. We aimed to identify the clinical manifestations, factors associated with infestation and treatment outcomes by treatment type among adults presenting to the treatment hospital in order to guide future scabies management efforts at the treatment hospital. We retrospectively reviewed the charts of patients aged ≥ 13 years diagnosed with scabies infestation treated at Siriraj Hospital, Bangkok, Thailand during 2011-2015. A total of 157 patient charts were reviewed. Four patients were excluded from the analysis due to incomplete data. The mean age of the 153 remaining subjects was 43.5 years; 69.9% were males. The most common signs and symptoms were pruritus (86.9%), rash (86.9%) and papules (70.1%). The most commonly affected sites were the web spaces between fingers and toes (60.1%) and the genitalia (59.5%). Four treatment regimens were prescribed: oral ivermectin monotherapy (17.6%), topical benzyl benzoate monotherapy (34.6%) and a combination of oral ivermectin, topical benzyl benzoate (26.1%) and other treatments (21.7%). Of the 107 patients who returned for follow-up, oral ivermectin gave a cure rate of 85%, the combination treatment gave a cure rate of 76% and topical benzyl benzoate alone gave a cure rate of 71.8%, there was no significant difference in cure rates among these three treatment groups ($p=0.635$). There was no significant difference in median time to cure among the 3 treatment regimens ($p=0.231$). Our study found no factors associated with cure. Therefore, no treatment regimen tested is preferred above the other regimens tested. Further studies regarding cost, patient acceptability of treatment and patient compliance with treatment are needed to determine if there are other factors that could significantly affect the recommended treatment regimen.

Keywords: scabies, oral ivermectin, treatment outcomes, clinical manifestations

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INTRODUCTION

Scabies is a contagious skin infestation with an intensely pruritic papular rash (Chosidow, 2000). It is diagnosed by a skin scraping showing mites, eggs or feces on microscopy (Shimose and Munoz-Price,

2013). Ivermectin is the only proven effective oral treatment (Scheinfeld, 2004). Topical permethrin cream is recommended first line therapy (Shimose and Munoz-Price, 2013) but not available in some developing countries, including Thailand.

Topical treatment failure has been increasingly reported (Hay *et al*, 2012; Strong and Johnstone, 2007). Data about the clinical manifestations and comparisons of treatment outcomes of scabies infestations among adults in Thailand is limited. Therefore, we aimed to identify the clinical manifestations, factors associated with infestation and treatment outcomes by treatment type among adults presenting to the treatment hospital in order to guide future scabies management efforts at the treatment hospital.

MATERIALS AND METHODS

Inclusion criteria for study subjects were those aged ≥ 13 years who presented to Siriraj Hospital, Bangkok, Thailand during January 2011-December 2015 and were diagnosed with having scabies infestation based on a positive microscopic examination for scabies. The medical records of these patients were retrospectively reviewed for this study. For the purpose of this study, "cure" was defined as either "clinical cure", in which the signs and symptoms of scabies resolved or "laboratory cure", in which no scabies mites, eggs or feces were detectable on microscopy. Patients with incomplete data were excluded from the study. This study was approved by the institutional ethics committee, Siriraj Institutional Review Board (Si 605/2016).

The data recorded included age, sex, number of affected sites, skin findings, presence of scabies among family members and immune status categorized into

immunocompetent and immunocompromized, which included HIV infected patients or patients receiving chemotherapy or immunosuppressive therapy.

Demographic data, clinical characteristics and laboratory findings were analyzed with descriptive statistics. Associations between treatments and cure were evaluated with the chi-square test and univariate logistic regression analysis. The Kaplan-Meier curve, log rank test, and Cox regression analysis were used to evaluate the association between treatment and time to cure. A p -value ≤ 0.05 was considered statistically significant. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) software program for Windows, version 18.0 (IBM, Armonk, NY).

RESULTS

A total of 157 charts of patients diagnosed with scabies infestation at the study hospital during the study period were reviewed. Four patients were excluded from analysis due to incomplete data, leaving 153 cases reviewed for the study; 69.9% males. The subject characteristics, clinical findings, microscopic examination results and cure rates for the study subjects are summarized in Table 1. The most common symptoms of scabies infestation reported by subjects were pruritus (86.9%), rash (86.9%) and papules (67.3%). Skin burrows were only seen in 4.5% of study subjects. The mean length of symptoms prior to presenting to the study hospital was 8.7 weeks. The most common skin areas affected were the web spaces between the fingers and toes (60.1%) and the genitalia (59.5%). Skin scrapings for microscopy revealed mites with or without eggs or feces in 69.2%. Among the 69.9% of subjects who returned for follow-up, the overall

Table 1
Baseline characteristics, clinical findings, microscopy results and cure rate among 153 study subjects.

Variables	Number of patient (%)
Male sex	107 (69.9)
Mean age in years \pm standard deviation	43.5 \pm 24.7
Immunocompromised status	15 (9.8)
Symptoms	
Itching	133 (86.9)
Rash	133 (86.9)
Pain	1 (0.01)
Signs ($n=147$)	
Papules	103 (67.3)
Plaques	36 (23.5)
Patches	25 (16.3)
Pustules	7 (4.5)
Burrows	7 (4.5)
Crust	6 (3.9)
Vesicles	4 (2.6)
Ulcers	2 (1.3)
Erosions	1 (0.7)
Duration of symptoms prior to treatment, number (SD)	8.7 (14)
Affected sites	
Head and neck	9 (5.9)
Upper extremities	39 (25.5)
Hand	43 (28.1)
Trunk	80 (52.3)
Axilla	35 (22.9)
Umbilicus	32 (20.9)
Genitalia	91 (59.5)
Buttock	24 (15.7)
Lower extremities	53 (34.6)
Foot	15 (9.8)
Interdigital webs	92 (60.1)
More than 6 body sites affected	15 (9.8)
Microscopy results	
Mites	13 (8.5)

Table 1 (Continued)

Variables	Number of patient (%)
Mites and eggs	20 (13.1)
Mites and feces	6 (3.9)
Mites, egg and feces	68 (44.4)
Eggs	17 (11.1)
Feces	12 (7.8)
Eggs and feces	17 (11.1)
Scabies infection in other family members	27 (17.6)
Family members received treatment	50 (32.7)
Cure among study subjects ($n=107$)	83/107 (77.5)
Clinical cure	14/83 (16.9)
Laboratory cure	44/83 (53.0)
Both clinical and laboratory cure	25/83 (30.1)

SD, standard deviation.

cure rate was 77.5%.

Of the 153 study subjects, 17.6% were treated with oral ivermectin monotherapy (200 μg /kg body weight as a single dose), 34.6% were treated with topical 10% benzyl benzoate (applied for 8 hours, and repeated after 7 days), 26.1% were treated with a combination of oral ivermectin and topical 10% benzyl benzoate and 21.7% were treated with other regimens (Table 2). There were no significant differences in characteristics, percentage failure to follow-up or cure rates by treatment group. Of the 107 patients who returned for follow-up, oral ivermectin gave a cure rate of 85%, combination treatment gave a cure rate of 76% and topical benzyl benzoate alone gave a cure rate of 71.8%. There was no significant differences in cure rates among the three groups ($p=0.625$). There were no significant differences in time to cure among the treatment regimens ($p=0.231$, Fig 1). No studied baseline facts (sex, age, immune status, symptoms) were significantly associated with cure or me-

dian time to cure on univariate analysis (Tables 3 and 4).

DISCUSSION

Several studies have reported an increasing incidence of scabies infection and scabies treatment failure (Strong and Johnstone, 2007; Hay *et al*, 2012). A randomized controlled trial of oral ivermectin in uncomplicated scabies revealed occurrence with topical permethrin cream (Strong and Johnstone, 2007). Similar to our study, another study found no factors significantly associated with cure or treatment failure (Brooks and Grace, 2002). However, patient compliance was not examined in our study. Further studies are needed to evaluate this factor.

In our study, oral ivermectin and topical benzyl benzoate had showed, similar cure rates. A study from Vanuatu, in the South Pacific found a scabies cure rate at three weeks of 51% with 10% benzyl benzoate and 56% with a single oral dose of

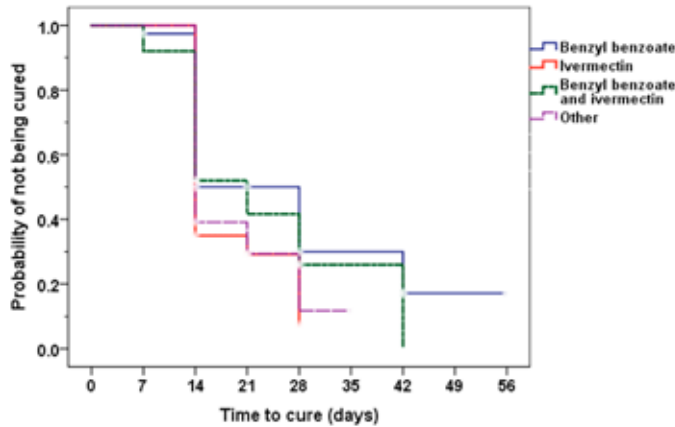


Fig 1-Kaplan-Meier curve of median time to cure by probability of not being cured ($p= 0.231$).

Table 2
Baseline characteristics and cure rates by treatment group.

Characteristics	Treatment regimens				p-value
	Oral ivermectin (n=27)	Topical benzyl benzoate (n=53)	Oral ivermectin and topical benzyl benzoate (n=40)	Others (n=33)	
Male, No. (%)	20 (74.1)	39 (73.6)	23 (57.5)	25 (75.8)	0.258
Age in years, No. (%)					
< 21	7 (25.9)	12 (22.6)	12 (30.0)	9 (27.3)	0.814
21-40	5 (18.5)	16 (30.2)	8 (20.0)	11 (33.3)	
41-60	8 (29.6)	9 (17.0)	7 (17.5)	5 (15.2)	
≥ 60	7 (25.9)	16 (30.2)	13 (32.5)	8 (24.2)	
Immunocompromised status, No. (%)	3 (11.1)	7 (13.2)	4 (10.0)	1 (3.0)	0.467
More than 6 body sites affected, No. (%)	1 (3.7)	7 (13.2)	5 (12.5)	2 (6.1)	0.477
Live mites found on microscopy, No. (%)	18 (66.7)	36 (67.9)	32 (80.0)	21 (63.6)	0.483
Scabies infection in other family members, No. (%)	4 (14.8)	12 (22.6)	5 (12.5)	6 (18.2)	0.616
Family members received treatment, No. (%)	4 (14.8)	20 (37.7)	14 (35)	12 (36.4)	0.184
Loss to follow-up, (%)	7/27 (25.9)	14/53 (26.4)	15/40 (37.5)	10/33 (30.3)	0.805
Cure rates, No. (%)	17/20 (85)	28/39 (71.8)	19/25 (76)	19/23 (82.6)	0.625

Table 3
Univariate analysis of factors associated with scabies treatment cure among study subjects ($n=107$).

Factors	Number	Cure No. (%)	Crude OR	95% CI	<i>p</i> -value
Sex					
Male	70	53 (75.7)	1		
Female	37	30 (81.1)	0.53	(0.27-1.95)	0.528
Age groups in years					
< 21	23	17 (73.9)	1		
21-40	27	20 (74.1)	1.01	(0.28-3.58)	0.990
41-60	25	17 (68)	0.75	(0.21-2.63)	0.653
> 61	32	29 (90.6)	3.41	(0.7515.44)	0.111
Immunocompromised					
No	94	73 (77.7)	1		
Yes	13	10 (76.9)	1.04	(0.26-4.20)	0.952
Treatment					
Benzyl benzoate	39	28 (71.8)	1		
Ivermectin	20	17 (85)	2.23	(0.54-9.13)	0.267
Ivermectin and benzyl benzoate	25	19 (76.0)	1.24	(0.39-3.94)	0.710
Others	23	19 (82.6)	1.87	(0.52-6.74)	0.341
Duration of symptoms prior to treatment (Days)					
< 15	21	19 (90.5)	4.02	(0.80-20.28)	0.092
15-28	49	38 (77.6)	1.46	(0.55-3.87)	0.445
> 28	37	26 (70.3)	1		
Number of affected sites					
< 6	98	78 (79.6)	1		
≥ 6	9	5 (55.6)	3.12	(0.7712.70)	0.112
Scabies infection among family members					
No	88	70 (79.5)	1		
Yes	19	13 (68.4)	0.56	(0.19-1.67)	0.296
Family members receiving treatment					
No	70	54 (77.1)	1		
Yes	37	29 (78.4)	1.07	(0.34-2.81)	0.884
Live mites found on microscopy					
No	30	23 (76.7)	1		
Yes	77	60 (77.9)	1.074	(0.39, 2.93)	0.889

OR, odds ratio; CI, confidence interval.

Table 4
Univariate analysis of factors associated with median time to cure.

Factors	Number	Median time to cure (in days)	Crude OR	95% CI	<i>p</i> -value
Sex					
Male	70	17	1		
Female	37	7	0.953	(0.61-1.49)	0.834
Age groups in years					
< 21	23	14	1		
21-40	27	21	0.72	(0.37-1.38)	0.320
41-60	25	14	0.68	(0.35-1.35)	0.273
> 61	32	14	0.75	(0.41-1.40)	0.373
Immunocompromised					
No	94	14	1		
Yes	13	28	0.96	(0.50-1.87)	0.911
Treatment					
Ivermectin	20	14	1.52	(0.82-2.81)	0.187
Benzyl benzoate	39	28	1		
Ivermectin and benzyl benzoate	25	21	1.21	(0.68-2.18)	0.518
Others	23	14	1.44	(0.79-2.63)	0.229
Symptom onset (Days)					
< 15	21	14	1.76	(0.97-3.19)	0.064
15-28	49	14	1.47	(0.88-2.43)	0.138
> 28	37	28	1		
Number of affected sites					
< 6 sites	98	14	1		
> 6 sites	9	28	1.87	(0.75-4.63)	0.177
Scabies infection among family members					
No	88	14	1		
Yes	19	14	1.19	(0.66-2.15)	0.567
Family members receiving treatment					
No	70	14	1		
Yes	37	14	1.03	(0.66-1.63)	0.885
Live mites found on microscopy					
No	30	14	1		
Yes	77	14	0.82	(0.51-1.33)	0.425

OR, odds ratio; CI, confidence interval.

ivermectin, which were not significantly different. (Makigami *et al*, 2011). Another study found no significant difference in cure rates between oral ivermectin and topical benzyl benzoate (Haar *et al*, 2014).

In our study, we found no significant difference in the time to cure among the studied regimens. However, a study from Japan found adding ivermectin orally in combination to topical agents significantly shortened time to cure (Ichikawa *et al*, 2013).

Areas not explored in our study were patient acceptability and compliance with treatment since topical regimens may be more difficult to comply with or unacceptable to some patients. We also did not explore differences in cost of the various regimens.

There were several limitations in this study: it was a retrospective chart study and some data was missing, the sample size was small, only ivermectin orally and benzyl benzoate were explored and 30% of the subjects did not follow up. The results might have been different with a larger study population and more complete data and follow-up.

In conclusion, there was no significant difference in cure rates or time to cure among the tested treatment regimens. Therefore, no treatment regimens tested is preferred above the other regimen tested. Further studies regarding cost, patient acceptability of treatment and patient compliance with treatment are needed to determine if there are other factors that could significantly affect the recommended treatment regimen.

CONFLICTS OF INTEREST

All authors have neither conflicts of interest nor financial supports from the drug companies.

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