

The Efficacy of Vitamin A Supplement in the Treatment of Scabies

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Abstract

Scabies is a debilitating contagious parasitic skin disease caused by a tiny mite (Sarcoptes scabiei) treated with the acaricides. Vitamin A supplementation is indicated in management of parasitic infestations in human. This study aimed to assess the effect of vitamin A supplementation as "add on therapy" on the cure rate and quality of life (QoL) in scabies patients treated either with permethin or benzyl benzoate lotions. A total number of 120 patients (66 males and 54 females), their ages ranged from 3 to 82 years were enrolled in this study. The clinical symptoms and signs were assessed according to their severity, location, lesion types and numbers. The severity of pruritus assessed by visual analogue scores (VAS). The Arabic version of Dermatology Life Quality Index for children and adults was applied to assess the impact of scabies on (QoL). Patients randomly sub-grouped to receive a single dose of 2500 IU vitamin A supplement to one application permethin lotion (5%) or two applications benzyl benzoate lotion (25%) and were followed-up for one week. Vitamin A supplementation improve the cure rate non-significantly in patients treated with permethin lotion (86.7% versus 66.7%, $p > 0.05$) whereas reached to the significant level in patients treated with benzyl benzoate lotion (76.7% versus 43.3%, $p < 0.01$), respectively. Permethin reduced the mean of total QoL scores in adult by 43.8% and after using vitamin A to 35.1% while benzyl benzoate reduced the mean scores in children by 40.6% and by 34.4% after using vitamin A. It concludes that vitamin A as an "add on therapy", in scabies, is a promising way to improve the cure rate and the quality of life within short period.

Keywords: Scabies, vitamin A, cure rate, quality of life

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INTRODUCTION

Scabies is a debilitating contagious skin disease caused by a tiny mite (*Sarcoptes scabiei*) treated with the acaricides. In one randomized study included 404 patients, two topical applications of permethrin (2.5% cream) provided a cure rate of 63.6% at the 2-week follow-up, which increased to 86.3% at the 4-week follow-up after repeating the treatment [1]. Other study included 103 patients treated with permethin (5% cream), or benzyl benzoate (25% lotion), a cure rate of 100% was observed after two weeks of treatment whereas others showed that the overall cure rates of benzyl benzoate lotion were 59 and 86% after two and four weeks treatment, respectively [2, 3]. The differences in the cure rate were attributed to the socio-demographic characteristics and the severity of disease. The quality of life (QoL) is impaired

in adult and children patients suffered from scabies and the degree of impairment increased in parallel to the degree of itching and scabies severity [4]. In one study using the Dermatology Life Quality Index (DLQI), the domain 1 (symptoms and feelings) and 5 (personal relationships) scored higher than other domains in scabies patients [5].

Vitamin A (retinol) is an essential nutrient which cannot be synthesized by humans and it is necessary for normal physiological functions. It plays a role in vision, growth and development of embryo, regulation of epithelial cells proliferation and differentiation, immune competence, reproduction and proper functioning of the adult brain [6–8]. Topical retinoids are used in management of dermatological diseases e.g. acne vulgaris, lichen sclerosus, warts [9–11]. The rational of

this study is the beneficial effect of vitamin A supplementation in management of parasitic infestations in human [12]. Therefore, this study aimed to assess the beneficial effect of vitamin A supplementation as "add on therapy" on the cure rate and quality of life in scabies patients treated either with permethin or benzyl benzoate lotions.

MATERIALS AND METHODS

This study was conducted in Department of Pharmacology, College of Medicine, Anbar University in cooperation with Consultant Clinic of Dermatology and Venereology, and the Laboratories of Ramadi Teaching Hospital in Anbar governorate, Iraq from November 2012 to June 2013. The study approved by the Institutional Scientific Committee and a consent form was obtained from each patient prior to the enrollment into the study. The patients were allowed to discontinue the study whenever there was no clinical response, reported serious adverse reactions and for other social or personal non-medical causes. The study was designed to be randomized, uncontrolled double blind clinical trial using several therapeutic drugs modalities that recommended and approved for treatment of scabies and vitamin A supplement as "add on therapy". The diagnosis was achieved by consultant dermatologists and patients were randomly grouped to receive medications and followed-up by the consultant dermatologists.

The eligible cases were both genders and with age extremities presented with scabies. The clinical diagnosis of scabies was achieved according to the presence of the following signs and symptoms: history of contact or family history of scabies, intense pruritus particularly at night, presence of borrows (linear papules between fingers), typical secondary skin lesions (papules, nodules, excoriations, crusts, or folliculitis) in characteristic sites, and gross scaling with hyperkeratotic plaques and fissuring. The criteria of exclusion include: skin diseases other than scabies, history of autoimmune diseases (e.g., systemic lupus erythamatos, diabetes mellitus or other serious medical illnesses), history of drugs intake including corticosteroids and non-steroidal anti-inflammatory drugs, pregnancy or breast feeding and patients with recurrent scabies

treated with anti-scabies therapy within the preceding one month.

Demographic characteristics and medical history were obtained from each patient. Each patient was examined by consultant dermatologist and the researcher. The clinical symptoms and signs were assessed according to their severity, location, lesion types and numbers. Itching (or pruritis) classified as intermittent, continuous or nocturnal and its severity was scored by using the visual analogue scores (VAS) as prescribed by Reich et al. [13]. The distribution of scabies lesions were identified in respect to the following human body sites: head, upper arms, lower arms, abdomen, chest, buttock, genitalia, and in between fingers or toes. The lesion types were identifies as: burrows, vesicles, papules, nodules and crust. The lesion numbers were classified as: mild (≤ 10 lesion), moderate (11–49 lesion), severe (≥ 50 lesion).

The Arabic version of Dermatology Life Quality Index (DLQI) for children and adults was used to measure how much scabies has affected the quality of life (QoL) of each patient on of QoL-Scabies for children and adults [14,15]. The DLQI for children (CDLQI) was analyzed under six domains: symptoms and feeling, leisure, school and holidays, personal relationships, sleep and treatment. While the DLQI for patients over 16 years old [ACDLQI] was analyzed under six domains: symptoms and feeling, daily activities, leisure, work and school, personal relationships, and treatment. The patient or his/her peroxy is interviewed by the research and asked to answer the ten questions of DLQI in which the scores ranged from 0 (non-relevant) to 3 (very much affect the life). The severity banding of DLQI scores are: no effect at all on patient's life (0–1), small effect (2–6), moderate effect (7–12), large effect (13–18), and extremely large effect (19–30).

A total number of 120 patients (66 males and 54 females) their ages ranged from 3 to 82 years were enrolled in this study. They randomly sub-grouped, according to the drug therapy, into the following groups:

Group IA (n=10): treated with single topical application of permethin lotion (5%) Group IB:

treated as above (Group IA) plus single oral dose of vitamin A (2500 IU) Group IIA: treated with two topical applications of benzyl benzoate lotion (25%) Group IIB: treated as above (Group IIA) plus single oral dose of vitamin A (2500 IU)

Topical treatment consisted of a thorough bath followed by application of benzyl benzoate lotion or once [for permethin lotion] to the entire body below the neck and repeated daily for two consecutive days [for benzyl benzoate]. Subjects were instructed to wash their clothing and bed linens in hot water. The patients were followed-up for one week and the efficacy of treatments assessed and the unwanted effects of drug therapy were reported. The criteria of cure included absence of pruritis and no new scabies lesions were observed. Quality of life index was assessed before and after treatment. All the drugs were purchased from local markets.

Statistical Analysis

The results are expressed as number, percent, range, median and mean± SD. The data were analyzed using the programs: Excell 2007 and SPSS version 10. The hypothesis was tested using non-paired and paired two tailed student's "t" test, one way ANOVA test, and differences between percentages tests taking the probability of ≤ 0.05 as the lowest limit of significance.

RESULTS

A total of 120 patients were recruited. Their mean (± SD) age was 26.4±15.8 years (range, 3–70 years); 66 (55%) were male, and 54 (54%) were female. About one-third [30%] of the patients were children 4–16 years of age. There were no significant differences in the residency or occupation of patients in each treated group (Table 1). Of 120 patients, 50 (41.7%) lived in crowded places and the majority of cases have a history of contact with infested subjects (Table 1).

Table 1: Characteristics of the Study.

Characteristics	Group IA (n=30)	Group IB (n=30)	Group IIA (n=30)	Group IIB (n=30)
Gender (M:F)	20:10	15:15	16:14	15:15
Age (Year)				
≤ 16	10	8	12	6
M:F	9:1	4:4	6:6	3:3
>16	20	22	18	24
M:F	11:9	11:11	10:8	9:15
Residency				
Rural	14	9	12	11
Urban	16	21	18	19
Occupation				
Housewife	8	10	7	8
Labor	6	5	8	6
Employee	4	3	2	5
Students	7	9	9	9
Kids	4	2	4	0
Military	1	2	0	2
Living (crowded)	12	13	12	13
History of contact				
Family	18	19	26	24
Current				
Home	22	24	25	24
School	0	2	0	0
Office	3	3	4	0
No contact	5	1	1	6
Previous history				
Scabies	5	7	6	4
Medical diseases	0	1	2	1
Drug intake	0	1	2	1

The results are expressed as number

Previous medical history of scabies reported in 18.3% (22 out of 120 patients) and two patients were hypertensive and treated with captopril (Table 1). Of the 120 patients, 78 (54.1%) had nocturnal itching with longstanding duration which reached to the median value of 37.5 days in Group IIA (Table 2). There was no significant difference

in pruritis score between each corresponding treatment (Table 2). Other than Group IIB patients, the number of scabies lesions distributed over than six sites in the body and there were no differences in the nature of scabies lesion between different treated groups (Table 2).

Table 2: Assessment of Clinical Presentation of Scabies.

	Group IA (n=30)	Group IB (n=30)	Group IIA (n=30)	Group IIB (n=30)
Itching				
Intermittent	02	03	0	03
Continuous	10	06	12	06
Nocturnal	18	21	18	21
Duration of itching (day)	26.2±17.3 (20)	25.1±19.3 (20)	52.43±35.8 (37.5)	28.0±25.2 (14)
Pruritis score	8.5±4.3 (8)	7.9 ±1.6 (8)	8.53±1.61 (9)	8.6±2.01(10)
Sites (Number)				
0-3	1	0	3	11
4-6	8	9	11	12
> 6	21	21	16	7
Lesion type				
Burrows	10	5	5	4
Vesicles	8	20	11	5
Papules	28	30	30	30
Nodules	13	15	10	4
Crust	0	0	0	0
Severity				
Mild	04	04	06	13
Moderate	19	14	14	10
Severe	07	12	10	7

The results are expressed as number, mean ± SD (median)

Of the 120 patients, 26 (21.7%) had severe scabies with a higher number in patients Group IB followed by Group IIA whereas about half (47.5%) of cases had moderate lesion (Table 3). Table 3 shows that vitamin A supplement improves non-significantly the cure rate achieved by permethin lotion (86.7%

versus 66.7%, $p > 0.05$) whereas; significantly improves the cure rate that achieved by benzyl benzoate lotion (76.7% versus 43.3%, $p < 0.01$). Each treatment significantly reduced the pruritis score and vitamin A supplementation adds further reduction in pruritic score (Table 3).

Table 3: Effect of Anti-scabies Drugs and Vitamin A Supplements on the Severity, Pruritis Score and the Reported Adverse Reactions after 1 Week Follow up.

	Group IA		Group IB		Group IIA		Group IIB	
	Before treatment	Before treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Severity								
Mild	04	09	04	03	06	8	13	7
Moderate	19	01	14	0	14	8	10	0
Severe	07	0	12	01	10	1	7	0
Cure	-	20 (66.7)		26 (86.7)		13 (43.3)		23(76.7)**
Pruritis score	8.5±4.3	1.4±1.4*	7.9 ±1.6	1.3±2.4*	8.53±1.61	3.433±3.1*	8.6±2.01	2.57±2.9*
Adverse drug reactions		17 (56.7)		14 (46.7)		30		30

The results are expressed as number (%), mean ± SD. * $p < 0.001$, ** $p < 0.01$ compared with corresponding "before treatment" group

Adverse reactions in term of burning sensation and erythema were present in 56.7% of patients treated with permethin and non-significantly reduced to 46.7% after vitamin A supplementation whereas; these adverse reactions were reported in all patients treated with benzyl benzoate (Group II A and B). Headache is a recognized adverse effect of patients received vitamin A supplementation

(Group IB and II B). Permethin therapy significantly reduced the scores of domains that interfered with the quality of life in children and a further improvement in these scores were observed after using vitamin A as "add on therapy" (Table 4a). In adults, vitamin A supplement does not offer further advantages on domain school and work (Table 4b).

Table 4(a): Effect of Permethin Lotion and Vitamin A as "Add on Therapy" to the Permethin Lotion on the Domains of Quality of Life in Children.

Quality of life domains	Group IA		Group IB	
	Before treatment (n=10)	After treatment (n=10)	Before treatment (n=8)	After treatment (n=8)
Symptoms and feelings	3.8±1.23	0.4±0.52*	5.5±0.53	0.5±0.76*
Leisure	2.3±1.42	0.7±0.48**	2.88±0.35	1.0±1.07*
School or holidays	0±0	0±0	0.75±1.4	0.375±1.06
Personal relationships	1.3±1.16	0±0**	2.62±1.19	0.125±0.35*
Sleep	2.5±0.97	0±0*	3.0±0	0.125±0.35*
Treatment	-	1.4±0.7		1.38±0.52
Total	9.9±2.51	2.4±1.71*	14.38±1.92	3.5±2.2*

Table 4(b): Effect of Permethin Lotion and Vitamin A as "Add on Therapy" to the Permethin Lotion on the Domains of Quality of Life in Adults.

Quality of life domains	Group IA		Group IB	
	Before treatment (n=10)	After treatment (n=10)	Before treatment (n=8)	After treatment (n=8)
Symptoms and feelings	4.75±0.79	0.8±0.83*	4.68±1.13	0.73±1.51*
Daily activities	2.55±1.36	0.8±0.7*	2.82±1.26	0.68±1.04*
Leisure	1.05±1.19	0.15±0.49*	0.68±0.89	0.18±0.50***
work and school	1.65±1.63	2.25±1.33**	1.23±1.51	1.363±1.53
Personal relationships	1.9±0.91	0.35±0.59*	1.55 ±1.22	0.23±0.87**
Treatment		1.1±0.85		0.82±0.5
Total	11.75±2.55	5.15±2.18	11.0±3.2	3.86±3.47**

The results are expressed as mean±SD, *p<0.001, **p<0.01, ***p<0.05 compared with before treatment scores.

Permetin alone reduced the mean of total domain scores in children (from 9.9 to 2.4) and in adult (from 11.75 to 5.15) i.e., reduced to be 24 and 43.8%, respectively. Vitamin A supplementation reduced these percent to 24.3 and 35.1% in children and adult, respectively.

Also, vitamin A supplementation with benzyl benzoate therapy improves the scores of domains of quality of life in children (Table 5a) but not in adult particularly in leisure domain (Table 5b).

Table 5(a): Effect of Benzyl Benzoate Lotion and Vitamin A as "Add on Therapy" to the Benzyl Benzoate Lotion on the Domains of Quality of Life in Children.

Quality of life domains	Group IIA		Group IIB	
	Before treatment (n=12)	After treatment (n=12)	Before treatment (n=6)	After treatment (n=6)
Symptoms and feelings	4.42±1.08	1.75±2.14**	5.17±0.98	0.67±1.03*
Leisure	3.08±0.79	1.33±1.61*	1.33±0.82	0.17±0.41***
School or holidays	0.25±0.87	0±0	1.17±0.98	0±0**
Personal relationships	1.75±0.75	0.5±0.9*	0.33±0.52	0±0
Sleep	2.75±0.45	0.67±0.98*	2.67±0.82	0±0*
Treatment		2.67±0.49		2.83±0.41
Total	12.33±2.35	5.0 ±3.25*	10.67±2.88	3.67±1.51*

Table 5(b): Effect of Benzyl Benzoate Lotion and Vitamin A as "Add on Therapy" to the Benzyl Benzoate Lotion on the Domains of Quality of Life in Adults.

Quality of life domains	Group IIA		Group IIB	
	Before treatment (n=18)	After treatment (n=18)	Before treatment (n=24)	After treatment (n=24)
Symptoms and feelings	5.44±0.78	2.56±2.23*	4.67±1.0	1.71±1.94*
Daily activities	2.89±1.32	1.0±1.19*	1.5±1.31	0.92±1.28**
Leisure	0.89±1.13	0.44±0.92***	0.125±1.45	0.0±0.0
work and school	1.17±1.5	1.5±1.54	2.08±1.38	2.0±1.44
Personal relationships	1.28±1.18	0.5±0.86**	1.25±1.45	0.38±0.77**
Treatment		2.28±0.67		2.04±0.62
Total	11.75±2.55	5.15±2.18*	9.5±2.84	6.79±3.84**

The results are expressed as mean±SD, * $p < 0.001$, ** $p < 0.01$, *** $p < 0.02$ compared with before treatment scores.

Benzyl benzoate alone reduced the mean of total domain scores in children (from 12.33 to 5.0) and in adult and (from 11.75 to 5.15) i.e., reduced to be 40.6 and 43.8%, respectively. Vitamin A supplementation reduced these percent to 34.4 and 71.5% in children and adult, respectively.

DISCUSSION

The results of this study show that single dose vitamin A improves the cure rate of single application of permethrin twice applications of benzyl benzoate after one week follow-up. The scores of domains that interfered with the quality of life were improved after using vitamin A particularly in children. Nocturnal itching is the most common clinical symptoms and the variety of skin lesions are similar to those reported by others [16]. Burrows are considered as pathognomonic sign of scabies infestation were reported only in 20%. Although the duration of disease showed inter- and intra-group, the pruritic scores of each group did not show significant differences in between groups prior to the treatment. It is well known that several therapeutic models were used in management of scabies. These include topical applications of permethrin, γ benzene hexachloride, sulfur in petrolatum, crotamiton, malathion, allethrin, and benzyl benzoate in different strength and pharmaceutical preparations whereas ivermectin is used as on oral dosage form [17].

In this study, two topical applications were used; permethrin because it is considered as first line therapy for scabies and it is safe in children and the benzyl benzoate as an alternative and less cost effective [18,19]. In

this study topical permethin achieved high cure rate than corresponding benzyl benzoate (66.7% versus 43.3%) after one week follow up.

These percents are similar to those reported by others taking in considerations the strength and the dosage of pharmaceutical preparations and the duration of treatment [3, 20]. Complete recovery from scabies was observed after 3–4 weeks treatment [1]. Adverse reactions in term of contact dermatitis were observed in higher percent in benzyl benzoate-treated group compared with permethin-treated group. Permethin improves all the domains of QoL in children and adults while benzyl benzoate did not significantly improve the "work and school domain" in adults. In this study the mean ± SD score was higher than that reported by Jingang et al. who reported 10.09 ± 5.96 score but within the same range (score 7–12) that scabies moderately affect the quality of life [5]. Vitamin A supplementation proved to have a beneficial effect in management of parasitic infestations like malaria [21].

The results of this study show that vitamin A improves the cure rate in benzyl-benzoate treated group and its effect on the QoL is well observed in children whereas it is marginal in adults. The possible explanation of these findings may be related to the synergistic effect of vitamin A with anti-parasitic medication or to its effect on the immune system [21]. Vitamin A improves the innate immunity, enhances antibody response, and promotes the profile of anti-inflammatory mediators [22–24]. One of the limitations of this study is the use of single small dosage.

CONCLUSION

It concludes that the use of vitamin A as an "add on therapy" is a promising way for improving the cure rate and the quality of life within short period.

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