

Hematological and Epidemiological Study for Patients Infected With Scabies

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Abstract

The current study conducted 250 clinically suspected cases of scabies infection and 30 cases of healthy patients who attended Al- Hakim Hospital and AL-Zahra Hospital in AL-Najaf province during the period from November 2016 to May 2017. This study is designed to determine the incidence of scabies in suspected clinical cases in the city of Al-Najaf by using a microscopic methods (light and electron) to determine the prevalence of this parasite and to provide an integrated picture of specialists, especially doctors and researchers, on the development of some blood standards in people infected with this parasite so that they can treat their patients.

After the direct microscopy tests for the diagnosis of parasite, the results of infection were 56 (22.4%) respectively, and varied according to gender, males were 34 (13.6%) and females 22(8.8%) respectively. While the number and percentage of infection after testing the technique of PCR were in males 40 (16%) and in females 20 (8%).

The study also examined the effect of some factors on the spread of this parasite, the most important being the education level and the socio-economic status. The number of infection percentage were 30 (50%) and 19 (31.66%) in the case of low socio-economic status and uneducated persons, respectively, while 1 (1.66%) in the good and the people at the university stage respectively.

The total number of white blood cells was significantly higher ($P < 0.05$) in males and females compared to control group due to the increase in the percentage of neutrophil and eosinophil, while the results showed no change in monocyte, lymphocytes and Basophil cells.

The current study shown that the blood parameters of hemoglobin levels and packed cell volume were significant decreased ($P < 0.05$) in *Sarcoptes scabiei* patients in compared to control group. Whereas red blood cells count was non-significant ($P > 0.05$) in *S. scabiei* patients compared to control group.

We concluded from the current study that the infection of scabies influences on the some blood parameters such as PCV, hemoglobin and total and differential leukocytes in patients infected with scabies.

Keyword: Scabies, PCV, Najaf, Leukocyte.

INTRODUCTION

Sarcoptes scabiei is important obligate ectoparasites that lives and reproduces in the epidermis of skin for human and many mammalian hosts and causing scabies disease which lead to significant human and animal morbidity and mortality (Larry *et al.*, 2016).

Secondary infection may be occurring by scabies disease due to *Streptococcus pyogenes* and *Staphylococcus aureus* therefore scabies disease should not be neglected because it is quite high pathogenicity, the have many clinical manifestation such as irritation, redness of the skin, itching and hypersensitivity reactions and these not appear after 4-8 weeks, The incidence of scabies influences by many factors such as low personal hygiene, low socioeconomic, unhygienic circumstances, reduced ventilation ,dirty environment and very high density(Mika *et al.*, 2012; Engelman *et al.*, 2013; Yahmi *et al.*, 2016).

Even though seen of mites may not be easy the diagnosis of *S. scabiei* depend on the microscopic demonstration of mites and their eggs on skin scrapings (Ghubash, 2006; Janina *et al.*, 2016). Morphological identification is not suitable for diagnosis of *Sarcoptes* mites due to its small sized configuration (<0.4mm) and restricted morphological differences ,PCR is a main and accurate diagnosis method used in detection of parasites due to its sensitivity allows enzymatic amplification of gene fragments from small quantities of parasite material, which used for isolation, analysis of whole parasite genomes, identification of disease , host-parasite interactions and immunology (Walton, 2004 ; Shumaila *et al.*, 2013).

MATERIAL AND METHODS

Detection of *Sarcoptes scabiei* by light and electron microscope

Surgical needle was using to open a burrow with a straight cutting and then scrapped longitudinally with a sharp border of a lancet. The material thus obtained was mounted on a glass slide with a drop of mounted media (KOH + Glycerin 1:1) and examined under low power microscope (Samina *et al.*, 2016)

Blood Specimens collection

Five ml was the total blood collected from each clinical suspected person with *S. scabiei* infection and healthy persons as control group by disposable syringe, 4.5 ml of blood kept at room temperature for 30 minutes. The blood samples have been centrifuged at 3000 rpm for 5 minutes to isolated of serum and have been collected in other sterile tubes, each sample of serum was distributed into sex parts; each of them was kept in deep freeze at -20C °until used for serological test and other part of blood 0.5 ml from each of blood samples were drawn in EDTA tubes for Haematological Assessments. From each patient the scarping skin sample which used to DNA extraction for molecular study.

Hematological Methodology

Procedure

Differential count was performed by using CYANHemato analyzer (automatic hematology analyzer. Catalog No.CY006, Diagnostic, Langdorpsesteenweg 160, B-3201 Belgium).

RESULTS

Incidence and detection of *Sarcoptes scabiei*

The parasite was identified after examinations of the scraping skin specimens by using light and electron microscopic method, the number and percentage were fifty six 56 (22.4 %) respectively, 34 (13.6%) male and 22 (8.8%) female, as revealed in table (1), patients were infested by distinguishing ova, larva and adult of *Sarcoptes scabiei* as seen in figures (1), (2) and (3).

Table 1: Incidence of *Sarcoptes scabiei* among suspected patients.

Method	Patient population	No.	Positive cases		Negative cases	
		Exam.	No.	%	No.	%
Light and electron microscope	male	150	34	13.6	116	46.4
	female	100	22	8.8	78	31.2
	Total	250	56	22.4	194	77.6



Fig. 1: *Sarcoptes scabiei* ova in skin scraping at (X40)



Fig. 2: *Sarcoptes scabiei* larva in skin scraping at (x40)



Fig. 3: *Sarcoptes scabiei* adult in skin scraping at (X40)

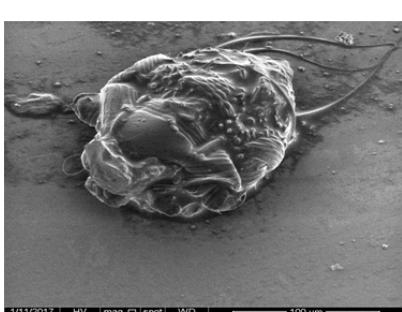


Fig. 4: Electron microscopic scanning of *Sarcoptes scabiei* adult in skin scraping.

Socio-Economic status and Education level

The results of the current study shown the occurrence of *S. scabiei* infestation was the highest in the Illiterate persons who had the number and percentage of 30 and 50% respectively. Flowed by low standard of living 19 and 31.66 % respectively. Then persons who had school education 5 and 8.33% respectively, and at intermediate level was 4 and 6.66% respectively, and the lowest incidence of infection was in person who have high school and college education and good Socio-economic status that were equal in percentage rate 1 and 1.66 % respectively, as seen in Tables (2) and (3).

Table 2: The relationship between Education Level and Infestation with *Sarcoptes scabiei*.

Level of Education	Positive cases	
	No.	%
High school and College	1	1.66
Primary Schools	5	8.33
Illiterate	30*	50

*The highest infestation with *Sarcoptes scabiei*.

Table (3): The relationship between the Socio-economic Status and Infestation with *Sarcoptes scabiei*.

Standard of living	Positive cases	
	No.	%
Good	1	1.66
Intermediate	4	6.66
Low	19*	31.66

* The highest infestation with *Sarcoptes scabiei*.

Blood parameters

The results of the current study revealed no differences in red blood cells count in male and female infestation with *S. scabiei* compared to the healthy group, whereas as a significant decrease ($P < 0.05$) in the concentration of hemoglobin and packed cell volume in male and female infestation with *S. scabiei* compared to the healthy group as shown in Table (4).

Table 4: Comparison between Blood Parameters in Patients infestation with *Sarcoptes scabiei* and Control Group.

Blood parameters	Patients male (n=28)	Control group of male (n=14)	Patients female (n=16)	Control group of female (n=8)
PCV (%)	30.806 \pm 0.715*	38.838 \pm 0.049	32.839 \pm 0.073*	39.979 \pm 0.198
Hb g/dL of blood	8.978 \pm 0.142*	14.021 \pm 0.304	9.041 \pm 0.802*	13.021 \pm 0.890
RBCs $\times 10^6$ /mm ³	4.631 \pm 0.083	5.098 \pm 0.092	4.737 \pm 0.082	4.959 \pm 0.190

* Significant difference $P < 0.05$ between patients and control group.

Leukocyte Count

Differential Leukocytes Percentage %

The result of differential type of leukocytes identified significant increase ($P < 0.05$) in neutrophil and eosinophil in patients suffering from *S. scabiei* compared to control group whereas non-significant ($P > 0.05$) change in the number of lymphocyte, monocyte and basophil in patients group compared to control group, as seen in Table (5).

Total Leukocyte Count ($\times 10^3/\text{mm}^3$)

The result of study revealed significant increase ($P < 0.05$) in TLC in patients infected with *S. scabiei* parasite compared to the control group, as seen in table 4.

Table 4: Differential Leukocyte and Total Leukocyte Count Percentage in Patients Suffering from *Sarcoptes scabiei* Infestation and Control Group.

Parameters	Patients female (n=16)	Control of female group (n=8)	Patients male (n=28)	Control group of male (n=14)
Basophil %	1.098 ± 0.067	1.132 ± 0.091	1.092 ± 0.091	1.814 ± 0.073
Neutrophil %	54.981 ± 0.185	52.001 ± 0.041*	54.681 ± 0.143*	52.071 ± 0.019
Eosinophil %	6.090 ± 0.091*	4.989 ± 0.071	4.024 ± 0.170*	3.087 ± 0.065
Monocyte %	6.088 ± 0.132	6.901 ± 0.196	7.920 ± 0.019	8.954 ± 0.102
Lymphocyte %	33.081 ± 0.017	35.026 ± 0.074	33.012 ± 0.082	33.926 ± 0.074
TLC ($\times 10^3/\text{mm}^3$)	7.910 ± 0.282*	6.211 ± 0.176	7.088 ± 0.133*	5.954 ± 0.411

* Significant difference $P < 0.05$ between patients and control group

DISCUSSION

The present study revealed that relationship between the Socio-economic factor and education level of patient with scabies infestation may be due to malnutrition and low levels of public health sanitation with (Stanton *et al.*, 1987; Green, 1989; Heukelbach and Feldmeier, 2006; Zeba *et al.*, 2014). The present study agreed with study of Samina *et al.*, (2016) who recorded that scabies was more prevalent among lower and middle socio-economic classes as compared to upper classes which are in line noticed that more than 70% of their patients belonging to low socio-economic group. Also Feldmeier and Heukelbach (2009) and Ursani and Baloch (2009) recorded that illiteracy and low standard of education are the factor responsible for the distribution of scabies. Some earlier workers (Sachdev *et al.*, 1982; Feldmeier and Heukelbach, 2007; Poudat and Nasirian, 2007; Shah *et al.*, 2010; Onoja, 2013; Zeba *et al.*, 2014) also recognized overcrowding as a prominent feature for the spread of scabies. Studies indicated that more families without scabies owned the house they were living in, had electricity, good sanitary condition, belonged to well-educated families than those who apparently experienced scabies. The results of study have revealed a significant decrease in concentration of Hb and PCV in male and female patients with *Sarcoptes scabiei* infection compared to control group. While non-significantly differences RBCs count in all patients male and female infected with *S. scabiei* in compared with control groups.

This result may be due to associated with anemia at later stages of infested with *S. scabiei* parasite and may be due to disabsorption of vitamins and iron. Similar results have also been reported in rabbits and dogs with severe and short term advanced sarcoptic mange (Arlian *et al.*; 1988a, 1995; Jardim-Botelho *et al.*, 2008; Onoja, 2013).

The results also recorded a decrease in level of PCV in male and female patient with *G. lamblia* parasite compared to control group; this result may be due to decrease in mean corpuscular volume (MCV) caused by decreased level of Hb in RBCs (Hesham and Edariah, 2003; Onoja, 2013; Saleem, 2016).

The results of this study indicated a significant increase in leukocytes; these due to an increase in the number of neutrophils and eosinophil because the infection with this parasite causes stimulation immune system of host humeral and cellular (Quihui, 2010 & Quihui-Cota, 2012; Onoja, 2013).

The results conducted eosinophilia associated with patients who suffering from *S. scabiei* infection. The reason for this observation maybe attributed to allergy disorder which is one of symptoms of *S. scabiei* infection and may be due to cellular respond due to the parasite infestation. This allergy causes increase IgE antibody in blood stream and these may lead to increase in the eosinophil because the receptor of IgE found on the surface of eosinophil and mast cell in human (Prieto-Lastra, 2006; Onoja, 2013; Hiro (2014) reported that increase in eosinophil in patients with parasite could produce some kinds of allergens which could reach some a deeper layer of intestine mucosa during infection and thus cause an increase in the number of eosinophils in patients this parasite in compared with control group.

CONCLUSION

Sarcoptes scabiei has an important role in change of some blood parameters levels such as RBCs, PCV, Hb, Total and differential blood leukocytes in patient infested with scabies. Also these results provide the relationship between *S. scabiei* infestation and Socio-economic factor and education level.

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CONFLICT OF INTERESTS:

There are no conflicts of interest.

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