

## Investigation of some Hematological Parameters and the biochemical system in pupils with Dermatophytosis

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**Abstract:** The study included 125 clinically healthy pupils (group 1) and 125 clinical cases of dermatophytosis (group 2). The influence of dermatophytosis on some biochemical profiles and the haematological parameters was investigated using standard methods. No significant difference occur in the mean PCV, Total WBC, neutrophils, lymphocytes, platelets counts, and RBS level ( $P>0.05$ ) but the ESR, Eosinophils counts, serum protein and serum albumin recorded a statistically significant values in the dermatophytic pupils when compared to the control group. Our findings suggest a possible relationship between some hematological parameters imbalance, biochemical system alteration and dermatophytic infection [R.R.Raheem-Ademola, B.T.Thomas, O.A.Omolade, A. Oluwadun **Investigation of some Hematological Parameters and the biochemical system in pupils with Dermatophytosis.** *Rep Opinion* 2012;4(9):67-69]. (ISSN: 1553-9873). <http://www.sciencepub.net/report>. 12

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### Introduction

Dermatophytosis are diseases caused by fungi that infect the superficial keratinized tissues such as the hair, skin and the nails (Jawetz *et al.*, 2001) and are caused by three genera of fungi collectively known as dermatophytosis (Weinstein and Berman, 2000). The disease is widespread and economically important as it a major public health problem (Karapehliyan *et al.*, 2007). Infection is usually limited to the cornified layers of the skin (Gudding and Lund, 1995). Following infection, skin response is mild to severe depending on various factors, such as the host's reaction to the metabolic products of the fungus, virulence of the infecting fungus, anatomic location and environmental factors (Karapehliyan *et al.*, 2007). Crowded housing, as is seen in winter season increases the incidence of the disease (Parker and Yager, 1997). Transmission of this infection is mainly through direct and indirect contact. The direct route of transmission is from animal to man or man to man whereas indirect route could be from fomites to man (Churchill, 1997). Skin lesion characterized by oedema and vesiculation are some of the clinical signs of dermatophytic infections (Lehrer, 2001). Before now, there is a lot of debate on whether dermatophytosis can alter hematological and biochemical parameters in the affected patient (Raheem-Ademola, 2007). Information on this subject matter is scanty. In this study, we investigated the impact of dermatophytoses on the hematological and biochemical parameters of dermatophytic pupils in various primary school in Remo community, Ogun State, Nigeria. This research becomes imperative because of the increasing rate of this infections among

primary school pupils and school age children in Ogun State and of course in Nigeria.

### MATERIALS AND METHODS

The study included 125 primary school pupils suffering from dermatophytosis and another 125 clinically healthy primary school pupils without dermatophytosis. These two group of students were kept in different group throughout the entire study and their parental consent were duly sought before the commencement of the research work.

#### Hematological Parameters

The Packed Cell Volume (PCV) was determined by haematocrit centrifugation technique (Jain, 1986). The Electrolyte sedimentation rate, the differential white blood cell counts and the platelet counts were carried out using standard hematological techniques (Cheesborough, 2005). The total white blood cell was carried out manually using the improved Hawksley Haemocytometer (Takeet and Fagbemi, 2009).

#### Biochemical technique

The total serum protein was estimated using the biuret method as described by Reinhold (1953). The blood glucose was determined using glucose oxidase method (Harold, 1969). Serum albumin were determined on a spectrophotometer (Shimadzu UV-1201, Japan) using commercial kits (Bio-Merieux, France).

#### Statistical Analysis

The statistical analysis was performed using the statistical package for social sciences (SPSS) version 17. Student independent "t" test was used for the

analysis of the data. Values were expressed as Mean  $\pm$  standard deviation. The significance level was set at  $p < 0.05$

## RESULTS

The effect of dermatophytosis on the hematological parameters of some primary school pupils are summarized in table 1. There was no significant difference in the mean PCV, total WBC, neutrophil, lymphocytes and platelet counts of both the control group and the dermatophytic group ( $p > 0.05$ ).

However, the ESR and the Eosinophil counts were found to be different from that of the control group significantly ( $p < 0.05$ ). Table 2 depicts the effect of dermatophytes on the biochemical system of the primary school pupils investigated. The mean serum protein and albumin differs significantly when compared to that of the control ( $p < 0.05$ ) while no significant difference was observed between the RBS of both the control and the dermatophytic patients ( $t = 11.828, p > 0.05$ ).

**Table 1. The effects of dermatophytosis on hematological parameters of some primary school pupils**

Values are expressed as mean $\pm$ SD			
Parameters	Dermatophytic (n=125)	Control (n=125)	
PCV	33.0 $\pm$ 4.98%	40.0 $\pm$ 5.0%	NS
ESR	62.7 $\pm$ 26.74mm/hr	12.5 $\pm$ 2.54mm/hr	**
Total WBC	6,421 $\pm$ 2014/mm <sup>3</sup>	10,000 $\pm$ 5,000/mm <sup>3</sup>	NS
Neutrophils	30.97 $\pm$ 14.98%	32.5 $\pm$ 12.5%	NS
Lymphocytes	60.41 $\pm$ 14.93%	57.5 $\pm$ 12.5%	NS
Eosinophils	7.69 $\pm$ 9.95%	3.5 $\pm$ 2.5%	**
Platelets	188.72 $\pm$ 29.18/mm <sup>3</sup>	275 $\pm$ 12.5/mm <sup>3</sup>	NS

NS: Not significantly different between groups ( $p > 0.05$ )

\*\* : Significantly different between group ( $p < 0.05$ )

**Table 2: The effect of dermatophytosis on biochemical system of some selected primary school pupils**

Biochemical Parameters	Dermatophytic (n = 125)	Control (n = 125)	
RBS	77.84 $\pm$ 29.18mg/100ml	69 $\pm$ 26mg/100ml	NS
Serum Protein	7.43 $\pm$ 0.42g/100ml	7.05 $\pm$ 1.05/100ml	**
Serum Albumin	3.90 $\pm$ 0.38g/100ml	3.75 $\pm$ 0.75g/100ml	**

NS: Not significantly different between groups ( $p > 0.05$ )

\*\* : Significantly different between groups ( $p < 0.05$ ).

## DISCUSSION

Dermatophytoses remain an important public health problem among primary school pupils in Ogun State and indeed in Nigeria (Raheem – Ademola, 2007). This zoonotic disease occurs throughout the year with a higher incidence during the winter housing season (Radostits *et al.*, 1994). Some species of these organisms can be acquired directly from the soil (Fathi *et al.*, 2000). In our study, no significant difference was obtained between the mean PCV of both the control and the dermatophytic pupils. This observation is an indication that dermatophytoses does not cause anaemia, thus vindicating the dermatophyte infected group as being free of polycythaemic vera (Cheesborough, 2005). The electrolyte sedimentation rate was significantly raised in dermatophytic pupils than in the control group. This variation may be associated with changes in plasma proteins, particularly fibrinogen, immunoglobulins and C-reactive proteins (Cheesborough, 2005). Plasma proteins are good for

monitoring chronic inflammatory disease (Smith and Samadian, 1994). Electrolyte sedimentation rate is a measure of the tendency of red blood cells to aggregate and it is a time dependent analysis of infection and inflammation (Farhana *et al.*, 2009). Accelerated electrolyte aggregation is caused by large, asymmetrical plasma proteins inhibiting the negative electrical forces that normally keep the electrolyte apart (Danesh *et al.*, 2000). Although, no apparent difference occur in the mean total WBC of the control and the dermatophytic pupils, however the moderate leucopenia observed in the dermatophytic pupils may be due largely to ineffective or depressed granulopoiesis in the bone-marrow (Anosa *et al.*, 1997a). The reduced platelet counts observed in the infected group was not significant but it is a major pointer to abnormal skin and probably mucosal bleeding (Cheesborough, 2005). The total serum protein increase observed in this study could be due to increase demand for the subfraction involved in the immune responses like

Immunoglobulin M (IgM) for the control of the infection (Takeet and Fagbemi, 2001). The serum albumin is an antioxidant molecule and changes in its level may suggest pathology (Karapehlihan *et al.*, 2007). Previously, it has been reported that albumin and uric acid, along with ascorbic acid provide major contributions to the total antioxidant status in humans (Wagner *et al.*, 1987). The lack of apparent difference observed between the control group and the infected group in terms of the RBS level means that the dermatophytes may not utilize blood sugar for their metabolisms. Our findings suggest a possible relationship between some hematological parameters imbalance, biochemical system alteration and dermatophyte infection. However, in order to delineate the pathogenesis of dermatophyte infection, further studies are necessary to completely elucidate the involvement of dermatophytes in the alteration of hematological and biochemical system of dermatophytic patients.

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