



## RESEARCH ARTICLE

**SEROPREVALENCE OF PARVOVIRUS B19 AMONG SUDANESE PATIENTS WITH SYSTEMIC LUPUS ERYTHMATOSUS**Mohammed J.El-Mak<sup>1</sup>, Mohammed Abbas<sup>2</sup>, Mohammed I.ELsedig<sup>3</sup>, Khalid Enan<sup>4</sup><sup>1</sup> Microbiology Department, Faculty of Medical Laboratory Sciences, Al-Neelain University, Sudan<sup>2</sup> Medical Laboratory Department, College of Applied Medical Sciences, Salman bin Abdulaziz University, Saudi Arabia.<sup>3</sup> Microbiology Department, Faculty of Medical Laboratory Sciences, Karray University, Sudan<sup>4</sup> Microbiology Department, Faculty of Medical Laboratory Sciences, Al-Neelain University, Sudan

Accepted 20 July 2014; Published 28 August 2014

**ABSTRACT**

**Background** Parvovirus B19 is a human pathogen that may result in spectrum of clinical features range from subclinical infection to potentially fatal effects. To the best of our knowledge, there was no study published in open literature regarding the coexistence of Parvovirus B19 with systemic lupus erythmatosus (SLE) among Sudanese. The aim of this study was to determine the seroprevalence of parvovirus B19 among patients with SLE in Khartoum state-Sudan.

**Methods:** it was descriptive, cross sectional study. 90 blood samples were collected from known Sudanese patients with systemic lupus erythmatosus disease living Khartoum state in the period between April and July 2014. ELISA technique was used for detection of IgG and IgM against Parvovirus B19 in patients' serum.

**Result:** The result showed that 56.7% of SLE patients were possessing antibodies to parvovirus B12, the IgG was detected in 49% while 30% of the patients had IgM.

**Conclusion:** Parvovirus B19 infection was frequent among patients with SLE, especially in the age group between 15-25 years. We recommended the rheumatologist to investigate their SLE patients for parvovirus B19 routinely to improve the patients health since the SLE symptoms will obscure the infection with parvovirus B19 and miss diagnosis may occur.

**INTRODUCTION:**

Parvovirus B19 is a human pathogen that may result in spectrum of clinical features range from subclinical infection to dermatologic, rheumatologic, and hematologic findings, to potentially fatal effects.

The virus belongs to the family parvoviridae and the genus erythrovirus and is anon enveloped single stranded DNA virus (1). It is resistance to heat and detergent because of its small genome and lack of a membrane (2). It is the only parvovirus clearly linked with human disease. The virus itself was originally discovered in 1974, and the name B19 refers to blood bank code by which the original positive serum sample was labeled (3).

The virus is highly tropic for erythroid progenitor cells and thus is classified as an erythrovirus. In fact, complete replication of the virus has been found only in these cells (2). The cellular receptor for B19 is a globoside, also known as blood group P antigen. Clinically, this classification means that those persons lacking this

antigen on their erythroid cells are not susceptible to infection with B19 (2). The virus composes of three proteins in association with a DNA molecule. These proteins include one non structural protein in association with DNA molecule: VPI and VP2. Although not fully defined, studies have made some progress in identifying antigenic regions on these proteins (4,5). The transmission of the virus infection through the respiratory route, much less transmitted through blood and blood products transfusion (6,7). Parvovirus B19 infection is common in childhood; half of 15-year-old adolescents have specific anti parvovirus B19 antibodies. Several investigators have focused on a link between B19 infection and systemic lupus erythmatosus, the clinical features of these disease exhibits several similarities, with the presence of fever, rash, joint symptoms, and hematologic abnormalities (8-17). Acute B19 infection may not only mimic SLE but also exacerbate it (18). Investigators have taken these observations further and

have attempted to determine whether the parvovirus involved in the pathogenesis of SLE disease, such as rheumatoid arthritis. Conflicting evidence has made it difficult to draw any definite conclusions on the subject, however. Joint symptoms are the major clinical feature of the parvovirus infection. In addition, B19 infection has been reported to trigger SLE (19).

Supportive studies also have investigated SLE production, IgM B19 DNA in involved tissues. However, these studies have provided conflicting evidence. It is again believed that parvovirus B19 may serve as only one of many possible triggers (1).

Few studies were carried out on SLE and parvovirus B19 in Sudan (20-22). To the best of our knowledge, there was no study published in open literature to determine the coexistence of Parvovirus B19 with systemic lupus erythmatosus (SLE) among Sudanese.

The aim of this study was to determine the Seroprevalence of parvovirus B19 among patients with SLE in Khartoum state-Sudan.

**MATERIALS AND METHODS:**

This is a descriptive, cross sectional study performed between April and July 2014 at Omdurman and Malitary hospitals, Sudan. 90 of known cases of Sudanese patients with SLE, eight male and Eighty two female (age 15 to 63 years) were enrolled in this study. Questionnaires were used to collect the patients' data. The study was approved from the ethical committee of EL Neelain University. After appropriate ethical approval and written consent form from participants prior the commencement of the study, 3 ml of blood were collected into plain container and allowed to clot, and then serum was

separated at room temperature by centrifugation at 5000 rpm for 10 min, and kept frozen at - 20° c until immediately before assay. The IgM and IgG antibodies against parvovirus B19 in patients' samples were detected by using ELISA technique by (Euroimmune Company – Germany). the method used as recommended by the manufacturer.

Data was entered in the computer and a Statistical software package (Excel 5.0, Microsoft, Redmond, WA; and Statistical Package for the Social Sciences 20.0, SPSS, Inc., and Chicago, IL) was used for data management and analysis.

**RESULTS:**

A total of 90 patients with SLE were enrolled in the study. Eighty two (91.1%) were females and only eight (8.9%) of the patients were male. The female to male ratio was (1:10.1).

Regarding age distribution, 39 were between 15- 25years, 43 were between 26 and 35 years, and 8 were above 35 years, figure 1 shows the age distribution.

The results showed that 56.7% of the patients were seropositive, 27 (30%), 49 (54.4%) were positive for IgM and IgG antibody respectively, while 39 (43.3%) were seronegative.

Table 1 showed that the seropositivity to parvovirus B19 was common among students compared to the other groups. Furthermore, the patients with family history to SLE were found to have IgG and IgM antibodies to parvovirus B19 compared to other patients with no family history as showed in table 2. On the other hand the blood transfusion showed no effects on the seropositivity in this study.

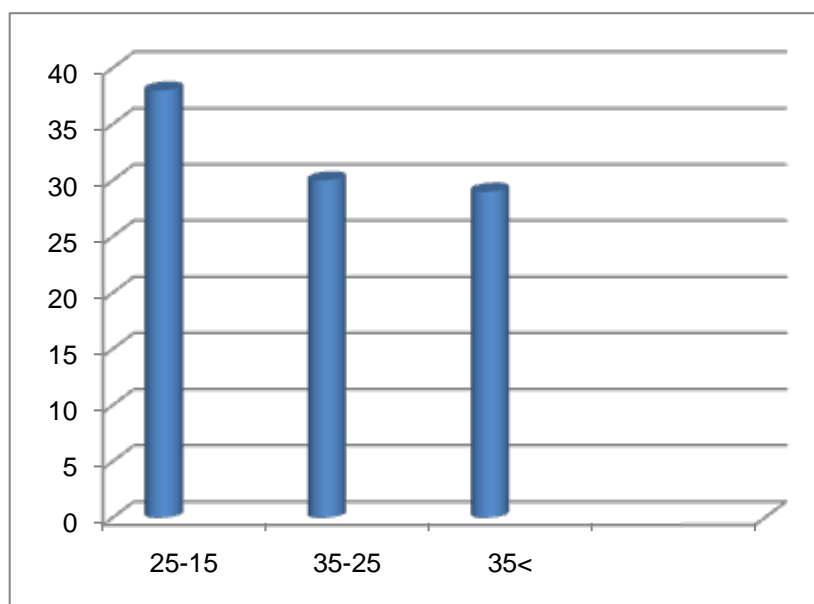


Figure 1: age group distribution among study population.

**Table 1: Distribution of study subjects according to their occupation.**

occupation groups	Results			
	IgM seropositive	IgG seropositive	IgM-IgG seropositive	Negative
Solgers	5 (5.6%)	10 (11.1%)	5 (31.3%)	6 (37.5%)
worker	6 (6.7%)	10 (11.1%)	5 (26.3%)	8 (42.1%)
students	16 (17.8%)	27 (30.0%)	15(30.6%)	21 (42.9%)
home wife	1 (1.1%)	4 (4.4%)	1 (16.7%)	2 (33.3%)
Total	28 (31.1%)	51 (56.7%)	26 (28.9%)	37 (41.1%)

**Table 2: The seropositivity to parvovirus B19 according to SLE family history.**

family history groups	Results			
	IgM seropositive	IgG seropositive	IgM-IgG seropositive	Negative
yes	22 (24.4%)	40 (44.4%)	21 (30.4%)	28 (40.6%)
no	6 (6.7%)	11 (12.2%)	5 (23.8%)	9 (42.9%)
Total	28 (31.1%)	51 (56.7%)	26 (28.9%)	37 (41.1%)

**DISCUSSION:**

The study of the correlations between parvovirus B19 and SLE is an important issue because it is so difficult to differentiate between them clinically. Globally, numbers of studies and case reports were published (8-17). The present study is the first study to determine the seroprevalence of parvovirus B19 among Sudanese patients with SLE in Sudan.

In the current study the majority of study subjects were females (89%), this result may attributed to the predominance of the SLE among females. Number of studies suggests that the sex hormones such as estrogen play roles in autoimmunity including SLE (23-26). Ballou *et al.* also noticed the high incidence of SLE among women rather than male (27).

The results of this study showed that (56.7%) of SLE patients were possessed antibodies to parvovirus B19. This result is in accordance with other studies (8-17) and opposite to the findings of Anders *et al*, they found no serological indications that SLE is linked with exposure to human parvovirus B19 (28). In Egypt, Nermine *et al* noticed the parvovirus viremia was detected in 30% of the SLE population in their study (29).

The high level of IgG was observed among the age group between 15-25 years in this study it is concordant with the results from other studies, which showed that the percentage of people with measurable levels of B19-specific IgG increases with age from 5-40% at age 1-9 years to 40-63% at age 10-18 years (30-32).

The study subjects in this age group represent the students' category in occupational group, the crowdedness and the close areas for long time of the day such as classes in schools may lead to increase the transmission of the virus from infected to non infected children.

In conclusion, the current study was the first study conducted in Sudan to determine and highlight the existence of Parvovirus B19 infection among Sudanese patients with SLE. the Parvovirus B19 infection was frequent among SLE patients, especially in the age group between 15-25 years. We recommended increasing the awareness especially in schools and society about the risk of Parvovirus B19 infection. We recommended also the rheumatologist to investigate their SLE patients for parvovirus B19 routinely to improve the patients health

since the SLE symptoms will obscure the infection with parvovirus B19 and miss diagnosis may occur.

#### ACKNOWLEDGMENTS

The authors sincerely thank the staff of the rheumatology and laboratory department at Omdurman and Military hospitals, Sudan.

#### CONFLICT OF INTEREST

The authors certify that they have no affiliation with or financial involvement in any organization or entity with a direct financial interest in the subject matter or materials discussed in this manuscript.

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