OPEN ACCESS
Saudi Journal of Biomedical Research
Abbreviated Key Title: Saudi J Biomed Res
ISSN 2518-3214 (Print) |ISSN 2518-3222 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

Prevalence of Asymptomatic COVID-19 among Medical Laboratory Science Students of Ambrose Alli University Ekpoma, Edo State, Nigeria

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DOI: 10.36348/sjbr.2022.v07i09.001 | **Received:** 19.07.2022 | **Accepted:** 24.08.2022 | **Published:** 09.09.2022

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Abstract

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome. It has been spreading rapidly worldwide, causing serious public health crisis. Although most SARS-CoV-2-infected cases have asymptomatic or mild-to-moderate diseases. This study was carried out to evaluate the prevalence of asymptomatic COVID-19 among Students of Ambrose Alli University, Ekpoma. A total of 100 Students were recruited for this study (50 males and 50 females). Ages were from 16 years upwards. 5ml of blood was drawn from each subject, 3 ml into an EDTA while 2ml was dispensed into plane tube for Elisa test of COVID-19 antibody dictation. The sensitivity and specificity of the Elisa kits used were 94.36% and 100% respectively. The full blood count was determined using Sysmex K^X 21 Haematology autoanalyzer). Results of this showed that 48% of the subjects tested positive for COVID-19 antibody, while 52% tested negative. The mean white blood cells of COVID-19 antibody positive and negative subjects revealed 5.61±1.79x10/9 and 5.30±1.37x109/l respectively. There were no significant statistical differences ($p>0.05$) in the white cell, Red cell indices of subjects positive for COVID-19 antibody when compared with those negative for COVID-19 antibody. Also result shows that those positive for COVID-19, their platelets revealed significant (<0.001) lower count 234.1 ±151.1 x109/l when compared with those who were negative (250.0±152.7 x109/l). The study concludes that lymphocytes, neutrophils and mixed cell counts studied were lower in subjects positive for COVID-19 antibody while total white blood cell count was higher in positive group ($p>0.05$). There was no significant difference ($p>0.05$) in the WBC, LYM, MXD and NEUT of the subjects with respect to age and sex.

Keywords: COVID-19, Asymptomatic, Prevalence, Lymphocytes, Neutrophils.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome. December 2019, an increasing number of pneumonia cases of unknown reason emerged in Wuhan, China (Li *et al*., 2020). Analysis from nasopharyngeal swabs, sputum, lower respiratory tract samples, and blood indicated a novel coronavirus, known as 2019- nCoV (WHO, 2020). Reports have shown that Coronavirus can cause multiple system infections and mainly respiratory infections in human, such as severe acute respiratory syndrome and Middle East respiratory syndrome (Guan, Ni, Hu, Liang, Ou & He, 2020; Huang *et al*., 2020; Xu *et al*., 2020). As at March 30th, 2022, 483,556,595 confirmed cases of COVID-19 have been reported globally of which 6,132,461 people died and only a total of 11,054,362,790 have been vaccinated (WHO, 2022). On March 11th, 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic (WHO, 2020b). It has a varied clinical presentation ranging from asymptomatic/mild infection to life- threatening illness requiring multi-organ support. Since the (COVID-19) discovery, it has been spreading rapidly worldwide, causing serious public health crisis. Although most SARS-CoV-2-infected cases have asymptomatic or mild- to-moderate diseases, around 10% of those infected may develop severe pneumonia and other associated organ malfunctions (Guan, *et al*., 2020). Old age, male sex, and underlying

comorbidities are risk factors for causing severe COVID-19; however, the pathogenesis mechanisms remains unclear. However, immune perturbations were thought to play crucial roles in the COVID-19 pathogenesis. Indeed, many reports showed that lymphopenia and increased blood cytokine levels were closely associated with the development or recovery of severe COVID-19 and proposed to treat the patients by inhibiting cytokine storms.

Blood Count is a blood test used often in clinical practice. It measures several component and features of blood cell. Its main features are to review the overall health of an individual, to diagnose a medical condition, monitor a diagnosed condition or to monitor medical treatment. Some of the components include Red blood cell, white blood cell and the platelets including their indices. The coronavirus disease 2019 pandemic had led to global health emergency since it was declared by the World Health Organization (WHO) 2020. COVID-19 has brought about immense challenges to the health care systems and economics in every country, with the impact being higher in countries of the developing world (**Wang, Han & Pan, 2020**). The impact of the overall health status of an individual which is closely associated with their economy needs to be investigated and for this reason the present study is aimed at determining the prevalence of asymptomatic COVID 19 among students of Ambrose Alli University, Ekpoma on hospital posting to observe if there were changes in some of the haematological parameters in such a condition.

MATERIAL AND METHODS

Study Area

This study was carried out in Ambrose Ali Universality, Ekpoma, Edo State. Ekpoma is located at latitude $6^0$45`N to $6^0$75`N of the Equator and longitude $6^0$08`E to $6^0$13`E of the Greenwich Meridian with altitude of about 332m above sea level. It is moderately populated with the people major occupation being farming and trading. The main sources of water in the locality are rainfall and wells. It is has 2 distinct seasons, raining and dry seasons. The raining season occurs between April and October with peak in August, average rainfall ranging 150cm to 250cm. The dry season occurs between November and March with cold harmatan between December and January, average temperature of about 25`C (Aziegbe, 2006).

Study Subjects and Selection Criteria

A total of one hundred (100) students were recruited for this study which consisted of fifty (50) males and fifty (50) females and their age were from 16 years upwards.

Ethical Approval

Ethical approval was obtained from the, Health Research Ethic Committee of Ambrose Alli University, Ekpoma. Informed consent was sought from after the students before sample collection was done.

Study Design

The study design is a cross sectional survey format. The work was conducted between April 2021-May, 2021. Apparently, healthy Students of Ambrose Alli University were recruited for this study.

Blood Collection

Five milliliters (5ml) of blood was drawn from each subject into an EDTA sample bottle with a silt concentration of 1.5ml for the assessment of full blood count and COVID 19 antibody dictation.

Specimen Analysis

The full blood count was determined using Sysmex K^X 21 Heamatology autoanalyser) (Sysmex 2004). While COVID 19 antibody was detected using WANTAI SARS CoV-2 Ab ELISA which is a two-step incubation antigen "sandwich" enzyme immunoassay kit that employs the use of polysterene microwell strips that have been pre-coated with recombinant SARS-CoV-2 antigen. The patient's plasma was added, and the specific SARS-CoV-2 antibodies, if present, are captured inside the wells during the first incubation. After that, the microwells are washed to remove any unbound proteins. A second recombinant SARS-CoV-2 antigen conjugated to the enzyme Horseradish peroxidase (HRP- Conjugate) was added and the conjugated antigen binds to the captured antibody inside the wells during the second incubation. After washing the, chromogen solutions are added to the wells. The amount of color intensity was measured which it is proportional to the amount of antibody present. Wells containing the specimens negative for SARS-CoV-2 Antibodies remain colorless.

Statistical Analysis

The Statistical Package for Social Science (SPSS) version 20.0 software (SPSS Inc., Chicago, IL USA) windows was used for analysis of data and significant difference was considered when $p \leq 0.05$.

RESULTS

Clinical Characteristics of the Subjects

Table 1 shows the clinical characteristics of subjects studied. The results obtained showed that 48% of the subjects tested positive for COVID-19 antibody, while 52% tested negative. Thirty (30%) of the subjects presented with COVID-19 fever, while 70% of the subjects had no fever. On the symptoms of COVID-19, 23% experienced loss of smell, 22% experienced loss of nasal congestion and 29% experienced difficulty in breathing. Furthermore, 53% of the subjects had history of antibiotics usage. On the type of treatment received by the students, 22% used antibiotics, 16% used herbs, 32% used antimalarial and 30% used other treatments.

The mean white blood cells of COVID-19 antibody positive subjects and negative subjects revealed 5.61±1.79x10/9 and 5.30±1.37x109/l respectively. The lymphocytes were 2.37±0.86 x109/l and 2.67±0.58 x109/l, while the MXD were 0.42±0.24x109/l and 0.45±0.23x109/l., their neutrophils were 2.48±1.03x109/l and 2.49±1.00x109/l respectively. There were no significant differences (p>0.05) in the white cell parameters of subjects positive for COVID- 19 antibody when compared with those negative for COVID-19 antibody. The RBC, PCV, Hb, MCV, MCH and MCHC of subjects positive for covid-19 antibodies were 4.47±1.36 x1012/l, 0.380±.057l/l, 129±15g/l, 57.50±55.58 fl, 10.48±24.72 Pg and 31.24±11.81 g/dl respectively while those that are negative for COVID-19 antibody showed 4.26±1.47x1012/l, 0.381±0.036l/l, 125±14g/l, 41.41±69.74 fl), 10.02±24.99 Pg and 26.87±18.97g/l). For the platelet and its indices. The result shows that those positive for COVID 19, their platelets revealed significant (<0.001) lower count 234.1 ±151.1 x109/l when compared with those who were negative (250.0±152.7 x109/l. On the other hand the mean platelet volume (MPV) of the positive subjects showed higher value 11.55±1.04 than their counterpart who are negative 10.49 ±1.0. However, the platelet distribution width (PDW) showed no significant change between the positive (24.57 ± 1.45) and negative (14.25 ±1.12) subjects.

Table 1 Clinical Characteristic of the Subjects

VARIABLE	NUMBER	PERCENTAGE (%)
COVID-19 antibody		
Positive	48	48
Negative	52	52
COVID-19 Fever		
Yes	30	30
No	70	70
Loss of Smell		
Yes	23	23
No	77	77
Loss of Nasal Congestion		
Yes	22	22
No	78	78
Difficulty breathing		
Yes	29	29
No	71	71
History of Antibiotics		
Yes	53	53
No	47	47
Treatment received		
Antibiotics	22	22
Herbs	16	16
Anti-malarial	32	32
Others	30	30

Table 2: white blood cells of COVID-19 antibody positive subjects and COVID-19 antibody negative subjects

Parameter	Positive Antibody (Mean ± SD) N = 48	Negative Antibody (Mean ± SD) N = 52	t-value	p-value
WBC (x10³/µL)	5.61±1.79	5.30±1.37	0.671	0.508
LYM (x10³/µL)	2.37±0.86	2.67±0.58	1.431	0.164
MXD(x10³/µL)	0.42±0.24	0.45±0.23	0.301	0.766
NEUT (x10³/µL)	2.48±1.03	2.49±1.00	0.136	0.971

Key: p≤0.05 – Significant; p≥0.05 – Not-Significant

Table 3: Platelet count of COVID-19 antibodies positive and negative subjects

Parameters	COVID-19 Positive Antibody	COVID-19 Negative Antibody	P-value
PLATELET COUNT	234.1±151.1	250.30±152.7	<0.001*
PDW(FL)	24.57 ±1.45	14.25±1.12	0.09
MPV (FL)	11.58±1.04	10.49±1.00	<0.001*

Key: p≤0.05 – Significant; p≥0.05 – Not-Significant

Table 4: RBC of COVID-19 antibodies positive and negative subjects

Parameters	Positive (n=88)	Negative (n=32)	t value	P value
PCV (%)	38.04±5.68	38.10±3.64	0.051	0.959
HB (g/dl)	12.91±1.47	12.54±1.37	1.205	0.231
RBC (x10^6Nl)	4.47±1.36	4.26±1.47	0.719	0.474
MCV (fl)	57.50±55.58	41.41±69.74	1.307	0.914
MCH (Pg)	10.02±24.99	10.48±24.72	0.088	0.930
MCHC (g/dl)	31.24±11.81	26.87±18.97	1.505	0.118

DISCUSSION

The findings of this present study show that covid 19 prevalence of 75% (12.54±1.37 g/dl). RBC levels were also higher in subjects that have positive covid-19 antibodies (4.47±1.36 x10^6Nl) when compared with negative (4.26±1.47 x10^6Nl). Also, MCV levels were higher in subjects that have positive covid-19 antibodies (57.50±55.58 fl) when compared with negative (41.41±69.74 fl). MCH levels were higher in subjects that have positive covid-19 antibodies (10.48±24.72 Pg) when compared with positive (10.02±24.99 Pg). MCHC levels were higher in subjects that have positive covid-19 antibodies (31.24±11.81 g/dl) when compared with negative (26.87±18.97 g/dl).

The results showed a non-significant increase in PCV levels in subjects that have negative covid-19 antibodies (38.10±3.64 %) when compared with those that are positive (38.04±5.68 %). On the contrary, HB levels were higher in subjects that have positive covid-19 antibodies (12.91±1.47 g/dl) when compared with those that are negative (12.54±1.37 g/dl). RBC levels were also higher in subjects that have positive covid-19 antibodies (4.47±1.36 x10^6Nl) when compared with negative (4.26±1.47 x10^6Nl).

Also, MCV levels were higher in subjects that have positive covid-19 antibodies (57.50±55.58 fl) when compared with negative (41.41±69.74 fl). MCH levels were higher in subjects that have positive covid-19 antibodies (10.48±24.72 Pg) when compared with positive (10.02±24.99 Pg). MCHC levels were higher in subjects that have positive covid-19 antibodies (31.24±11.81 g/dl) when compared with negative (26.87±18.97 g/dl) lymphocytes, neutrophils and mixed cell counts studied were lower in subjects positive for COVID-19 antibody, total white blood cell count was higher in positive group compared with subjects negative for COVID-19 antibody, but the difference were not statistically significant (p>0.05). However, the values were within the reference range. The finding is in agreement with some previous studies (Huang *et al.*, 2020; Lindsley, Schwartz & Rothenberg, 2020; Chen *et al.*, 2020; Kazancioglu, Bastug, Ozbay, Kemirtlek & Bodur, 2021).

Kazancioglu *et al.* (2021) in their study reported lower lymphocytes, neutrophils, and basophils in subjects positive for COVID-19 antibody compared to healthy controls while Huang *et al.*, 2020 reported Lymphopoenia as a common finding in patients with COVID-19. Furthermore, neutropaenia has been reported. The in COVID-19 patients and may help predict severe prognosis (Lindsley *et al.*, 2020; Chen *et al.*, 2020). Similarly, Sun *et al.* (2020) reported lower eosinophils and lymphocytes in patients with COVID-19 compared to controls (Sun *et al.*, 2020). The low lymphocytes, neutrophil and high WBC counts found in most patients of COVID 19 infection may be used as a maker in diagnosis of this infection.

CONCLUSION

The study concludes that lymphocytes, neutrophils and mixed cell counts studied were lower in subjects positive for COVID-19 antibody compared with subjects negative for COVID-19 antibody, while total white blood cell count was higher in positive group however, the difference was not statistically significant (p>0.05). There was no significant difference (p>0.05) in the WBC, LYM, MXD and NEUT of the subjects with respect to age and sex.

CONFLICT OF INTEREST

The authors declare no conflicts of interest. The authors alone are responsible for the content and the writing of the paper.

FUNDING

This research did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

AUTHORS' CONTRIBUTIONS

*Amaechi RA and Babatope IO - Research idea and design, drafted the work
*IYEVHOBU KO - Sample and Data analysis
*Akpotuzor JO - Reviewed the write-up
*Tijani FZ and Omoruyi C. - Field work (Questionnaires administration and sampling)

ACKNOWLEDGEMENTS

The authors would like to acknowledge Dr. Ehichioya, D. for providing the Elisa kits and the enabling environment and the management of Ambrose Alli University, Ekpoma, Edo State, Nigeria for giving the ethical permission to use their students.

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