**Prothrombin time and Activated Partial Thromboplastin Time in apparently healthy COVID-19 individuals of Ambrose Alli University (AAU) Ekpoma Community in association with Malaria Parasite infection.**

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## Abstract

COVID-19 and its associated complications remain main challenge to wellness. This study is aimed at evaluating PT and APTT among apparently health COVID-19 individuals. This study took a descriptive study approach. Sixty-nine apparently healthy students of Ambrose Ali University, Ekpoma were enrolled for this study. Quick one stage method was used for the PT, Modified Kaolin was used for the APTT, while ELISA method was used for the COVID-19. Age range 20-23 years constituted majority of the studied subjects. Only 11.6% of the studied population were vaccinated. The prevalence of symptomatic COVID -19 was found to be 68.1% while asymptomatic malaria co-infection was found to be 34.8%. There was no significant difference in the PT and APTT of COVID 19 positive and negative subjects. Though we found a high level of asymptomatic covid COVID-19, There was no alteration in PT and APTT of the studied population.

**Keywords:** Prothrombin time, Activated Partial Thromboplastin Time, COVID-19 Ambrose Alli University, Ekpoma, Malaria Parasite infection.

## Introduction

Following the outbreak of pneumonia of unknown origin reported in Wuhan province in China on December 31, 2019, the World Health Organization (WHO) named the disease Coronavirus disease 2019 (COVID-19) while Coronaviridae study group of the International Committee of Taxanomy of Viruses named the pathogen sever acute respiratory syndrome coronavirus -2 (SARS –CoV-2) (Rabi *et al*., 2020; Okoriwu *et al.,* 2022). As of September 30, 2022, there have been up to 614,385,693 confirmed cases of COVID-19 and up to 6,522,600 deaths reported to WHO (WHO 2022). Similarly, there have been 265,382 confirmed cases of COVID-19 with 3,155 deaths in Nigeria (WHO, 2022). The COVID-19 pandemic has reached level of global concern and has affected socioeconomic and health services (Joseph et al., 2021 Ogar *et al.,* 2021).

The severity of COVID-19 infection ranges considerable from asymptomatic to life threatening (Araga *et al.,* 2021). Most of the patients have a favorable prognosis, but some rapidly progress to severe respiratory distress syndrome, coagulation dysfunction and multiple organ failures (Long *et al*., 2020; Guan *et al.,* 2020). The severe inflammatory state secondary to the infection leads to severe derangement of homeostasis typically observed in patients with sepsis (Panigada *et al.,* 2021).

The present study sets off to assess the prevalence of asymptomatic COVID-19 infection and associated coagulation parameters among students of Ambrose Ali University, Nigeria.

## Method
### Study population

In this study, we enrolled 69 apparently health subjects of AAU students whose COVID-19 status were unknown. These are off campus students of Ambrose Ali University. The tertiary institution is located in Ekpoma, Edo State, Nigeria.

## Sample collection, COVID-19 test and coagulation profile

About 8ml of blood was collected from the study subjects via the ante-cubital vein. Of this, 3.5ml was transferred into trisodium citrate container containing 0.5ml of trisodium citrate for coagulation studies, while 3ml was transferred into plain container for serum generation for the COVID-19 test. The remaining blood sample was transferred into EDTA bottle for malaria parasitemia assay.

Quick One Stage method was used for the prothrombin time (PT) assay while the modified Kaolin method was used for the activated partial thromboplastin time (APTT). Malaria parasetemia was assessed using thick film method. ELISA method was used for the COVID-19 assay with 94.36% and 100% sensitivity and specificity, respectively.

## Statistical analysis

Data generated in this study was analyzed using SPSS version 22. Continuous data were represented as mean and standard deviation while categorical data were represented in proportions (percentages). Alpha value was kept at 0.05.

## Results

Majority of the studied subjects were in the 20-22 age category (46.4%) followed by those in 23-25 years category (31.9%). Females constituted majority (60.9%) of the studied participants (Table 1).

Approximately 11.6% (n=8) of the study participants were vaccinated while 82.6% (n=57) were not vaccinated. About 5.8% (n=4) did not disclose their vaccination status. Most of the participants responded to use of nose mask sometimes (72.5%; n=50), while 20.3% (n=14) do use always. The majority (73.9%; n=51) of the participants observed social distancing sometimes while 17.4% (n=12) observed same always. Religious gateway (church in this case) was the major large event attended by the participants (63.8%; n=44) (Table 2).

The prevalence of asymptomatic COVID-19 among the studied participants is 68.1% while asymptomatic malaria prevalence was found to be 52.2%. COVID-19 malaria co-infection was found to be at 34.8% (Table 3).

There was no significant difference in the PT and APTT of the COVID-19 positive and COVID-19 negative subjects ($P>0.05$). Although lower values were observed in the COVID-19 positive participants (Table 4).

**Table 1: Demographic characteristics of the studied participants**

| Variable | Frequency (%) |
|---|---|
| **Age (Years)** | |
| 17-19 | 11(15.7) |
| 20-22 | 32(46.4) |
| 23-25 | 22(31.9) |
| 26-28 | 3(4.3) |
| Missing data | 1(1.4) |
| **Gender** | |
| Male | 27(39.1) |
| Female | 42(60.9) |

**Table 2: Preventive practices among studied subjects**

| Variable | Frequency (%) |
|---|---|
| **Vaccination Status** | |
| No | 57 (82.6) |
| Yes | 8 (11.6) |
| Missing data | 4 (5.8) |
| **Use of Nose Mask** | |
| Sometimes | 50 (72.5) |
| Always | 14 (20.3) |
| Never | 1 (1.4) |
| Missing data | 4 (5.8) |
| **Observation of Social Distance**(D). | |
| Sometimes | 51 (73.9) |
| Always | 12 (17.4) |
| Never | 2 (2.9) |
| Missing data | 4 (5.8) |
| **Large Event Attended** | |
| Religion | 44 (63.8) |
| Birthday | 7 (10.1) |
| Weddings | 7 (10.1) |
| Others | 7 (10.1) |
| Missing data | 4 (5.8) |

**Table 3: Prevalence of COVID-19 and asymptomatic malaria among the studied subjects**

| Population | Number positive (%) | |
|---|---|---|
| COVID-19 | 47 | (68.1) |
| Malaria parasitaemia | 36 | (52.2) |
| Malaria + COVID-19 | 24 | (34.8) |

**Table 4: Assessment of PT and APTT among the studied participants**

| | COVID19 negative N = 22 | COVID19 positive N = 47 | P-value |
|---|---|---|---|
| PT (s) | $12.64 \pm 1.92$ | $12.49 \pm 1.69$ | 0.748 |
| APTT (s) | $42.86 \pm 8.88$ | $41.06 \pm 5.59$ | 0.309 |

## Discussion

We found an asymptomatic COVID-19 prevalence of 68.1% among the studied participants. This value is similar to 71.4% reported in Port Harcourt, Nigeria (Omunakcwe et al., 2021), while another serological study on health care staff of an institution in Ibadan Nigeria (Olayanju et al., 2021) reported 45.1%. Studies outside Nigeria has reported asymptomatic COVID-19 prevalence of 80.2% in Ghana (Kenu et al., 2020), 62% in South Korea (Jung et al., 2020), 50% and 48.9% in Bahrain (Almadhi et al., 22021; Al-Qahtani et al., 2021), 57% in Iran (Shakiba et al., 2020) and 42% in China (Li et al., 2021), and the center for Disease Control (CDC) had earlier estimated that about 35% of the COVID-19 infections are asymptomatic (Omunakcwe et al., 2021). Earlier national documented data had Edo state (The area of study) in 7th position out of the 36 states and federal capital territory in terms of COVID-19 prevalence (Okoroiwu et al., 20221). Although high prevalence of asymptomatic COVID-19 has been reported in several studies in Nigeria and Africa in general, however, prevalence of severe infection have been comparatively low with respect to other regions as against earlier prediction of vulnerability of Africans owing to weak health care system and large immunocompromised population (More et al., 2017; Lone and Ahmed, 2020; Okoroiwu et al.,2021). Some experts have attributed this reality to greater youthful population in Africa (David et al., 2020; UN, 2022). Other researchers have attributed same to favorable climate (Sadaji et al., 2020). However, some researchers have reported reduced severity of COVID-19 infection in malaria endemic regions (Anyanwu, 2021; Orish et al., 2021). Nevertheless, the acquired malaria induced immunity needs more studies to establish.

We found a comparable value of PT and APTT in the asymptomatic COVID-19 positive participants and the COVID-19 negative participants. This observation shows non alteration of the coagulation system in asymptomatic state of COVID-19 infection. However, previous studies have indicated coagulation abnormalities as significant biomarkers of poor prognosis in COVID-19 patients (Al-Samkari et al., 2020; Annuziata et al., 2020; Savioli and Rocha, 2020). There have been reports of prolonged PT and APTT, increased D dimer and fibrinogen concentration, and a modest decrease in platelet count as markers of severe COVID-19 infection as well as poor prognosis (Baranovskii et al., 2021; Panigada et al., 2020; Quintana-Diaz et al., 2020).

The present study has a few potential limitations. First our sample size is small. Also, serological methods were used. However, this is the first such study in the study area. Subsequent research may establish the findings.

## Conclusion

We found a high prevalence of asymptomatic COVID-19 among the studied subjects. We also found a considerable COVID-19 malaria coinfection. We did not find coagulation alteration among the COVID-19 asymptomatic subjects as well as the COVID-19 negative subjects.

## Ethical consideration

The study was approved by the Ambrose Ali University (AAU) Health Research and Ethics Committee, Ekpoma, Edo State. Written informed consent was obtained from the study participant prior to the commencement of the study.

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