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Short Communication

Bleeding and Clotting Time in Different Blood Groups- A Pilot Study in a Nigerian Undergraduate Population

Ekpruke C.D.

Department of Physiology, University of Benin. Benin City, Nigeria

Summary: Many physiological factors such as ethnicity, sex and blood group have been proven to have roles to play in determining the bleeding and clotting time of an individual. Earlier studies had conflicting results about the bleeding and clotting time in an individual concerning physiological factors. The objective of the study was to study the bleeding and clotting time of an individual with respect to their sex and blood group. This cross-sectional study involved 134 undergraduate students between the ages of 17-25years. Blood group was determined using standard anti-sera, clotting time was determined using the capillary method while the bleeding time was determined using Duke's filter paper method. In this study, blood group B was predominant. The bleeding time and clotting time were significantly longer in females compared to those of males. The clotting time was longer in individuals with blood group O but the bleeding time among the blood groups was not significantly different. However, the subject size needs to be increased in further studies.

Keywords*: bleeding time; clotting time; blood group; male; female*

**Address for correspondence*: *damilola.ekpruke@uniben.edu; Tel: +2348034587346*

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INTRODUCTION

The time taken for a blood vessel to constrict and platelet plug formed is known as bleeding time. The time taken for the generation of thrombin which involves the actions or activations of many factors released by platelets and the damaged tissue is known as blood clotting time. These two physiological processes have been established as major ways of assessing the function of the platelet since it plays a vital role in the two processes.

There are various systems used in grouping blood. The ABO system of grouping blood remains a widely accepted system. This system was introduced by Karl in 1900 and it is based on the principle of presence or absence of antigens on red blood cell surfaces.

Many researchers over the years have reported that there is a clear relationship among blood groups, bleeding time and clotting time of an individual (Baishya *et al*., 2017; Kaur *et al*., 2015; Yasmeen *et al*., 2014). They observed that there is a lower expression of Von Willenbrand factor (vWf) in individuals with blood group O (Reddy, 2008). vWf is a glycoprotein synthesised by endothelial cells and megakaryocytes, its gene codes are located on chromosomes 12p12 and 9q34 while others found no association between bleeding time and vWf expression. Factors such as sex and race have also been implicated as having a role to play in blood clotting and bleeding time. Objectives of this study were to determine the average bleeding and clotting time in male and female young adults and also in ABO blood groups.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Department of Physiology, School of Basic Medical Sciences, University of Benin, Nigeria. 134 apparently healthy undergraduate students during the academic year of 2017/2018 in the age group of 18-25years were selected for this study after obtaining informed consent from them. Students with any history of bleeding or clotting related disorders and on medication (NSAIDs) were excluded. This study was approved by the ethical committee of the College of Medical Sciences, University of Benin, Nigeria. Results were analyzed based on their sex and blood groups.

Blood groups of the subjects were determined using standard anti-sera. This involved the exposure of blood samples to Anti-sera A and B, thereafter observed under a microscope to determine if agglutination occurred not.

Bleeding time was determined using Duke's filter paper. This method entails the pricking of the anterior surface of the forearm with a sterile lancet and the time taken for bleeding to stop was carefully observed by using a blotting paper to blot the drop of blood on that area. Thereafter, the number of blots on that paper were counted and multiplied by 30 seconds to determine the bleeding time.

Clotting time was determined using the capillary tube method. The blood sample was taken into a capillary tube after making an incision on the skin. The clotting time was determined by breaking the capillary tube after 2minutes at a length of 1-2cm at every 30 seconds until a thread-like substance (thread-fibrin) was seen

Data analysis

Data obtained were expressed in Mean ± Standard Error of Mean (SEM) and recorded using frequency and to compare the bleeding and clotting time in the various groups. The Statistical Analysis was done using Graph pad prism 5 and P-value < than 0.05 was considered to be statistically significant

RESULTS

Data of 134 subjects were analyzed. They were aged between 17-25years. Fifty (37.31%) were males and 84 (62.69%) were females (Table 1). They were further grouped based on the different blood groups of which blood group A, B, AB and O consisted of 32 (23.88%), 58 (43.28%), 26(19.41%) and 18(13.43%) subjects respectively. It was observed in this study that blood group B was more predominant followed by A, AB and O. The bleeding and clotting times in both male and female subjects as shown in Fig. 1 showed a statistically significant difference at P< 0.05. The bleeding time in Female subjects was 4.12±0.09 mins which was longer compared to that of the male that was 3.17±0.09 mins (P=0.001).

The clotting time of female subjects was 8.15±0.12 mins compared to that of the male subject which was 7.073±0.11mins. It was significantly longer in Female subjects compared to the male subjects (P=0.001).

The blood group O, using one-way ANOVA showed a significantly longer clotting time of 8.28±0.278 mins compared to the other blood groups A (7.48±0.16 mins); B (7.53±0.15 mins); AB (7.64±0.17 mins) (P value=0.02) as shown in Fig. 2. There was no significant difference (P=0.49) in bleeding time among the different blood groups as shown in Fig. 3.

DISCUSSION

Blood group B was predominant in the selected population. The prevalence of blood group B was also reported by other scientists in consonance with our study (Patil *et al*., 2013; Roy *et al*., 2011; Abhisheth *et al*.,2011). Some of these studies carried out in Nigeria showed the contrary result, it was reported that the blood group O was prevalent (Chima *et al*., 2012). The disparity in the number of subjects that volunteered for this study may be responsible for the conflicting result.

Table 1:
Showing gender percentage among students

Sex	Frequency	Percentage
Male	50	37.31%
Female	84	62.69%
Total	134	100%

Table 2:
Distribution of Blood Groups

Blood group	Frequency	Percentage
A	32	23.88%
AB	26	19.41%
B	58	43.28%
O	18	13.43%
Total	134	100%

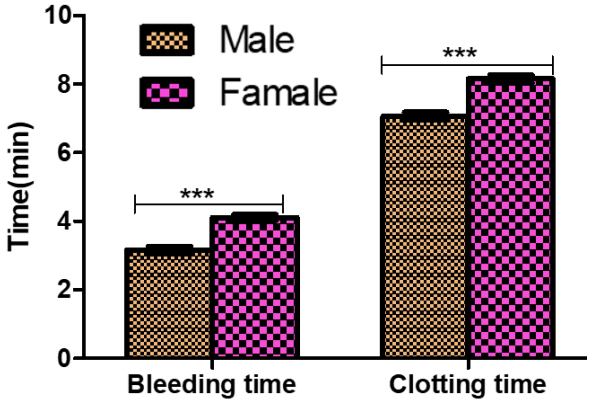

Figure 1:
A bar chart comparing the bleeding and clotting time in male and female subjects. **P < 0.05 (significant).*

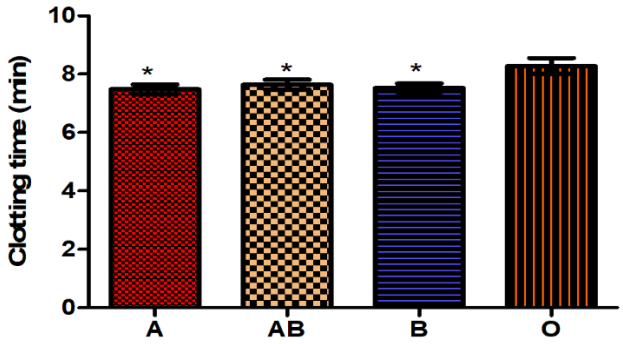

Figure 2:
A bar chart showing the clotting time in the different blood groups. *P< 0.05 (significant).

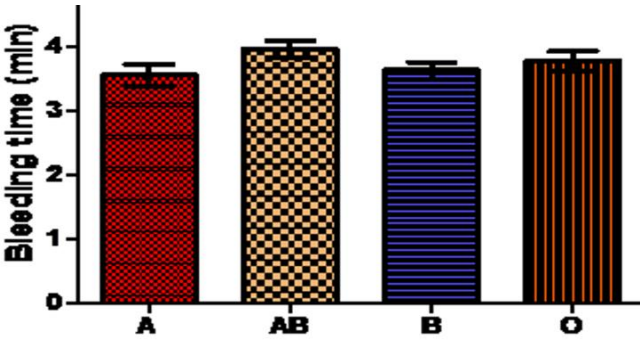

Figure 3:
A bar chart showing the bleeding time in the different blood groups.

Female subjects had longer bleeding and clotting time when compared to that of the male which was statistically significant (P value=0.001). This was in line with the report of other scientists (Baishya *et al*., 2017). Other researchers reported that there was no

relationship between the bleeding and clotting time in male and female (Mahapatra and Mishra, 2009). The presence of oestrogen in females may be responsible for the prolonged clotting and bleeding time. Oestrogen has been reported to lower the plasma level of fibrinogen thereby increasing Clotting time and dilation of blood vessels causes prolonged bleeding time (Reeta, 2017; Meena and Sunil, 2016).

Prolonged clotting time in blood group O was observed in this study and it was in line with the report of Baishya *et al*., 2017, but not in agreement with the report of other researchers which clearly stated that it was prolonged in blood group B individuals (Maharaja and Mishra, 2009) and blood group AB individuals (Yasmeen *et al*., 2014).

In the present study, a difference in bleeding time among different blood groups was not statistically significant. The prolonged clotting time in blood group O can be linked to the findings that von Willebrand factor (vWf) is higher in individuals in this group and vWf is known to play an important role in hemostasis and that its level in an individual depends on the blood group.
However, the plasma level of vWf was not estimated in this study.

In this study, blood group B was predominant while blood group O was the least dominate group among the population selected for this study. Bleeding and Clotting time were prolonged in females compared to that of the males. The clotting time in blood group O individuals was longer compared to those in the other groups while the bleeding time was not significantly different among the blood groups. However, a larger size of volunteers will be needed to confirm our findings as the number of individuals used for this study was small.

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