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Pre and Post Glucose Levels among Voluntary Blood Donors in Jos Metropolis**Obeta, M.U.^{1*}, Ejinaka, R.O.², Udoh, P.W.³, Nwapi, L.L.¹***Department of Chemical Pathology, Federal School of Medical Laboratory science, Jos-Nigeria ¹,**Department of Parasitology, Federal School of Medical Laboratory science, Jos-Nigeria ²,**Department of Haematology, Federal School of Medical Laboratory science, Jos-Nigeria ³**Author for Correspondence*: uchejesoobeta@gmail.com***Abstract**

There has been complain of dizziness and fainting after blood donation especially by first time donors in Jos metropolis. The aim of this experimental study was to investigate any variation between concentration of glucose before and immediately after blood donation. Ethical approval and written informed consent were obtained from the institution and subjects respectively. Thirty (30) volunteer blood donors were studied and the On-Call Plus glucometer (Acon Labs, USA) was used to determine the blood sugar levels. The difference in blood glucose concentration (Random Blood Sugar) in subjects before (106.20 ± 18.13) and after (103.13 ± 15.74) blood donation was not statistically significant ($p > 0.05$). There was no statistically significant difference ($p > 0.05$) in the pre-blood donation random Blood Sugar based on gender [male (109.00 ± 21.46) and female (103.00 ± 13.46)]. However, there was a statistically significant difference in the post blood donation random Blood Sugar level [male (110.00 ± 18.76) and female (95.28 ± 4.74) ($p < 0.05$). There is no significant difference in glucose level (Random Blood Sugar) before blood donation based on age [20-29 years (100.16 ± 13.98), 30-39 years (95.00 ± 4.12), 40-49 years (129.71 ± 12.89)] ($p > 0.05$). There was a significant difference after blood donation at ($p < 0.05$) as age 40-49 years had the highest level of sugar (126.28 ± 16.74) when compared to age 20-29 years (96.11 ± 5.88) and 30-39 years (96.00 ± 2.73). The study reveals that there is no significant variation in the glucose concentration (Random Blood Sugar) in subjects before and immediately after blood donation. There was a

significant difference in the post donation blood sugar level between male and female. The pre donation blood sugar level is significantly higher among older (40-49 years) blood donors. There is need for adequate care and monitoring of particularly younger and female donors. Blood donors should be adequately cared for and thoroughly observed during and after blood donation as they may have reduced sugar levels after donation which may lead to dizziness or fainting. Blood donors should be medically checked adequately before voluntary blood donation.

Keywords: *Pre, Post, Glucose, Blood donation***Running Title:** Pre and Post Glucose Concentration among Blood Donors**Introduction**

In Jos, there has been an increase in the awareness on voluntary blood donation. This is to meet up with the annual need of blood units that will take care of accident victims, post-partum haemorrhaging mothers, casualties from Boko Haram insurgency, Herdsmen and bandits attacks. Voluntary blood donation is a precious life-saving venture made by socially conscious humanitarian individual (FMOH, 2005) which is giving out some volume of blood of not more than 450mL at a time for a patient's transfusion. Globally 80 million units of blood are donated in sub-Saharan Africa. In Nigeria although half of the population in the country is medically fit for blood donation, only four in a thousand are voluntary blood donors. Since infectious diseases can be transmitted through blood

transfusion. There is an absolute requirement to source blood from a low risk population. The first step toward blood safety is to motivate voluntary, non-compensated and constant blood donor system. The national policy on blood safety supports that blood donation should be exclusively voluntary (Salaudeen and Odeh, 2011).

Obeta *et al.* (2009) observed that up to 80% of 100 blood donors visiting Jos University Teaching Hospital are now aware of voluntary blood donation. In Ilorin, Salaudeen and Odeh (2011) revealed that although the majority of respondents (Students of University of Ilorin) had good knowledge of blood donation, only a few had donated blood in the past and encouraged student union government to include voluntary blood donation in their annual activities. Uche *et al.* (2013) studied 82 regular blood donors who have donated 3-8 times to assess lipid parameters as significant low Cholesterol and LDL shows cardiovascular protection. Zheng *et al.* (2007) in their work states that high-frequency blood donation was associated with reduced iron stores and not related to changes in glucose metabolism. They added that diabetes mellitus is a well-recognized modifiable cardiovascular risk factor that is associated with increased serum ferritin levels and evidence of vascular endothelial dysfunction. Iron overload is associated with decreased insulin production, increased insulin resistance, and increased risk of diabetes mellitus.

Invariably, repeated blood donation could reduce high blood sugar caused by iron overload, however much work has not been carried out in this area. Gap in literature exists in this study area and to the best of the ability of the researchers, the study has not been carried out in Jos metropolis at the time of this study. This study therefore, provides more literature to intending researchers.

Materials and Methods

Ethical clearance was obtained from the National blood transfusion service, Jos and

health institutions where the study was conducted. The volunteers were administered written informed consent form and confirmed physically fit for voluntary blood donation by the hospital laboratories. The sample size for this study is 30 voluntary blood donors who consented to the study. Oncall Plus Glucometer (Acon Laboratories, USA) was used to test subjects for blood sugar level based on the principle of glucometer and methodology as seen in the user manual insert of 2015. Statistical analysis was carried out using percentages and t-test with carried out using a statistical software SPSS version 2017.

Results

The result of pre and post blood donation glucose concentration involving 30 voluntary blood donors is presented in Table 1 with their demographics are as shown. Effect of blood donation on glucose concentration in subject before (106.20 ± 18.13) and immediately after blood donation (103.13 ± 15.74), shows that there was no significant difference between the level of glucose before and after blood donation at ($p > 0.05$) as shown in Table 2. Effect of blood donation on glucose concentration in subject before and immediately after blood donation based on gender, shows before blood donation there was no significant difference in glucose level between male (109.00 ± 21.46) and female (103.00 ± 13.46) at ($p > 0.05$). However, there was significant difference after blood donation at ($p < 0.05$). Male had a higher glucose level (110.00 ± 18.76) compared to female (95.28 ± 4.74) as shown in Table 3. Effect of blood donation on glucose concentration in subjects before and immediately after blood donation based on age shows before blood donation there was no significant difference in glucose level between the age groups, 20-29 years (100.16 ± 13.98), 30-39 years (95.00 ± 4.12), 40-49 years (129.71 ± 12.89) at ($p > 0.05$). However, there was significant difference after blood donation at ($p < 0.05$). Age 40-49 years had the highest level of sugar (126.28 ± 16.74) compared to age 20-29 years (96.11 ± 5.88) and 30-39 years (96.00 ± 2.73) as shown in Table 4.

Table 1: Demographic variables among the subjects

Variables	Variables	Participants	Percentage (%)
Gender	Male	16	53
	Female	14	47
Age (Years)	20-29	18	60
	30-39	5	17
	40-49	7	23
	50-59	7	23
Weight (kg)	60-69	14	47
	70-79	5	17
	80 above	4	13
	Total		30 each column

Table 2: Effect of blood donation on glucose concentration in subjects before and immediately after blood donation

Treatment	Sugar (mMol/L)	df	t-value	p-value
Before	106.20±18.13	29	1.355	0.186
After	103.13±15.74			

Result is significantly different if (p<0.05); values are mean±SD; N=30

Table 3: Effect of blood donation on glucose concentration in subjects before and immediately after blood donation based on gender

Gender	Before (mMol/L)	After (mMol/L)
Male	109.00±21.46	110.00±18.76
Female	103.00±13.46	95.28±4.74
	t =0.901; df=28; p=0.375	t =3.037; df=28; p=0.008

Result is significantly different were (p<0.05); values are mean±SD; N=30

Table 4: Effect of blood donation on glucose concentration in subjects before and immediately after blood donation based on age

Age (Years)	Before (mMol/L)	After (mMol/L)
20-29	100.16±13.98	96.11±5.88 ^a
30-39	95.00±4.12	96.00±2.73 ^a
40-49	129.71±12.89	126.28±16.74 ^b
NS		

NS=No significant difference at (p>0.05); means tagged with same letter alphabet are the same otherwise are significantly different at (p=0.05); values are mean±SD; N=30

Discussions

We observed that there is no effect of blood donation on glucose concentration (Random Blood Sugar) in subjects before and immediately after blood donation considering the level of glucose before (106.20 ± 18.13) and after (103.13 ± 15.74) blood donation at ($p > 0.05$). This shows that blood donation does not affect sugar levels of blood donors provided they have eaten for the day before blood donation.

There is no gender-related difference in the pre-blood donation glucose level (Random Blood Sugar) between male (109.00 ± 21.46) and female (103.00 ± 13.46) at ($p > 0.05$) as a result of blood donation. However, there was significant difference after blood donation while comparing male and female subjects as Male had a higher glucose level (110.00 ± 18.76) compared to female (95.28 ± 4.74) at ($p < 0.05$). This could be the reason why female subjects show symptoms of fainting higher than males after blood donation especially during the first-time donation as reported previously by Damulak and Colleagues (2015). Similarly, Newman *et al.* (2003) reported that majority of females had weakness and fainting up to 25% of population under study and buttressed Newman and Roth (2005).

There is no significant difference in glucose level (Random Blood Sugar) before blood donation based on age among the age groups, 20-29 years (100.16 ± 13.98), 30-39 years (95.00 ± 4.12), 40-49 years (129.71 ± 12.89) at ($p > 0.05$). However, there was significant difference after blood donation at ($p < 0.05$) as age 40-49 years had the highest level of sugar (126.28 ± 16.74) when compared to age 20-29 years (96.11 ± 5.88) and 30-39 years (96.00 ± 2.73).

Conclusion

The Pre and Post sugar levels of voluntary blood donors in Jos Metropolis were carried out among 30 volunteers. The study reveals that there is no significant variation on the effect of blood donation on glucose concentration (Random Blood Sugar) in subjects before and immediately after blood donation considering the level of glucose before and after blood donation. There is no significant difference in glucose level

(Random Blood Sugar) between male and female as a result of blood donation on subjects before blood donation based on gender. However, there was significant difference after blood donation while comparing male and female subjects as Male had a higher glucose level compared to female. There is no significant difference in glucose level (Random Blood Sugar) before blood donation based on age among the age groups but there was significant difference after blood donation as age 40-49 years had the highest level of sugar when compared to age 20-29 years and 30-39 years. There is no significant difference in glucose concentration from pre-and-post blood donation among voluntary blood donors in Jos metropolis. This research suggests that blood donor volunteers should be adequately cared for and thoroughly observed during blood donation as they may have reduced sugar levels after donation which may lead to dizziness or fainting.

Recommendations

From this study, the researchers hereby recommend as follows:

1. That female donors should be given food and beverages before blood donation
2. That older donors should be adequately examined during blood donation
3. Voluntary blood donation should be encouraged with numerous information to educate volunteers
4. Research should be encouraged among voluntary blood donors in Jos Metropolis.

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