

biosynthesis of heme thereby causing anemia and other hematological problems [24]. Lead also has negative effects on the proximal tubules of the kidney [17].

Lipids are very important components of plasma membranes and hormones. They are also important source of energy in the body. However, the lipids are not soluble in blood and therefore require low density and high density lipoproteins for their transportation in and out of cells. Results obtained from the present study show that the concentration of total cholesterol (TC), LDL-C and Triacylglycerides (TG) from the exposed rats increased significantly ($p < 0.05$) compared to the control. However, the concentrations of HDL-C from the exposed rats were lower compared to those of the control. The increase in TC, LDL-C and TG reported in this study may be due to higher production or low clearance of lipoproteins. Low clearance may occur due to inhibition of the liver lipoprotein lipase activity by heavy metals or alterations of the cell-surface receptors for lipoproteins [25]. Some heavy metals like lead and chromium inhibit cytochrome P450 activity [26, 25]. This can in turn decrease the clearance of cholesterol from the body through the hindrance of the biosynthesis of the bile acids. HDL-C is often referred to as the “good cholesterol” as a result of its role in the catabolism of cholesterol. The low level of HDL-C reported in this study is in the same trend with that of Samarghandian *et al.* [27] who reported that liver dysfunctions caused by exposure to heavy metals such as cadmium decrease the HDL-C content to cause dyslipidemia. The results from this study also indicate that the concentrations of TC, TG and LDL-C were raised significantly ($p < 0.05$) in the test samples during the dry season compared to the wet season, while the concentrations of HDL-C were decreased in the dry season compared to the wet season. This may be due to the fact that higher concentrations of heavy metals were determined in the serum of the rats during the dry season compared to the concentration in the wet season. High concentrations of TC, TG, LDL-C and lower concentrations of HDL-C found in the serum of rats used in this study are indications of risk of cardiovascular disease.

CONCLUSION

The data obtained from the present study indicate that the experimental animals used in this study were at a high risk of heavy metal toxicity and cardiovascular disease. The risks are more in the dry season than in the wet season. These results imply that the quarry workers at Ugwuele are at greater risks of heavy metal toxicity and cardiovascular disease. This study

also found that workers at the crusher section of the quarry site are at the highest risk of heavy metal toxicity and cardiovascular disease.

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