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The Effect of Acute Muscular Exercise and Training Status on Haematological Indices in Adult Males

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Abstract : Introduction: Long term physical training affect the performance of athletes especially the females. Soccer which is a team sport, played in an outdoor field, require adequate oxygen transport system for the maximal aerobic power during exercise in order to complete 90 minutes of competitive play. Suboptimal haematological status has often been recorded in athletes with intensive physical activity. It may be due to the iron depletion caused by hemolysis or haemodilution results from plasma volume expansion. There is lack of data regarding the dynamics of red blood cell variables, in male football players. We hypothesized that, a long competitive season involving frequent matches and intense training could influence red blood cell variables, as a consequence of applying repeated physical loads when compared with sedentary. Methods: This cross sectional study was carried on 40 adult males (20 athletes and 20 non athletes) between 18-25 years of age. The 20 apparently healthy male non athletes were taken as sedentary and 20 male footballers comprise the study group. The university institutional review board (ABUTH/HREC/TRG/36) gave approval for all procedures in accordance with the Declaration of Helsinki. Red blood cell (RBC) concentration, packed cell volume (PCV), and plasma volume were measured in fasting state and immediately after exercise. Statistical analysis was done by using SPSS/ win.20.0 for comparison within and between the groups, using student's paired and unpaired "t" test respectively. Results: The finding from our study shows that, immediately after termination of exercise, the mean RBC counts and PCV significantly ($p<0.005$) decreased with significant increased ($p<0.005$) in plasma volume when compared with pre-exercised values in both group. In addition the post exercise RBC was significantly higher in untrained (261.10±8.5) when compared with trained (255.20±4.5). However, there was no significant differences in the post exercise hematocrit and plasma volume parameters between the sedentary and the footballers. Moreover, beside changes in pre-exercise values among the sedentary and the football players, the resting red blood cell counts and Plasma volume (PV %) was significantly ($p < 0.05$) higher in the sedentary group (306.30±10.05 x 104 /mm3; 58.40±0.54%) when compared with football players (293.70±4.65 x 104 /mm3; 55.60±1.18%). On the other hand, the sedentary group exhibited significant ($p < 0.05$) decrease in PCV (41.60±0.54%) when compared with the football players (44.40±1.18%). Conclusions: It is therefore proposed that the acute football exercise induced reduction in RBC and PCV is entirely due to plasma volume expansion, and not of red blood cell hemolysis. In addition, the training status also influenced haematological indices of male football players differently from the sedentary at rest due to adaptive response. This is novel.

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