

Abstract

Iron Status and Associations with Physical Performance in Female New Zealand Army Recruits [†]

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Background: Decreases in iron status have been reported in military women during initial training periods of 8–10 weeks. The current study aimed to characterise iron status in female New Zealand Army recruits during a 16-week basic combat training (BCT) course and associations with operationally relevant indicators of physical performance.

Methods: Iron status indicators—haemoglobin (Hb), serum ferritin (sFer), soluble transferrin receptor (sTfR), transferrin saturation (TS) and erythrocyte distribution width (RDW) were assessed at the beginning (baseline) and end of BCT in 76 volunteers without iron deficiency non-anaemia (sFer < 12 µg/L; Hb ≥ 120 g/L) or iron deficiency anaemia (sFer < 12 µg/L; Hb < 120 g/L) at baseline or a C-reactive protein >10 mg/L at baseline or end. A timed 2.4 km run followed by maximum press-ups were performed at baseline and the mid-point (week 8) to assess physical performance. Changes in iron status were investigated using paired *t*-tests and associations between iron status indicators and physical performance were evaluated using Pearson correlation coefficients.

Results: Serum ferritin (56.6 ± 33.7 vs. 38.4 ± 23.8 µg/L) and TS (38.8 ± 13.9 vs. 34.4 ± 11.5%) decreased (*p* < 0.001 and *p* = 0.014, respectively), while sTfR (1.21 ± 0.27 vs. 1.39 ± 0.35 mg/L) and RDW (12.8 ± 0.6 vs. 13.2 ± 0.7%) increased (*p* < 0.001) from baseline to end, respectively. Haemoglobin (140.6 ± 7.5 vs. 142.9 ± 7.9 g/L) increased (*p* = 0.009) during BCT. At the end, sTfR was positively associated (*r* = 0.29, *p* = 0.012) and TS inversely associated (*r* = −0.32, *p* = 0.005) with the mid-point run time. There were no significant correlations between iron status and press-ups.

Conclusions: Storage and functional iron parameters indicated a decline in iron status in female recruits during BCT. Correlations between tissue-iron indicators and run times suggest aerobic fitness is impaired. Optimal iron status appears paramount for aerobic performance and enabling the success of female recruits during military training.



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