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Prevalence of Iron Depletion and Anemia in Hong Kong Female Athletes

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Purpose Iron is a structural component of hemoglobin and myoglobin for oxygen delivery. It also plays a key role in energy production. Iron depletion, with or without anemia, may impair physical work capacity and can therefore be detrimental to the competitive athletes. Although it is known that iron depletion may have a negative impact on exercise performance, the incidence among athletes remains high [1,2]. The purpose of this study is to investigate the prevalence of iron depletion and anemia in Hong Kong female athletes.

Methodology Female athletes (n = 157) were divided into two groups, adult (age = 18-38 years, n = 107) and adolescent (age = 12-17 years, n = 50) from 18 sports (divided into 4 categories: competitive, endurance, sprint/power, and skill) were screened for iron stores status. The test included a complete blood count (CBC), serum iron, ferritin, transferrin, transferrin saturation and total iron binding capacity (TIBC). Statistical analyses were performed using PASW Statistics 18 (SPSS Inc., Chicago, Illinois, USA).

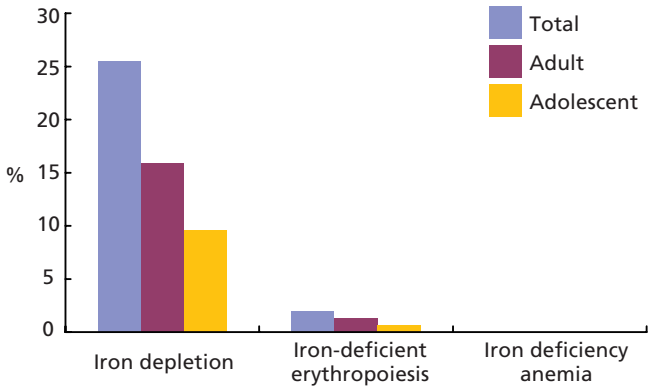
Results No significant differences in mean CBC measurements (Table 1) were found among different sports groups and between adult and adolescent. In iron store measurements, adult had higher mean serum iron than adolescent (102.1 ± 38.9 μg/dL vs. 83.5 ± 29.8 μg/dL, *p*-value < 0.05). However, no significant differences in iron store measurements were found among different sports groups. Iron depletion, defined by a ferritin level below 35ng/ml [3], was found in 25.5% of participants (15.9% in adults and 9.6% in adolescents) as indicated in Figure 1. Iron deficiency erythropoesis, defined by a ferritin level below 12ng/ml and transferrin saturation below 16% [2,3], was found in 1.9% of participants (1.3% in adults and 0.6% in adolescents) as shown in Figure 1. Iron deficiency anemia, defined by a ferritin level below 12ng/ml, transferrin saturation below 16% and low hemoglobin [2,3], was not found in this study. Moreover, no significant differences in the prevalence of iron depletion, iron deficiency erythropoesis and iron deficiency anemia were found among different sports groups.

Table 1 Mean values of complete blood picture measurements and iron store measurements

Parameters	Adults (n = 107)	Adolescents (n = 50)
Age (year)	20.9 ± 5.8	15.5 ± 1.5
Hemoglobin (g/dL)	13.7 ± 0.8	13.3 ± 0.8
Hematocrit (%)	38.0 ± 2.4	38.3 ± 2.2
MCV (fL)	88.1 ± 4.1	87.4 ± 3.0
MCHC (g/dL)	34.7 ± 0.5	34.8 ± 0.8
Ferritin (ng/ml)	68.1 ± 53.1	60.4 ± 44.8
Serum iron (μg/dL)*	102.1 ± 38.9	83.5 ± 29.8
Transferrin (mg/dL)	250.2 ± 38.5	266.7 ± 31.5
TIBC (μg/dL)	317.8 ± 48.9	338.7 ± 39.9
Transferrin saturation (%)	32.6 ± 13.1	25.0 ± 9.4

** p-value < 0.05*

Figure 1 Percentage of subjects with iron depletion, iron-deficient erythropoiesis and iron deficiency anemia



Conclusion Iron plays an important role in exercise performance. Iron depletion or iron deficiency is one of the most prevalent nutrient deficiencies in athletes [1,2]. The prevalence of iron depletion in Hong Kong female athletes was similar to other studies [1,2]. No significant difference was found among different sports groups suggesting that different forms of training may not affect iron status of female athletes in Hong Kong. Iron depletion or iron deficiency is preventable. It is recommended that athletes, particularly with past medical history of low iron stores, should regularly monitor their iron status.

References

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