The effects of a vegetarian diet on dietary iron intake in adolescent female endurance athletes

Heather Gerrish, Tucker Reiley, Meghan Varner
Central Washington University Dept. of NEHS

ABSTRACT
Iron is a key component for oxygen transport within the body. This makes it important for athletes, especially those in endurance events. Young women begin losing iron monthly through menstruation. Animal-based sources of heme iron are better absorbed than plant-based sources of nonheme iron. Considering all this, are vegetarian adolescent female cross country runners at risk of consuming inadequate amounts of iron than their non-vegetarian cohorts? Food Frequency Questionnaires (FFQ) and 3-Day Diet Logs (3DL) were given to 6 vegetarian and 15 non-vegetarian subjects. Intakes of iron and vitamin C, which aids iron absorption, were assessed using a scoring system (FFQ) and ESHA Research Solutions diet analysis software (3DL). Permutation tests were used to analyze the data. No significant differences in the average intakes of iron or any other key nutrients were found to exist between groups for 3DL data, but a commonly-attended running camp during the log period may have been a factor. Analysis of the FFQ dietary data revealed that vegetarians had statistically significantly higher intakes of both vitamin C (p < 0.05) and iron (p = 0.0135) than non-vegetarians.

RESULTS

No significant differences in average iron intake or other key nutrients were found to exist between vegetarians and non-vegetarians for 3DL data. FFQ dietary data, representative of longer-term intakes, revealed that vegetarians had statistically significantly higher intakes of both vitamin C (p < 0.05) and iron (p < 0.05) than non-vegetarians.

DISCUSSION

• One vegetarian subject did not follow a strict vegetarian diet and reported via the FFQ occasional consumption of red meat, poultry, seafood, and fish.

• 3DL data showed no statistically significant differences between groups for any key nutrient intakes, possibly due to attendance of many subjects at the same running camp during the administration of the study.

• Vitamin C intake (65 mg/day RDA for 14-18 y.o. females) was higher for vegetarians than non-vegetarians (92 mg/day vs. 58 mg/day; see Figure 2). 33% of vegetarians did not meet RDA vs. 47% non-vegetarians.

• Iron intake (15 mg/day RDA for 14-18 y.o. females) was higher for vegetarians than non-vegetarians (23 mg/day vs 14 mg/day; see Figure 2). All vegetarians met RDA with one subject approaching the UL (45 mg/day) according to 3DL data. 66% of vegetarians met the RDA.

• It is recommended that vegetarians get 1.8 times the iron intake to account for low bioavailability of non-heme sources. This makes the adjusted RDA 27 mg/day, which 33% of vegetarians met.

• Only 17% of vegetarians and 20% of non-vegetarians consumed the RDA of calcium (1300 mg/day for 14-18 y.o. females) according to 3DLs.

CONCLUSION

• This study does not provide conclusive results about differences in iron intake between vegetarians and non-vegetarians.

• While it is possible for a vegetarian diet to meet the RDA standards, supplementation may be beneficial to ensure all micronutrient needs are met. Vegetarians should continue to consume adequate amounts of vitamin C to aid iron absorption.

• Calcium- and iron-containing foods or supplements should be consumed independently of each other to prevent absorption interference.

• Further research should quantify heme and nonheme intake and examine the iron status of subjects with blood testing.

REFERENCES


ACKNOWLEDGEMENTS

We’d like to thank: Dr. Ethan Bergman of CWU NEHS, Dr. Tim Englund of CWU Mathematics for their mentorship and guidance on this project; Ed Callahan for inviting us to participate in his Master’s Thesis work; and Jeff Hashimoto for his insights as a cross-country coach.