
The Physiological and Psychological Implications of a Vegetarian/vegan Diet on Endurance Athletes

In recent years, the public's outlook on vegetarianism and veganism has dramatically changed resulting in greater support and recognition worldwide. A stationary vegetarian diet consists of no animal flesh but may include the consumption of animal products such as eggs and dairy. A true plant-based diet or vegan diet, on the other hand, involves zero consumption of animal products such as animal meats, fish, dairy or eggs. As the general population of vegetarians and vegans rise, many recognized athletes have also followed this trend and chosen to adopt a diet focusing on foods that are unrefined, micronutrient-dense while minimizing or completely avoiding animal products and nutrient depleted foods. This has led to the discussion of an optimal vegan diet for athletes that focuses on avoiding potential nutrient deficiencies while also accommodating for optimal athletic performance.

Research studies that have been conducted on vegan high performance athletes, although limited, have been shown to produce distinct results when placed in direct comparison with athletes who adopt mixed diets such as omnivorous diets – which involve the consumption of animal products such as meat and dairy. Adherence to a vegetarian diet has been associated with a reduced risk of developing cardiovascular disease, breast, colorectal and prostate cancer, as well as type 2 diabetes. Additionally, vegetarians and vegans have been typically shown to possess a lower body mass index (BMI). Even so, there remains a lack of knowledge on the exact influences a vegetarian or vegan diet could have on athletic performance. Across the globe, there are not many individuals that can participate in a sport as challenging as the Tripe-Ironman. For such an extreme endurance sport, there is almost no knowledge on the effects a vegetarian or vegan diet can have on a triathlete. Until 4 years ago, the first ever case report was published involving the presentation of characteristic parameters of a vegan ultra-endurance athlete. Conducted by Roman Leischik and Norman Spelsberg, the study follows a 48-year-old male who has been practicing a raw vegan diet for 6 years prior to the test taking place (2014). The vegan ultra-triathlete was tested in comparison to a control group of 10 Ironman triathletes who were similar age and living on mixed diets using echocardiography and spiroergometry technology, and blood samples taken during the triathlon season and off season. In addition to exhibiting no signs of nutrient deficiencies or impaired health, it was discovered that the vegan athlete displayed a higher degree of maximal oxygen intake (VO₂max) and greater left ventricular end diastolic diameter and stroke volume in his heart.

Moreover, in a cross-sectional study conducted by Lynch et al. (2016), elite vegetarian and omnivore adult endurance athletes were compared for peak torque differences and

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cardiorespiratory fitness through the measurement of maximal oxygen uptake (VO₂ max). The sample group consisted of 27 vegetarian (VEG) and 43 omnivore (OMN) athletes. These athletes were evaluated on the treadmill for their VO₂ max and assessed for their strength through the use of a dynamometer that determined their peak torque for leg extensions. It was found that the vegetarian endurance athletes possessed greater cardiorespiratory fitness compared to their omnivore counterparts. Revolving around the vegan ultra-triathlete and vegetarian endurance athletes, both studies were able to determine that a plant-powered diet was not detrimental to the athletes' health nor did it compromise performance when compared to mixed diet athletes. Similarly, both research studies collected data that suggests a vegetarian or vegan diet helped to facilitate greater aerobic capacity in athletes. Even so, limitations exist in both research methods adopted such as small, selected sample sizes that are unrepresentative of the general population. Therefore, the meaningfulness of these results in varying environments remains limited. As well, it must be considered that the skill levels of the vegetarian/vegan athletes and the control group of mixed diet/omnivorous athletes varied. As popularity around plant-based diets increase, many research studies have been conducted with the purpose of further identifying qualitative health properties that are associated with consumption of foods that are plant-based and free of animal products.

In an observational study conducted by Link, Hussaini and Jacobson (2008), further improvements to emotional and psychological wellbeing have also been linked to individuals who adopted a strict raw vegan diet for 1-3 weeks. Taking place in a raw vegan institute in Florida, the study was conducted on screened participants who were 18 years of age or older, proficient in English, and well enough to be transitioned into a pure raw vegan diet. Participants had blood samples drawn and were also asked to complete a well-validated and reliable questionnaire, the Medical Outcomes Study SF-36, that accurately measured both the physical and mental components of the participant's quality of life (QOL) related to diet change, perceived stress (Perceived Stress Scale), anxiety and depression (Hospital Anxiety and Depression Scale) upon arrival and 12 weeks. Upon comparing the baseline data to the 12-week measurements of the participants, subjects who stayed at the raw vegan institute self-reported improved QOL on the questionnaires, especially mental QOL, anxiety and stress. This exploratory study indicates that the shift from a mixed diet to vegan diet in a controlled setting such as the Florida institute, is associated with improvements to mental and emotional quality of life. Even so, given the limits of this controlled setting, knowledge on conceptual elements such as personal, emotional and psychological well-being is limited.

Similarly, conducted by Boldt et al. , the Nutrition and Running High Mileage (NURMI) Study sought to collect data regarding the quality of life scores of female and male vegetarian and vegan endurance runners in comparison with athletes who adhered to an omnivorous diet (2018). In the second step of the NURMI Study, a total sample of 281 recreational runners of which 159 were female and 122 male completed a questionnaire called the World Health

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Organization Quality of Life Assessment - brief (WHOQOL-BREF). This test consisted of domains with regards to physical health, psychological wellbeing, environment, and social relationships. The data collected revealed results depicting individuals who adopted a vegetarian or vegan diet displayed a high Quality of life (QOL) suggesting that it is an appropriate and equal alternative to an omnivorous diet. By adhering to a vegetarian or vegan diet while simultaneously adopting an active lifestyle, data from the study depicts that this combination of lifestyle choices will successfully help an individual achieve a high degree of life satisfaction. As the survey utilized in the methods of this study was based on self-report, the accuracy of the data is dependent on the conscientiousness of the participants. Additionally, the sample participants used in this study were highly motivated endurance athletes, therefore limiting statistical representation. Apart from these two studies, there is a limit on information regarding the plant-based diet's effect on quality of life specifically to athletes.

Through analysis of present research conducted on the implications of a vegan diet on performance athletes, there is an abundance of knowledge to be discovered regarding the various scopes of health benefits stemming from a plant-based, vegan diet. The link between a vegetarian/vegan diet and QOL should remain an ongoing topic for research to determine the directional relationship of this association. Athletes who have reached a plateau and burnout response or even young athletes who are at the beginning stages of specialization in sport would benefit from longitudinal studies conducted with the purpose of determining correlation between the two variables.

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