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# The Impact of the Ketogenic Diet on Athletic Performance: A Systematic Literature Review

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**Abstract**

**Introduction**

The low-carbohydrate, high-fat ketogenic diet (K-LCHF) is gaining popularity among athletes as a potential strategy for improving body composition and physical performance. It is based on restricting carbohydrate intake to a level that induces ketosis while increasing dietary fat consumption. This study aimed to review the current literature on the effects of the K-LCHF diet on athletic performance and to identify possible adverse effects associated with its use.

**Current State of Knowledge**

Scientific articles published between 2020 and 2025 were analyzed using PubMed, Scopus, and Google Scholar databases. Both original studies and reviews focusing on athletes and physically active individuals were included. Findings suggest that while the K-LCHF diet may promote weight loss, it does not consistently improve aerobic capacity, strength, or speed. In some athletes, performance decline, disturbances in calcium-phosphate metabolism, changes in iron metabolism, and inflammatory markers were observed. Benefits appear more pronounced in individuals who are overweight or participating in non-endurance-based sports.

**Conclusion**

The use of a ketogenic diet by athletes should be considered individually and conducted under professional supervision. Due to potential side effects and the lack of clear evidence for performance enhancement, further well-designed studies are necessary-particularly those considering sex differences and the long-term effects of the diet on the athlete’s body.

Keywords

ketogenic diet, physical activity, athletes, physical performance, body composition, methabolic health, diet

## Introduction

Diet is considered one of the fundamental factors influencing athletic performance, and post-exercise nutritional recommendations are among the most important aspects of adaptation and recovery processes. Therefore, an appropriate diet can enhance muscle function and improve physical performance [1].
The ketogenic low-carbohydrate, high-fat diet (K-LCHF) involves maintaining carbohydrate intake at a very low level while varying the amounts of protein and fat. The primary goal of this diet is to induce ketosis, a metabolic state that alters energy pathways, thereby promoting weight loss without muscle mass reduction and potentially improving other health outcomes [2].
During adherence to this diet, the body relies more heavily on fat as an energy source. Since fat stores are more abundant than carbohydrate reserves, this theoretically provides a longer-lasting energy supply [3]. Ketone bodies, produced during the ketogenic diet, appear to be more efficient in generating metabolic energy compared to glucose or fatty acids [4–6].
The application of the ketogenic diet in athletic contexts remains a topic of debate. Current research indicates that a low-carbohydrate diet may extend endurance during steady-state submaximal exercise in well-trained athletes. However, in high-intensity sports that rely on rapid glycogen availability, its effectiveness may be limited [3–5].
Recently, numerous studies have been conducted to determine whether the K-LCHF diet positively affects aerobic capacity and physical performance in athletes, as existing findings are often conflicting [3].

### The Aim of the study

The aim of this study, based on a review of the medical literature, is to evaluate the impact of the ketogenic diet on athletes' physical performance using selected parameters, as well as to assess the potential side effects associated with its use.

## Materials and methods

This study is a narrative (non-systematic) review of the scientific literature concerning the effects of the ketogenic diet on physical performance and athletic activity. Literature searches were conducted using three databases: PubMed, Scopus, and Google Scholar. The analysis covered publications from the years 2020 to 2025. Articles were selected based on the review of titles, abstracts, and full texts using the following keywords: "ketogenic diet", "athletic performance", and "physical activity".
The analysis included original studies (including randomized controlled trials and observational studies), as well as review articles, provided they directly addressed the impact of the ketogenic diet on physical performance. Only full-text publications written in English and involving physically active individuals or athletes were considered.
The review excluded non–full-text publications (such as conference abstracts or letters to the editor), articles not directly related to the topic of ketogenic diet effects on physical performance, and non-peer-reviewed sources (e.g., blogs or popular science articles).
A limitation of this review is the predominance of studies conducted on male athletes. Among the analyzed publications, only one included female participants in the study group.

## Current state of knowledge

### Characteristic of the Ketonic Diet

Currently, there is no universally accepted classification that defines the precise percentage distribution of macronutrients in the ketogenic diet. The classical dietary protocol emphasizes a high intake of fats (approximately 80–90%), a moderate intake of protein (6–15%), and a very low intake of carbohydrates (around 5–10%) [7]. Various forms of the ketogenic diet can be distinguished, including the classical ketogenic diet, the modified Atkins diet, the low-energy ketogenic diet, and the Mediterranean ketogenic diet [8].

During a ketogenic diet, the body receives a minimal amount of carbohydrates. As a result, the liver begins to metabolize fatty acids, producing ketone bodies (a process known as ketogenesis): acetone, acetoacetic acid, and β-hydroxybutyrate, which serve as alternative sources of energy. The state of ketosis-defined by blood ketone concentrations of approximately 0.5–3.0 mmol/L-is essential for the diet's effectiveness [8].

Potential benefits of following a ketogenic diet include improved glycemic control, which may be advantageous for individuals with type 2 diabetes, positive effects on appetite-regulating hormones (such as ghrelin and leptin), and favorable changes in lipid profiles. However, there are also risks associated with the diet. Long-term adherence may disrupt acid-base balance, impair thyroid and adrenal function, and in some individuals, lead to increased LDL cholesterol levels. Therefore, proper supplementation and regular monitoring of health parameters are necessary during the application of the ketogenic diet [9].

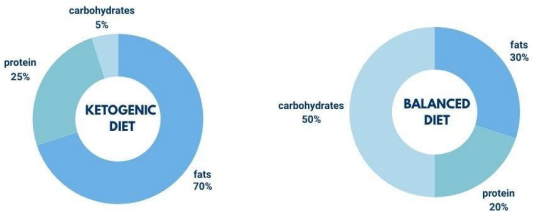


Figure 1. presents a comparison of the percentage distribution of macronutrients in a ketogenic weight-reduction diet, a low-carbohydrate high-fat diet, and a balanced hypocaloric diet.

## The impact of the Ketogenic Diet on athletic performance

Previous studies have clearly indicated that the ketogenic diet (K-LCHF) leads to significant weight reduction in various athletic populations, including elite athletes (e.g., competitive race walkers – Burke et al. 2017, 2020), moderately trained individuals (Cipryan et al. 2018), and recreationally active subjects (Dostal et al. 2019, Fleming et al. 2003) [3,11–13].

In the 2021 meta-analysis by Cao J. et al., eight studies were included, among them those listed above. Each study focused on measuring maximal oxygen uptake ($VO_2$ max) and performance in treadmill, cycle ergometer, or time-trial tests (e.g., 5-km run, 10-km race). None of the studies reported a significant impact of the ketogenic diet on $VO_2$ max. Moreover, no substantial benefits were observed in performance tests such as the Wingate sprint or 5–10 km time trials [3].

This meta-analysis also found no significant overall effect of the K-LCHF diet on maximum heart rate (HR max), time to exhaustion (TTE), or the rating of perceived exertion (RPE). However, a notable effect was observed on the respiratory exchange ratio (RER). Nevertheless, this did not translate into improved aerobic performance in athletes [3].

Kysel P. et al. (2020) compared the effects of a cyclical ketogenic weight-loss diet versus a nutritionally balanced reduction diet on measures of muscular strength. Muscle strength was assessed via maximal loads in bench press, lat pulldown, and leg press exercises. The cyclical ketogenic diet did not result in significant changes in any of these strength parameters, whereas the balanced diet group showed statistically significant improvements in the lat pulldown and leg press exercises [14].

The same study also assessed the impact of both diets on spiroergometric parameters. Athletes following the ketogenic diet demonstrated a reduced respiratory exchange ratio compared to those on the balanced diet, while other spirometric parameters remained largely unchanged [14]. This further supports the conclusion that a cyclical ketogenic weight-loss diet effectively reduces body weight but is not a viable strategy for enhancing anaerobic performance or strength in healthy young male athletes.

Interesting findings were also presented by Kaufman M. et al. (2023), who highlighted the ketogenic diet’s impact on calcium-phosphate metabolism and its association with decreased bone mass, which may impair physical performance in endurance sports. This phenomenon is likely due to the diet's low carbohydrate content, which was shown to increase serum markers of bone resorption in athletes both at rest and post-exercise. These included markers of bone breakdown (C-terminal telopeptide of type I collagen), formation (N-terminal propeptide of type I procollagen), and metabolism (osteocalcin) [15,16].

This was confirmed by Fensham NC et al. (2022), who studied 28 elite race walkers. Those assigned to the low-carbohydrate group had significantly elevated bone resorption markers, which improved with increased carbohydrate intake [17].

Additional findings have shown that athletes following a ketogenic low-carbohydrate diet (K-LCHF) exhibited elevated levels of certain blood biomarkers, including interleukin-6, white blood cell count, hepcidin, and cortisol, compared to pre-diet levels. These indicators suggest

that the diet may have adverse effects on the body, such as disrupting iron metabolism (via hepcidin), increasing physiological stress (interleukin-6, cortisol), and promoting inflammation (white blood cells, interleukin-6) [15,18]. Given these health consequences, it is recommended to avoid restricting carbohydrate intake in athletes engaged in intensive training, especially in endurance sports. In such cases, the ketogenic diet may actually impair athletic performance [15,19].

However, the benefits of K-LCHF may be more apparent in overweight athletes, for whom the diet facilitates weight loss and potentially enhances physical efficiency as a result [3,19].

Vargas-Molina S. et al. (2024) conducted a further meta-analysis supporting these findings. Based on the collected data, they concluded that the ketogenic diet does not impair bench press (BP) or one-repetition maximum (1-RM) squat performance in trained athletes- but it does not improve them either. Furthermore, the 1-RM test may not be the most suitable method for evaluating strength adaptations during resistance training in well-trained individuals or athletes primarily aiming to increase muscle mass [20].

Table 1. presents a comparative summary of all the included studies and the performance parameters assessed in athletes following a ketogenic diet.

| Study / Author | Study Group | Assessed Parameters | Findings on Aerobic Performance |
|---|---|---|---|
| Burke et al. 2017, 2020 | Elite race walkers | $VO_2$ max, running time trials | No $VO_2$ max change; no improvement in time trials. |
| Cipryan et al. 2018 | Moderately trained individuals | $VO_2$ max | No significant changes. |
| Dostal et al. 2019, Fleming et al. 2003 | Recreationally active individuals | $VO_2$ max | No effect on $VO_2$ max. |
| Cao J. et al. 2021 (meta-analysis) | 8 studies, various athlete populations | $VO_2$ max, Wingate Sprint, time trials, RER, HR max, TTE, RPE | No changes in $VO_2$ max, HR max, TTE, or RPE; lower RER without endurance gain. |
| Kysel P. et al. 2020 | Athletes on cyclical ketogenic diet | Spirometry parameters, respiratory exchange ratio (RER) | Lower RER vs. balanced diet; no other respiratory changes. |
| Kaufman M. et al. 2023 | Athletes | Calcium-phosphate balance, bone mass | Lower bone mass - possible drop in endurance performance. |
| Fensham NC et al. 2022 | 28 race walkers | Bone degradation markers | Higher bone degradation markers in low-carb group; improved after increased carbohydrate intake – possibly impairing |

| | | | |
|---|---|---|---|
| | | | performance. |
| General observations [16, 19] | Athletes on K-LCHF | Inflammatory and stress markers (IL-6, hepcidin, cortisol, WBC) | Potential negative impact on performance due to iron imbalance, increased stress, and inflammation. |
| Vargas-Molina S. et al. 2024 | Strength-trained athletes | Strength performance (bench press, squat 1-RM) | No effect on strength outcomes; not directly related to aerobic performance. |

**Risk and side effects**

While the ketogenic diet may offer certain health benefits, it is also associated with potential side effects. For this reason, it is not suitable for everyone and should always be followed under medical supervision.

The most commonly reported adverse effects of the ketogenic diet involve the gastrointestinal system. A sudden shift in eating habits may lead to abdominal pain, nausea, vomiting, and diarrhea. A key feature of this diet—significant carbohydrate restriction—often results in the elimination of whole grains, fruits, and vegetables, leading to a reduced intake of dietary fiber. Fiber deficiency may, in turn, cause constipation, which is frequently reported among individuals adhering to this diet. Additionally, an unbalanced diet may contribute to deficiencies in vitamins essential for proper bodily function [21].

Moreover, the high fat intake characteristic of this dietary strategy is often accompanied by increased consumption of saturated fatty acids. Excessive intake of these fats can promote the development of atherosclerosis and elevate the risk of cardiovascular events, posing a significant health concern, particularly for individuals with pre-existing cardiovascular risk factors [21,22].

Particular caution should be exercised when applying the ketogenic diet in individuals with type 1 diabetes. Clinical studies have documented an increased incidence of hypoglycemic episodes in this population, which represents a serious health hazard [23]. Additionally, individuals with type 1 diabetes are at elevated risk of developing diabetic ketoacidosis—a potentially life-threatening metabolic complication exacerbated by the elevated production of ketone bodies associated with the ketogenic diet [24].

Metabolic changes associated with this diet may also negatively affect pregnancy and fetal development. A review of data from the National Birth Defects Prevention Study showed that pregnant women who restricted carbohydrate intake consumed less than half the recommended amount of folic acid compared to those who did not restrict carbohydrates. This

group also demonstrated a slightly increased risk of neural tube defects in offspring [25]. Of notable clinical concern is the very limited availability of reliable data on this topic.

## Monitoring the Ketogenic Diet

Successful implementation of the ketogenic diet requires appropriate supervision to achieve optimal results. In athletes, it is recommended to assess body weight and body composition, as well as to perform exercise tests both before and after starting the diet. Prior to testing, a standardized meal should be consumed, either reflecting the individual's habitual intake or aligned with the ketogenic diet menu. A three-hour interval between the meal and the exercise session is advised to avoid any short-term effects of food intake on exercise performance [26].
It is important to note that the duration of adherence to the ketogenic diet may significantly influence its effectiveness, likely due to the fact that full metabolic adaptation to ketosis—referred to as "keto-adaptation"—occurs after approximately seven days. Therefore, it is essential to confirm the achievement of ketosis by measuring the level of ketone bodies (KB) in urine and/or blood. During the course of the diet, ketone concentrations in the body may fluctuate throughout the day. The highest and most reliable levels are typically observed in urine samples collected in the morning and after dinner. For this reason, measurements should be taken at consistent times to ensure data reliability [26].
Regular monitoring of clinical parameters is also recommended, including liver enzymes, kidney function markers, and blood lipid profiles, to minimize the potential risks associated with the ketogenic diet [27].
Additionally, fasting glucose levels, insulin, HbA1c, and C-reactive protein should be monitored—especially in individuals with type 1 diabetes. Numerous studies have confirmed that the ketogenic diet can improve glycemic control, which in many cases allows for a reduction in insulin requirements and adjustments to treatment protocols [28].
Furthermore, monitoring the mental health of athletes following a ketogenic diet may be important. One study conducted among endurance athletes reported an initial decline in mood, general well-being, and physical readiness during the early stages of the diet [29].

## Conclusions

Studies show that the ketogenic diet (K-LCHF) effectively reduces body weight in athletes of various training levels. However, it does not significantly impact maximal oxygen uptake ($VO_2$ max), maximum heart rate, time to exhaustion, or perceived exertion. No improvements have been observed in endurance or strength performance tests.

The K-LCHF diet may negatively affect bone health by increasing markers of bone resorption, which can impair performance in endurance sports. Additionally, elevated indicators of inflammation and metabolic stress have been reported in athletes, suggesting a detrimental effect of the diet on the body.

Common side effects include gastrointestinal issues and an increased risk of fiber deficiency. A diet high in saturated fats may elevate the risk of cardiovascular diseases, especially in individuals with pre-existing risk factors. For individuals with type 1 diabetes, the ketogenic diet increases the risk of hypoglycemia and ketoacidosis. Pregnant women following a low-carbohydrate diet may be at risk of folate deficiency and a slightly increased likelihood of neural tube defects in the fetus.

In summary, while the ketogenic diet is effective for weight reduction, it does not enhance endurance or strength performance in healthy athletes. Due to its potential health risks, it is not recommended for individuals engaged in high-intensity training, particularly in endurance sports.

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**Declaration of Generative AI and AI-Assisted Technologies:**

The authors used ChatGPT to improve language and readability, after which the content was reviewed and edited. The authors accept full responsibility for the substantive content of the publication.

**Bibliography:**

1. Malsagova KA, Kopylov AT, Sinitsyna AA, Stepanov AA, Izotov AA, Butkova TV, Chingin K, Klyuchnikov MS, Kaysheva AL. Sports nutrition: diets, selection factors, recommendations. Nutrients. 2021;13(11):3771. https://doi.org/10.3390/nu13113771
2. McGaugh E, Barthel B. Przegląd diety ketogenicznej i stylu życia. Nutrients. 2022;14(13):2742. https://doi.org/10.3390/nu14132742
3. Cao J, Lei S, Wang X, Cheng S. The effect of a ketogenic low-carbohydrate, high-fat diet on aerobic capacity and exercise performance in endurance athletes: a systematic review and meta-analysis. Nutrients. 2021;13(8):2896. https://doi.org/10.3390/nu13082896
4. Stellingwerff T, Cox GR. Systematic review: carbohydrate supplementation on exercise performance or capacity of varying durations. Appl Physiol Nutr Metab. 2014;39(9):998–1011. https://doi.org/10.1139/apnm-2014-0001
5. Volek JS, Phinney SD, Forsythe CE, et al. Carbohydrate restriction has a more favorable impact on the metabolic syndrome than a low fat diet. Lipids. 2009;44(4):297–309. https://doi.org/10.1007/s11745-008-3274-2
6. Di Raimondo D, Buscemi S, Musiari G, et al. Ketogenic diet, physical activity, and hypertension: a narrative review. Nutrients. 2021;13(8):2567. https://doi.org/10.3390/nu13082567
7. Malinowska D, Żendzian-Piotrowska M. Ketogenic diet: a review of composition diversity, mechanism of action and clinical application. Nutrients. 2024;16(4):645. https://doi.org/10.3390/nu16040645
8. Ashtary-Larky D, Bagheri R, Bavi H, et al. Ketogenic diets, physical activity and body composition: a review. Br J Nutr. 2022;127(11):1731–1741. https://doi.org/10.1017/S0007114521002609
9. Batch JT, Lamsal SP, Adkins M, et al. Advantages and disadvantages of the ketogenic diet: a review article. J Clin Med. 2020;9(8):2786. https://doi.org/10.3390/jcm9082786 10. Burke LM, Ross ML, Garvican-Lewis LA, et al. Low-carbohydrate, high-fat diet impairs exercise economy and negates performance benefits from intensified training in elite race walkers. J Physiol. 2017;595(9):2785–2807. https://doi.org/10.1113/JP273230 11. Cipryan L, Plews DJ,

Ferretti A, et al. Effects of a 4-week very low-carbohydrate diet on highintensity interval training responses. J Sports Sci Med. 2018;17(2):259–268. 12. Dostal T, Plews DJ, Hofmann P, et al. Effects of a 12-week very low-carbohydrate high-fat diet on maximal aerobic capacity, high-intensity intermittent exercise and heart rate variability: A parallelgroup non-randomized trial. Front Physiol. 2019;10:912. https://doi.org/10.3389/fphys.2019.00912
13. Fleming J, Sharman MJ, Avery NG, et al. Endurance capacity and high-intensity exercise performance responses to a high-fat diet. Int J Sport Nutr Exerc Metab. 2003;13(4):466–478. https://doi.org/10.1123/ijsnem.13.4.466
14. Kysel P, Haluzíková D, Doležalová RP, et al. The influence of cyclical ketogenic reduction diet vs. nutritionally balanced reduction diet on body composition, strength, and endurance performance in healthy young males: a randomized controlled trial. Nutrients. 2020;12(9):2832. https://doi.org/10.3390/nu12092832
15. Kaufman M, Nguyen C, Shetty M, et al. Popular dietary trends' impact on athletic performance: a critical analysis review. Nutrients. 2023;15(16):3511. https://doi.org/10.3390/nu15163511
16. Heikura IA, Burke LM, Hawley JA, et al. Short-term ketogenic low-carbohydrate high-fat diet impairs markers of bone health in response to exercise. Front Endocrinol (Lausanne). 2019;10:880. https://doi.org/10.3389/fendo.2019.00880 CONFIDENTIAL: FOR PEER REVIEW ONLY References
17. Fensham NC, Heikura IA, McKay AKA, et al. Short-term carbohydrate restriction impairs bone formation at rest and during prolonged exercise more than low energy availability. J Bone Miner Res. 2022;37(10):1915–1925. https://doi.org/10.1002/jbmr.4658
18. McKay AKA, Peeling P, Pyne DB, et al. Six days of low carbohydrate, not energy availability, alters the iron and immune response to exercise in elite athletes. Med Sci Sports Exerc. 2022;54(3):377–387. https://doi.org/10.1249/MSS.0000000000002819
19. Burke LM. Ketogenic low-CHO, high-fat diet: the future of elite endurance sport? J Physiol. 2020;599(3):819–843. https://doi.org/10.1113/JP278928
20. Vargas-Molina S, Murri M, Gonzalez-Jimenez A, et al. Effects of the ketogenic diet on strength performance in trained men and women: a systematic review and meta-analysis. Nutrients. 2024;16(14):2200. https://doi.org/10.3390/nu16142200
21. Popiolek-Kalisz J. Ketogenic diet and cardiovascular risk – state of the art review. Curr Probl Cardiol. 2024;49:102402. https://doi.org/10.1016/j.cpcardiol.2024.102402
22. Visseren FJ, Mach F, Smulders YM, et al. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J. 2021;42(34):3227–3337. https://doi.org/10.1093/eurheartj/ehab484
23. McGaugh E, Barthel B. A Review of Ketogenic Diet and Lifestyle. Mo Med. 2022;119(1):84–88. PMC9312449
24. Shaikh S, Mohamed MM, Mujeeb A, et al. Euglycemic Diabetic Ketoacidosis Precipitated by a Keto Diet: Importance of Dietary History in Diagnosis. Cureus. 2020;12(9)\:e10199. https://doi.org/10.7759/cureus.10199
25. Desrosiers TA, Siega-Riz AM, Mosley BS, et al. Low carbohydrate diets may increase risk of neural tube defects. Birth Defects Res. 2018;110:901–909. https://doi.org/10.1002/bdr2.1198
26. Durkalec-Michalski K, Nowaczyk PM, Siedzik K. Effect of a four-week ketogenic diet on exercise metabolism in CrossFit-trained athletes. J Int Soc Sports Nutr. 2019;16(1):16. https://doi.org/10.1186/s12970-019-0284-9
27. Choy KYC, Louie JCY. The effects of the ketogenic diet for the management of type 2 diabetes mellitus: A systematic review and meta-analysis. Diabetes Metab Syndr. 2023;17(12):102905. https://doi.org/10.1016/j.dsx.2023.102905

28. Dowis K, Banga S. The Potential Health Benefits of the Ketogenic Diet: A Narrative Review. Nutrients. 2021;13(5):1654. https://doi.org/10.3390/nu13051654
29. Bowler AL, Polman R. Role of a Ketogenic Diet on Body Composition, Physical Health, Psychosocial Well-Being and Sports Performance in Athletes: A Scoping Review. Sports (Basel). 2020;8(10):131. https://doi.org/10.3390/sports810013