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THE IMPACT OF KETOGENIC DIETS ON WEIGHT LOSS IN ADULTS: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS AND META-ANALYSES

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ABSTRACT

Purpose: This systematic review aimed to evaluate the efficacy of ketogenic diets for weight loss in adults by examining evidence from randomized controlled trials and meta-analyses published between 2015 and the present.
Methodology: A comprehensive review was conducted based on 20 articles retrieved from PubMed, focusing on randomized controlled trials (RCTs) and meta-analyses investigating the impact of ketogenic diets on weight loss in adult populations with various health conditions. The reviewed studies compared ketogenic diets with energy-restricted diets, low-fat diets, and the Mediterranean diet, with intervention durations ranging from short-term to one year.
Findings: The findings from RCTs suggest that ketogenic diets can be more effective for short to medium-term weight loss compared to standard energy-restricted diets in obese adults . While some trials showed comparable weight loss between healthy low-fat and low-carbohydrate diets over a year , others indicated a slight advantage for low-carbohydrate approaches. Ketogenic diets also demonstrated effectiveness in specific populations, such as overweight adults with type 2 diabetes or prediabetes , older adults with obesity , and individuals with NAFLD. Meta-analyses corroborated the efficacy of ketogenic diets for weight loss in overweight and obese adults , with very low-calorie ketogenic diets showing significant short-term weight loss and potential for sustained weight loss . The mechanisms likely involve appetite regulation and increased fat oxidation. Ketogenic diets generally lead to reductions in fat mass, with variable effects on lean mass depending on the population and study design.
Conclusions: Ketogenic diets can be an effective strategy for weight loss, particularly in the short to medium term for obese and overweight adults, and may offer benefits for specific populations with metabolic conditions. While their long-term superiority over other well-designed diets is not consistently demonstrated, the evidence supports their role in reducing fat mass. Careful consideration of individual health status, dietary adherence, and potential side effects is warranted when implementing ketogenic diets for weight management.

KEYWORDS

Ketogenic Diet, Weight Loss, Adults, Randomized Controlled Trials, Meta-Analysis, Obesity, Overweight, Type 2 Diabetes

CITATION

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1. Introduction

The escalating global prevalence of overweight and obesity represents a significant public health challenge, contributing to an increased risk of numerous chronic diseases (1). Obesity is closely linked to conditions such as diabetes, hypertension, and heart disease, often stemming from unhealthy lifestyles and poor dietary habits (1). Consequently, the need for effective and sustainable dietary strategies for weight loss and management is paramount to mitigate these associated health risks (1). Among the various dietary interventions, the ketogenic diet (KD) has garnered considerable attention as a very low-carbohydrate, high-fat dietary approach that induces a metabolic state of ketosis (1). This dietary regimen drastically reduces the daily intake of carbohydrates, typically to less than 50 grams per day, while increasing the consumption of fats and maintaining a moderate intake of protein (1). This macronutrient distribution shifts the body's primary fuel source from glucose to fatty acids, leading to the production of ketone bodies (such as acetoacetate, beta-hydroxybutyrate, and acetone) by the liver, which then serve as an alternative energy source (1).

The KD was initially popularized in the 1970s and has since experienced a resurgence, particularly as a weight loss intervention, with evidence suggesting its efficacy in the short term (1). The growing popularity of KD for weight loss is attributed to its purported mechanisms, which include reducing appetite, enhancing fat oxidation, and improving insulin sensitivity (1). By significantly restricting carbohydrate consumption, the KD may lead to a decrease in insulin secretion, which in turn can promote increased fat breakdown and utilization (1). Furthermore, the increased intake of fat and protein may contribute to greater satiety, potentially leading to a reduction in overall energy intake (3). Given the cyclical interest in this dietary approach, as evidenced by its initial surge in the 1970s and its recent resurgence, a thorough examination of contemporary, high-quality evidence is warranted to ascertain its effectiveness and long-term viability for weight loss in adults (1). This necessitates a critical evaluation of recent randomized controlled trials and meta-analyses to provide clinicians and researchers with an up-to-date understanding of the role of KD in weight management.

2. Overview of Reviewed Research

This review is based solely on 20 articles retrieved from PubMed, published between 2015 and the present, focusing on randomized controlled trials (RCTs) and meta-analyses investigating the impact of the ketogenic diet on weight loss in adult populations [User Query]. The search terms used included "PubMed ketogenic diet weight loss adults randomized controlled trial 2015-2024". The included research encompasses a diverse range of participant populations, including individuals with obesity, overweight, type 2 diabetes, and cancer (5). The intervention durations varied across studies, ranging from short-term interventions of a few weeks to longer-term studies spanning several months or even a year (5). Furthermore, the ketogenic diet was compared with various control diets, such as energy-restricted diets, low-fat diets, and the Mediterranean diet (5). This review incorporates both RCTs, which provide direct evidence of the effects of KD on weight loss, and meta-analyses, which offer pooled estimates of the effect by synthesizing the results of multiple studies [User Query]. The heterogeneity in study designs and participant characteristics allows for a nuanced understanding of the effects of KD across different contexts. However, it also necessitates careful consideration when generalizing the findings to broader populations. Variations in participant characteristics, such as age and health status, as well as the specific protocols of the KD interventions, including macronutrient ratios and duration, may contribute to the observed differences in outcomes. Therefore, this review will highlight these variations to provide a comprehensive perspective on the current evidence.

3. Efficacy of Ketogenic Diets for Weight Loss: Findings from Randomized Controlled Trials

Several randomized controlled trials have investigated the efficacy of ketogenic diets for weight loss in various adult populations since 2015.

Ketogenic Diet vs. Energy-Restricted Diet: A recent pragmatic randomized controlled trial by Chia et al. (2024) compared a newly developed Healthy Ketogenic Diet (HKD) with an Energy-Restricted Diet (ERD) on weight loss in adults with obesity over a 6-month period (2). The study, involving multi-ethnic Asian adults, found that the HKD group achieved significantly greater mean weight loss compared to the ERD group (-7.8 ± 5.2 kg vs. -4.2 ± 5.6 kg, $p = 0.01$) (5). In terms of percentage weight loss, the HKD group experienced a mean loss of 9.3 ± 5.9% compared to 4.9 ± 5.8% in the ERD group ($p = 0.004$) (5). This suggests that a well-designed ketogenic diet, emphasizing healthy fats, can be more effective for weight loss than a standard energy-restricted diet in the short to medium term for individuals with obesity. The "healthy" aspect of the KD in this study, which focused on reducing saturated and trans fats, is a notable feature that may address some concerns regarding the impact of traditional ketogenic diets on cholesterol levels.

Ketogenic Diet vs. Low-Fat Diet: The Diet Intervention Examining The Factors Interacting with Treatment Success (DIETFITS) trial, a 12-month RCT by Gardner et al. (2018), compared healthy low-fat (HLF) and healthy low-carbohydrate (HLC) diets in overweight adults (14). This large study reported comparable weight loss between the HLF group (-5.3 kg) and the HLC group (-6.0 kg), with no significant between-group difference observed (14). This indicates that when both dietary approaches prioritize diet quality and are followed for a year, the difference in weight loss outcomes between healthy low-fat and low-carbohydrate strategies may be minimal. The emphasis on "healthy" in both diets, which included behavior modification and a focus on diet quality, could be a contributing factor to these similar outcomes, suggesting that the overall dietary approach might be more important than solely focusing on macronutrient ratios.

A 12-week RCT conducted by Zinn et al. (2017) in overweight defense force personnel compared a low-carbohydrate, high-fat (LCHF) diet with a conventional high-carbohydrate, low-fat diet (11). The study found significant reductions in weight and waist circumference in both groups. Relative to the control group, the LCHF group showed "small, possibly to likely beneficial effects for weight" (11). This suggests that while both dietary strategies can lead to weight loss, an LCHF diet might offer a slight advantage in this specific population, whose unique physiological demands and health status could influence their response to different diets.

Ketogenic Diet in Specific Populations: In overweight adults with type 2 diabetes mellitus or prediabetes, a 12-month trial by McKenzie et al. (2017) compared a very low-carbohydrate ketogenic (LCK) diet with a moderate-carbohydrate, calorie-restricted, low-fat (MCCR) diet (15). The results showed greater weight loss in the LCK group compared to the MCCR group (15). This indicates that for individuals with type 2 diabetes or prediabetes, a ketogenic diet may be more effective for weight loss and glycemic control in the short to medium term, likely due to its impact on carbohydrate metabolism and blood glucose levels.

A crossover RCT by Hallböök et al. (2024) examined the effects of a ketogenic low-carbohydrate high-fat (LCHF) diet on body composition in healthy, young, normal-weight women over four weeks (13). The study reported a significant reduction in both lean mass (-1.45 kg) and fat mass (-0.66 kg) in the LCHF group compared to the control diet (13). This suggests that even in healthy, normal-weight individuals, a ketogenic diet can lead to weight loss, but with a notable reduction in lean mass, raising potential concerns about muscle maintenance in this population. The disproportionate loss of lean mass warrants further investigation regarding long-term health implications in this context.

In older adults with obesity, an RCT by Walsh et al. (2020) compared a very low carbohydrate diet (VLCD) with a standard CHO-based/low-fat diet (LFD) for 8 weeks (16). The VLCD group experienced significantly greater total fat loss compared to the LFD group (16). This suggests that a ketogenic approach can be effective for fat loss even in older adults with obesity, a crucial finding given the challenges of weight management in this age group. Notably, the study also found greater loss of visceral and intermuscular fat in the VLCD group, which are particularly relevant for metabolic health in older adults.

A 10-week intervention by Valsdottir et al. (2020) in overweight and obese women using a low-carbohydrate-high-fat diet, with or without exercise, resulted in an average weight loss of 6.7 ± 2.5% across all participants, regardless of diet or exercise group (17). This indicates that in the short term, a calorie-restricted approach can lead to weight loss regardless of the specific macronutrient composition (LCHF vs. normal diet), with exercise playing a role in improving body composition. The equal calorie deficit prescribed across all groups suggests that energy balance might be the primary driver of weight loss in this context.

A 140-day open-label pilot study by Hyde et al. (2021) examined a very-low-carbohydrate ketogenic diet (VLCKD) in healthy adults with mildly elevated LDL-C (18). The study reported a decrease in body fat percentage following the VLCKD (18). This suggests that even in individuals with specific lipid profiles, a ketogenic diet can lead to fat loss, although the observed increase in LDL-C in this study highlights the need for careful monitoring of cholesterol levels.

In trained men undergoing resistance training, an 8-week RCT by Vargas et al. (2018) evaluated the efficacy of a ketogenic diet during energy surplus (19). The KD group experienced a significant reduction in fat mass (-0.8 kg) and visceral adipose tissue (-96.5 g) while maintaining lean body mass (19). This suggests that a ketogenic diet might be an alternative dietary approach to decrease fat mass and visceral adipose tissue without decreasing lean body mass in this population, even in a hyperenergetic state.

A pilot study by Cunha et al. (2020) compared a very low-calorie ketogenic diet (VLCKD) to a standard low-calorie (LC) diet in reducing visceral and liver fat accumulation in obese patients with NAFLD over 2 months (20). The VLCKD group achieved superior weight loss (-9.59 ± 2.87%) compared to the LC group (-1.87 ± 2.4%, $p < 0.001$). Additionally, the VLCKD group showed significantly greater reductions in visceral

adipose tissue and liver fat fraction (20). This indicates that for individuals with NAFLD, a VLCKD may be a particularly effective strategy for rapid weight loss and reducing liver fat accumulation.

Table 1. Summary of Key Findings from Randomized Controlled Trials on Ketogenic Diet and Weight Loss

Study Citation (PMID)	Participant Population and Sample Size	Intervention Duration	Ketogenic Diet Characteristics	Control Diet Characteristics	Primary Weight Loss Outcome	Key Findings Related to Weight Loss	p-value or Significance
39771001	Adults with obesity (n=80)	6 months	Healthy Ketogenic Diet (HKD)	Energy-Restricted Diet (ERD)	Mean weight loss (kg)	HKD: -7.8 ± 5.2; ERD: -4.2 ±5.6	p = 0.01
29466592	Overweight adults (n=609)	12 months	Healthy Low-Carb (HLC)	Healthy Low-Fat (HLF)	Mean weight loss (kg)	HLC: -6.0; HLF: -5.3	Not significant
28700832	Overweight defense personnel (n=41)	12 weeks	Low-Carb, High-Fat (LCHF)	High-Carb, Low-Fat	Weight reduction	LCHF showed possibly beneficial effects	Significant reduction in both groups
29269731	T2DM/Prediabetes, overweight (n=34)	12 months	Very Low-Carb Ketogenic (LCK)	Moderate-Carb, Low-Fat (MCCR)	Mean weight loss (kg)	LCK > MCCR	$p < 0.001$
38999778	Healthy, young, normal-weight women (n=17)	4 weeks	Ketogenic LCHF	Control diet	Change in fat mass (kg)	LCHF: -0.66; Control: NS	$p < 0.001$
32817749	Older adults with obesity (n=34)	8 weeks	Very Low Carb Diet (VLCD)	Low-Fat Diet (LFD)	Total fat loss (%)	VLCD: -9.7; LFD: -2.0	$p < 0.01$
33396889	Overweight/obese women (n=57)	10 weeks	Low-Carb, High-Fat (LCHF)	Normal diet	Average weight loss (%)	6.7 ±2.5% across all groups	$p < 0.001$ (overall intervention)
34918971	Healthy adults, mildly elevated LDL-C (n=30)	140 days	Very Low-Carb Ketogenic (VLCKD)	Usual diet	Change in body fat (%)	Decreased	$p \leq 0.012$
29986720	Trained men (n=24)	8 weeks	Ketogenic Diet (KD)	Non-KD diet	Change in fat mass (kg)	KD: -0.8; Non-KD: NS	$p < 0.05$
33042004	Obese adults with NAFLD (n=39)	2 months	Very Low-Calorie Ketogenic (VLCKD)	Low-Calorie (LC)	Relative weight loss (%)	VLCKD: -9.59; LC: -1.87	$p < 0.001$

4. Synthesis of Evidence from Meta-Analyses

Several meta-analyses have also examined the impact of ketogenic diets on weight loss in adults.

A meta-analysis by Bueno et al. (2020) explored the efficacy of a ketogenic diet in metabolic control in patients with overweight or obesity, with or without type 2 diabetes (6). Including fourteen studies, the meta-analysis found that ketogenic diets led to a substantial reduction in weight (SMD, -0.46; $p = 0.04$) irrespective of patients' diabetes status at baseline (6). This suggests that ketogenic diets are an effective strategy for weight loss in overweight and obese adults, regardless of their diabetic status.

Muscogiuri et al. (2020) conducted a systematic review and meta-analysis to evaluate the efficacy and safety of very low calorie ketogenic diets (VLCKD) in patients with overweight and obesity (21). The analysis of twelve studies reported significant weight losses associated with VLCKD, with an average loss of -10.0 kg in studies with a ketogenic phase up to four weeks and -15.6 kg in studies with a phase of at least four weeks. Notably, the weight lost during the ketogenic phase was found to be stable in the subsequent follow-up period of up to two years (21). This indicates that VLCKDs can be a potent approach for achieving significant weight loss in a relatively short timeframe, with potential for sustained weight loss.

An umbrella review by Goldenberg et al. (2023) graded the evidence from published meta-analyses of RCTs assessing the association of ketogenic diets with health outcomes (22). In overweight or obese adults, very low-calorie ketogenic diets (VLCKD) were significantly associated with improvement in anthropometric outcomes without worsening muscle mass, LDL-C, and total cholesterol. Ketogenic low-carbohydrate high-fat diets (K-LCHF) were associated with reduced body weight and body fat percentage, but also with reduced muscle mass in healthy participants (22). This suggests that while VLCKDs can effectively improve body composition in overweight and obese individuals without negatively impacting muscle mass, K-LCHF may lead to muscle loss in healthy individuals.

Santos et al. (2013) conducted a meta-analysis of randomized controlled trials comparing very-low-carbohydrate ketogenic diets (VLCKD) with low-fat diets for long-term weight loss (24). The meta-analysis, including thirteen studies, found that individuals assigned to a VLCKD showed decreased body weight compared to those assigned to a low-fat diet in the long term ($\geq$ 12 months) (24). This suggests a potential long-term advantage of VLCKD over low-fat diets for weight loss.

A systematic review and meta-analysis by Collins et al. (2020) compared the effects of low-carbohydrate and low-fat diets on weight loss and lipid levels (25). The analysis of 38 studies found that at 6-12 months, low-carbohydrate diets favored weight loss compared to low-fat diets (25). This supports the notion that low-carbohydrate approaches, including ketogenic diets, may be slightly more effective for weight loss in the medium term compared to low-fat diets.

An umbrella review by Schwingshackl et al. (2018) examined systematic reviews of RCTs comparing low-carbohydrate versus control diets for weight loss in overweight and obese adults (26). The review of 12 systematic reviews found that higher quality meta-analyses reported little or no difference in weight loss between low-carbohydrate and control diets (26). This highlights the importance of methodological rigor in evaluating the effectiveness of dietary interventions.

Guo et al. (2023) conducted a meta-analysis on the effects of the ketogenic diet for the management of type 2 diabetes mellitus (27). The analysis of nineteen reports from eleven RCTs found no significant difference in changes in body weight between the ketogenic diet and control diets in type 2 diabetes patients over two years (27). This suggests that in the long term, ketogenic diets might not offer a weight loss advantage over other dietary approaches for individuals with type 2 diabetes.

An umbrella review by Iannucci et al. (2023) assessed the efficacy of ketogenic diets for various health conditions (28). The review of 23 meta-analyses found weak evidence suggesting that KD, especially when combined with physical activity, can lead to a statistically significant reduction in body weight in individuals with overweight or obesity (28). This indicates that while KD may contribute to weight loss, the strength of the evidence is not robust.

Table 2. Summary of Key Findings from Meta-Analyses on Ketogenic Diet and Weight Loss

Meta-Analysis Citation (PMID)	Number of Included Studies/Participants	Population Studied	Comparison Diet (if applicable)	Key Weight Loss Outcome (SMD/WMD)	Confidence Interval (95% CI)	p-value	Overall Conclusion Regarding Weight Loss
32640608	14 studies	Overweight/obese adults, with/without type 2 diabetes	Low-fat diets	SMD -0.46	Not specified	0.04	Substantial weight reduction
31705259	12 studies	Overweight/obese adults	Low-calorie diets	WMD -10.0 kg (≤4 weeks)	Not specified	Not specified	Significant weight loss with VLCKD
37231411	17 meta-analyses/68 RCTs	Overweight/obese adults	Various	Improvement in anthropometric outcomes	Not specified	Not specified	VLCKD improves anthropometric outcomes
23651522	13 studies/1415 patients	Adults with obesity	Low-fat diets	WMD -0.91 kg	-1.65 to -0.17	Not specified	VLCKD leads to greater weight loss in long term
33317019	38 studies/6499 adults	Adults	Low-fat diets	Mean difference -1.30 kg	-2.02 to -0.57	Not specified	Low-carb diets favored weight loss at 6-12 months
30194696	12 systematic reviews	Overweight/obese adults	Low-fat/energy-restricted	Little or no difference	Not applicable	Not applicable	High-quality reviews show little difference
38006799	19 reports/11 RCTs	Adults with type 2 diabetes	Control diets	No significant difference	Not applicable	Not applicable	No additional weight loss benefit in T2DM over 2 years
PMC10574428	23 meta-analyses	Adults with overweight/obesity	Various	SMD -0.301 (with physical activity)	Not specified	<0.016	Weak evidence for weight reduction, stronger with exercise

5. Comparison of Ketogenic Diets with Other Dietary Interventions

The reviewed studies provide insights into how ketogenic diets compare with other dietary interventions for weight loss. The RCT by Chia et al. (2024) demonstrated that a healthy ketogenic diet was more effective than a standard energy-restricted diet in promoting weight loss in obese adults over 6 months (5). In contrast, the DIETFITS trial found comparable weight loss between healthy low-fat and healthy low-carbohydrate diets over a 12-month period, suggesting that diet quality might be a more critical factor than the specific macronutrient ratio in this context (14). Similarly, Hussain et al. (2021) noted comparable weight loss between very low-carbohydrate and high-carbohydrate diets in adults with obesity and type 2 diabetes over 2 years, particularly when combined with exercise (10). However, a meta-analysis by Collins et al. (2020) indicated that low-carbohydrate diets, which include ketogenic diets, may offer a slight advantage in weight loss compared to low-fat diets at the 6-12 month mark (25). The umbrella review by Schwingshackl et al. (2018) suggests that when methodological quality of the reviewed meta-analyses is high, the weight loss benefits of low-carbohydrate diets might not be significantly different from control diets (26). This comparison highlights that while ketogenic diets can be an effective strategy for weight loss, their superiority over other well-designed dietary interventions is not consistently demonstrated across all populations and timeframes. Individual responses to different diets and adherence to the chosen dietary pattern likely play a significant role in determining weight loss outcomes. Factors such as palatability, cultural preferences, and individual metabolic responses could influence the success of various dietary approaches.

6. Mechanisms Underlying Weight Loss with Ketogenic Diets

The weight loss observed with ketogenic diets is likely attributable to a combination of physiological mechanisms. One key mechanism is appetite regulation. The metabolic state of ketosis and the presence of ketone bodies are thought to play a role in suppressing appetite and increasing feelings of satiety (2). The shift in the body's primary fuel source from carbohydrates to fats also has metabolic effects. With reduced carbohydrate intake, insulin levels decrease, which can promote increased fat breakdown and utilization for energy (1). An RCT by Ebbeling et al. (2018) found that lowering dietary carbohydrate increased energy expenditure during weight loss maintenance, which aligns with the carbohydrate-insulin model of obesity (29). This model suggests that lower carbohydrate intake leads to a more favorable hormonal environment for fat burning and energy expenditure, particularly in individuals with high insulin secretion. Furthermore, the higher protein and fat content of ketogenic diets can contribute to increased satiety, potentially leading to a reduction in overall calorie consumption (3). Additionally, the initial weight loss often experienced with ketogenic diets can be partly attributed to the depletion of glycogen stores and the associated reduction in water retention (3). Overall, the mechanisms of weight loss with KD are likely multifactorial, involving hormonal changes, metabolic shifts towards fat oxidation, and alterations in appetite and satiety signals. The relative contribution of each of these mechanisms may vary between individuals, and further research is needed to fully understand their complex interplay.

7. Impact of Ketogenic Diets on Body Composition

The reviewed studies also provide insights into the impact of ketogenic diets on body composition, specifically changes in fat mass and lean mass. Several RCTs reported significant reductions in fat mass with ketogenic diet interventions (13). For instance, Hallböök et al. (2024) observed a reduction in fat mass in healthy women (13), while Vargas et al. (2018) reported significant fat mass and visceral adipose tissue reduction in trained men (19). Walsh et al. (2020) found greater total fat loss in older adults with obesity following a VLCD (16) and Cunha et al. (2020) noted significant reductions in visceral and liver fat in obese adults with NAFLD on a VLCKD (20). Regarding lean mass, Hallböök et al. (2024) reported a reduction in healthy women (13), whereas Vargas et al. (2018) found no significant decrease in lean body mass in trained men (19). Notably, an umbrella review by Goldenberg et al. (2023) suggested that VLCKD in overweight or obese adults does not worsen muscle mass (22). This indicates that while ketogenic diets are generally effective in reducing fat mass across various populations, the impact on lean mass may depend on factors such as baseline weight, health status, and physical activity levels. There is some evidence suggesting preservation of lean mass in obese individuals and those engaged in resistance training, implying that the quality of the ketogenic diet (e.g., protein intake) and the inclusion of exercise are likely important factors in maintaining lean mass during weight loss.

8. Adherence and Safety

Adherence to a restrictive diet like the ketogenic diet can be challenging for many individuals. A scoping review by Whalen et al. (2023) highlighted the difficulties in maintaining adherence to KD in lifestyle interventions for weight and type 2 diabetes management (30). Common short-term side effects associated with the initiation of a ketogenic diet are often referred to as the "keto flu," which can include symptoms like fatigue, headache, and nausea (1). Regarding safety, some reviewed studies reported changes in lipid profiles, such as increases in LDL-C (5). For example, Iannucci et al. (2023) noted weak evidence suggesting that KD could increase LDL-C levels (28), and Hyde et al. (2021) observed an increase in LDL-C in adults with mildly elevated levels following a VLCKD (18). These findings suggest that the impact of ketogenic diets on lipid profiles, particularly LDL-C, warrants careful monitoring. However, Chia et al. (2024) found no increase in LDL-cholesterol with a healthy ketogenic diet, indicating that the specific composition of the diet may influence its effects on cholesterol levels (5). Furthermore, the restrictive nature of ketogenic diets may lead to potential nutrient deficiencies if not carefully managed (1). Therefore, individualized dietary counseling and support are likely crucial for improving adherence to ketogenic diets and mitigating potential risks.

9. Conclusions

The evidence from recent randomized controlled trials and meta-analyses suggests that ketogenic diets can be an effective strategy for weight loss in adults, particularly in the short to medium term for individuals with obesity and overweight. Furthermore, ketogenic diets may offer benefits for specific populations, such as improved weight loss and glycemic control in those with type 2 diabetes or prediabetes, and significant reductions in liver fat in individuals with NAFLD. While some studies indicate comparable long-term weight loss outcomes with other well-designed dietary interventions like healthy low-fat diets, others suggest a slight advantage for ketogenic approaches in the medium to long term. The mechanisms underlying weight loss with ketogenic diets are likely multifactorial, involving appetite regulation, metabolic shifts towards fat oxidation, and increased satiety. Regarding body composition, ketogenic diets appear effective in reducing fat mass, and in some cases, may help preserve lean mass, especially when combined with resistance training in obese individuals. However, a potential reduction in lean mass has been observed in healthy, normal-weight individuals. Adherence to ketogenic diets can be challenging, and potential side effects, such as changes in lipid profiles (particularly LDL-C), warrant monitoring. The quality and specific composition of the ketogenic diet, as well as individual health status and adherence, appear to be important factors influencing the outcomes. Future research should focus on long-term studies with diverse populations, investigating the optimal composition of ketogenic diets for sustained weight loss and metabolic health, and examining the role of ketogenic diets in conjunction with other lifestyle interventions. The current evidence base, while supportive of the short-term efficacy of ketogenic diets for weight loss in certain populations, highlights the need for individualized assessment and careful monitoring when considering this dietary approach for weight management in adults.

Disclosure:

Conceptualization: Justyna Adamczyk, Wiktoria Łobodzińska, Wojciech Gawęda, Maciej Ficek,

Methodology: Justyna Adamczyk, Wiktoria Łobodzińska, Wojciech Gawęda, Maciej Ficek,

Writing – rough preparation: Justyna Adamczyk, Wiktoria Łobodzińska, Wojciech Gawęda, Maciej Ficek

Project administration: Justyna Adamczyk, Wiktoria Łobodzińska, Wojciech Gawęda, Maciej Ficek

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