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Utilization, Knowledge, and Perception of the Ketogenic Diet among Medical University Students in the UK

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Abstract

Background

The ketogenic diet (KD) has gained popularity as a weight-management strategy and is being researched for its potential therapeutic benefits. Understanding the knowledge and perception of the KD among healthcare professionals, including medical students, is crucial for providing accurate patient information and guidance.

Methods

A survey-based study was conducted among public health program students in London to assess their knowledge and perception of the KD. Participants were asked questions about their demographic characteristics, dietary habits, sources of nutritional information, and understanding of the KD. Data were analyzed using descriptive statistics.

Results

Out of 76 participants, predominantly female (80.3%), the majority expressed satisfaction with their body weight (53.9%) and body shape (65.8%), while fewer participants were satisfied with their food habits (38.2%). Social media was the primary source of nutritional information (34.2%), and most participants had attended nutrition-related courses at university (71.1%). The participants showed limited knowledge of the KD, with a mean total score of 3.4±3.6 out of 11 points. Common misconceptions included the role of fruits in the KD (5.3% correct responses) and the long-term adverse effects of the diet. However, participants acknowledged the need for medical supervision and long-term clinical trials for KD users.

Conclusion

This study emphasizes the importance of enhancing knowledge and awareness of KD among public health program students. Medical students, as future healthcare providers, have a critical role in patient counseling and should possess accurate information about the KD to guide patients in making informed dietary decisions.

Keywords

Knowledge, Ketogenic Diet, Medical Students, Perception, Weight Management.

Introduction

The ketogenic diet (KD), which typically contains less than 20 grams of carbohydrates per day or 5% of total calories consumed, is high in fat and protein[1]. It causes the body to enter a metabolic state akin to starvation or fasting, which has historically been used to reduce the symptoms of epilepsy[2]. The KD has become a promising weight-management strategy in recent years. It is also being researched for its potential advantages in lowering the burden of metabolic syndrome, managing hyperglycemia in type-2 people with diabetes, maintaining muscle strength for athletes, and even easing symptoms of autism[3]. The main difficulty in managing weight is continuing to lose weight after the initial 5–10% reduction. This difficulty is frequently caused by the constant hunger that results from insufficient calorie intake[4]. This hunger sensation becomes a significant obstacle to sticking to restrictive diets for people who are overweight or obese. In this situation, the KD has been suggested to control satiety and hunger while managing one's weight[5].

According to studies, KD can reduce appetite and make you feel "more full" after meals. By creating ketone bodies, which have been seen to affect appetite by suppressing the ghrelin hormone, the KD aids in weight loss. According to research, KD may result in more significant weight loss than low-fat diets, primarily because it lowers total calorie intake[6]. Furthermore, people with hyperglycemia, including those with type-2 diabetes, have responded favourably to the KD. It can improve insulinemia and insulin resistance by directing the body's metabolism towards ketone production, which lowers postprandial glucose levels and insulin secretion[7].

As future healthcare providers, medical students are essential in patient counselling and promoting healthy lifestyles. Therefore, their understanding and perception of the KD are of utmost significance[8]. First, knowing the KD enables medical students to give accurate, factual information to patients who might consider implementing this dietary strategy[9]. Patients are more likely to seek advice from medical professionals about the KD's potential advantages and disadvantages as it gains popularity. Medical students who are well-versed in the KD can provide helpful guidance and aid patients in making educated dietary decisions[10]. Second, it is

crucial for patient safety that medical students are aware of the KD. They should know the diet's potential side effects, contraindications, and monitoring requirements. Medical students can identify patients at risk of complications and give appropriate advice to mitigate possible adverse effects by understanding the nuances of the KD[11].

Additionally, medical students frequently participate in multidisciplinary healthcare teams collaborating with dietitians, nutritionists, and other experts. Medical students can effectively communicate and work with these experts when they have a solid grasp of the KD. With the inclusion of dietary considerations in their treatment plans, this interdisciplinary approach guarantees that patients receive thorough care[9]. While the KD holds potential for various therapeutic applications, it is essential for healthcare providers, including medical students, to be knowledgeable about its applications and possible consequences. Therefore, it is crucial for medical students to understand the KD, as they may come across individuals following this diet and may even choose to engage in dietary regimens themselves for weight loss. This study examines how medical students in the UK use comprehend and feel about the ketogenic diet. We can find areas where education and awareness can be improved, ultimately helping future healthcare providers and the people they may advise about dietary practices by investigating the students' knowledge and perceptions of the KD.

Methodology

Participants Selection and Recruitment

Students at various universities in London enrolled in public health programs were invited. They were asked to participate in the study by responding to emails that contained links to the questionnaire and by posting notices on the websites of their respective universities—undergraduate students who complied with the requirements for participation qualified as eligible participants. The study did not include graduate students, who were under 18, or had not completed the survey. The students were reminded of the voluntary nature of participation and informed of their right to discontinue the study at any time without repercussions. Participants were also assured that their private information would be kept confidential and used only for research.

Data Collection Procedure

Data was gathered in October 2022 using an online survey. There were five sections to the questionnaire. In the first section, sociodemographic data like age, gender, years of education, place of residence, and financial situation were collected. The second section of the questionnaire asked questions about dieting, including previous experiences, motivations for beginning a diet, sources of dietary knowledge, and any relevant university-level nutrition courses. The third section evaluated the subjects' weight, body composition, eating patterns, and self-reported height and weight values—questions with multiple choices about various facets of Ketogenic Diet (KD) made up the fourth section. The fifth section, which measured participants' attitudes towards KD, contained questions with three possible responses: agree, no opinion, and disagree.

Statistical Strategies

The statistical package for social sciences (SPSS) software, version 21.0, was used to analyze the data gathered. All statistical tests had a significance level of 0.05, and p-values under 0.05 with 80% power were regarded as statistically significant. Before analysis, missing data were filled in, and outliers were investigated. The BMI variable eliminated only one extreme value (49 kg/m2). To determine whether continuous variables were normal, the Shapiro-Wilk Test was applied. Descriptive analysis was estimated for continuous dependent and independent variables, including means and standard deviations.

Results

Demographic Characteristics

Out of the 350 students invited from the public health programs, only 76 completed the online questionnaire and were included in the final analysis, representing a response rate of approximately 21.71%. Among the respondents, the majority were females, accounting for 80.3% of the participants, while males constituted 19.7% of the respondents. The average age of the participants was 20±3 years, ranging between 18 and 24 years. Almost all of the participants (97.4%) reported being married.

Participants Perception on, Dietary Habits, Body Weight and Shape

It reveals that 53.9% of the participants expressed satisfaction with their body weight, while 65.8% reported being satisfied with their body shape. In contrast, only 38.2% of the subjects indicated satisfaction with their food habits (Table-1).

Table-1 Participants satisfaction in dietary habits, body weight and shape

Self-satisfaction	Scale	n (%)
Body weight satisfaction	Yes	41(53.9%)
	Some how	14 (18.4%)
	No	21 (27.6%)
Body shape satisfaction	Yes	50 (65.8%)
	Some how	8(10.5%)
	No	18(23.7%)
Dietary habits satisfaction	Yes	29 (38.2%)
	Some how	20 (26.3%)
	No	27 (35.5%)

Further, on nutritional information sources, 34.2% of students used social media, while just 6.6% relied on books. Conversely, most participants (71.1%) reported attending nutrition-related courses at the university (Table-3).

Table-2 Nutrition information sources		
Nutrition information	**Options**	**n (%)**
Source of reliable nutrition information	Nutritionist	9 (11.8%)
	Health care workers	5 (6.6%)
	Books	5 (6.6%)
	Social media	26 (34.2%)
	Mixed	31 (40.8%)
Nutrition course during study	Yes	54 (71.1%)
	No	22 (28.9%)

Knowledge and Perception of KD

The knowledge items linked to the KD and the percentages of the correct and incorrect answers are displayed in Table-3. The mean total score for correct responses was 3.4±3.6 out of 11 points, showing that the participants have little knowledge of the KD. Item no. 11 (KD help to control the hunger sensation) scored the highest percentage of correct answers, 63.2%. In contrast, item no. 8 (Fruit consumption during the KD) scored the lowest percentage of correct answers, 5.3%. The rest of the items showed variable rates of right and wrong answers.

Table-3: Students responses to the knowledge questionnaire				
No.	**Question**		**Correct answers**	**Wrong answer/ I don't know**
1	**The medical indication for KD is for**	**Epilepsy** Diabetes mellitus Autoimmune I don't know	18 (23.7)	58 (76.6)
2	**The following is among the characteristics of KD**	**High fat very low CHO** Balanced diet Diet without bread or rice I don't know	32 (42.1)	44 (57.9)
3	**The ketone bodies are formed from (in human body)**	CHO **Fatty acids** Animal protein I don't know	48 (63.2)	28 (36.8)
4	**The KD increases the utilization of fatty acids**	**Yes** No I don't know	40 (52.6)	36 (47.4)
5	**The following organ depends on ketones as energy source during hypoglycaemia**	**Brain** Muscle All the body organs I don't know	18 (23.7)	58 (76.3)
6	**The ketones body increase during**	**Prolonged fasting** After meals Between meals I don't know	31 (40.8)	45 (59.2)

7	**Muscle cramps and pain are common during keto diet, it is recommended to take the following supplementations**	Calcium + vit D **Magnesium** Potassium I don't know	12 (15.8)	64 (84.2)
8	**Fruit consumption during the keto diet**	Allowed Fresh fruits are allowed while dried are not **Fruits are forbidden** I don't know	4 (5.3)	72 (94.7)
9	**The amount of rice allowed during the keto**	100 gm bread or rice/day **Rice and bread are not allowed in any amount** I don't know	21 (27.6)	55 (72.4)
10	**The main precautions you need to know about keto diet**	**Long term safety is not confirmed** No risk or precaution The side effect disappear with time	40 (52.6)	36 (47.4)
11	**Keto diet help to control the hunger sensation**	**Yes** No I don't know	48 (63.2)	28 (36.8)

n (%)

The participants' perception towards the KD in Table-4 showed that item no. 8 received the highest agreement among the participants, with 60.5% agreeing to the need for long-term clinical trials. Similarly, item no. 7, which focuses on the necessity of medical supervision to follow the KD, received a relatively high agreement score of 78.9%. In contrast, item no. 4, which suggests that the KD is easy to follow, received the highest score of disagreements, with 53.9% of the participants expressing disagreement. Item no. 3, which explores beliefs regarding the numerous health benefits of the KD, received the second-highest score of differences, with 22.4% of

participants disagreeing. The remaining items showed varying levels of agreement and disagreement among the participants.

Table-4 Perception of students about ketogenic diet

No.	Question	Responses	(n)%
1	**KD is popular and many people follow**	Agree No opinion Disagree	44 (57.9) 17 (22.4) 15 (19.7)
2	**I believe that following KD is reliable method for weight loss**	Agree No opinion Disagree	44 (57.9) 19 (25.0) 13 (17.1)
3	**I believe KD has many good health effect**	Agree No opinion Disagree	35 (46.1) 24 (31.6) 17 (22.4)
4	**I believe KD is easy to follow**	Agree No opinion Disagree	21 (27.6) 14 (18.4) 41 (53.9)
5	**I believe that KD is suitable for life long life style**	Agree No opinion Disagree	34 (44.7) 29 (38.2) 13 (17.1)
6	**I believe that KD leads to certain nutrients deficiency**	Agree No opinion Disagree	43 (56.6) 22 (28.9) 11 (14.5)
7	**I believe that KD must be followed under medical supervision or by nutritionist**	Agree No opinion Disagree	60 (78.9) 12 (15.8) 4 (5.3)

8	**I believe that ketogenic diet needs long term clinical research to documents the side effects**	Agree No opinion Disagree	46 (60.5) 24 (31.6) 6 (7.9)
9	**I believe that following KD increase the risk of CVD**	Agree No opinion Disagree	26 (34.2) 36 (47.4) 14 (18.4)

Discussion

The prevalence of obesity has increased globally, which has increased interest in KD as a weight-loss diet strategy. According to the study's data, women comprised the majority of participants (80.3%). This gender distribution is consistent with earlier research that found that most respondents were females when examining respondents' knowledge and perception of KD[12]. It is crucial to remember that the gender distribution in the study population may restrict the applicability of the findings to a larger population. Instead of reflecting the general or medical student population, the results may be more indicative of women's knowledge and perception of KD.

According to studies from various nations, university students follow low-carb diets to varying degrees[13]. For instance, despite having an average BMI within the normal range, a study conducted in Brazil discovered that 1 in 4 students followed a low-carb diet[14]. Contrarily, Lebanon's university students were said to engage in unhealthy dieting habits rarely[15]. These results underline how crucial it is to educate students about healthy eating, realistic healthy weight goals, and improved self-image.

The participants in this study were found to need to gain more knowledge of KD. More than half of the students had no idea that KD could treat diseases like diabetes and epilepsy. Additionally, a sizable portion of participants had little to no knowledge of the long-term adverse effects of KD on health, including acidosis, nutrient deficiencies, osteoporosis, and kidney stones, which suggests that there is a need for better information and awareness about the possible risks connected to KD. Weight management was cited as the primary justification for dieting,

including the KD, consistent with research conducted among medical students. The results of other studies conducted among college students in the United States and medical students in Lahore, Pakistan, agree that participants' knowledge of KD was generally low[16-17].

Social media was the most popular platform for obtaining nutritional information (34.2%), while books were relied upon by a lower percentage of participants (6.6%). The majority of participants (71.1%) did, however, claim to have taken nutrition-related classes at their university, suggesting that educational programmes and level of education are significant determinants of knowledge and perception about KD.

About half of the respondents agreed that long-term clinical trials and medical supervision for KD users were necessary regarding how they perceived KD. While most students thought KD was challenging to adhere to or maintain, there needed to be more disagreement among them regarding KD compliance and ease of adoption. Similar ideas have been discovered in other studies, which suggest that pre-KD counselling and involving family and food buyers can improve adherence to KD. About 60% of the students were aware of the common side effects of KD, including fatigue, headache, dizziness, nausea, vomiting, and constipation. Due to calorie restrictions and decreased energy levels, these effects are frequently linked to different diet plans.

Overall, the results indicate that public health program students need better understand KD, including its potential advantages and risks. This could be accomplished by promoting the safe and knowledgeable use of KD through targeted educational interventions and in-depth counselling.

Limitations and Prospective Implications

The reliance on self-reported survey responses, vulnerable to dishonesty or inaccurate recall, poses one potential end of this study. Additionally, the survey was delivered electronically and could be completed on various devices, opening the door for participant interaction and collaboration that might impact their responses. Given the freedom to complete the survey outside a controlled environment, external influences or social desirability bias may have

discouraged students from fully disclosing their experiences with the KD. Furthermore, the survey questionnaire limited the exploration of knowledge on other significant KD aspects, such as its effects on cognitive function, other chronic diseases, or epilepsy. The survey questionnaire concentrated primarily on the KD and weight management questions. The future implications of this study underscore the importance of a multidisciplinary approach involving healthcare professionals, educators, and researchers to enhance understanding and promote the safe and informed use of the ketogenic diet. By addressing knowledge gaps, providing guidance, and emphasizing the importance of medical supervision, we can strive for better outcomes and mitigate potential risks associated with the unsupervised use of the KD.

Conclusion

The study discovered that people who were already utilizing the KD had higher knowledge levels, and it's interesting to note that these people also had higher BMIs, indicating that weight management may have been a driving force behind choosing the KD. The results imply that medical students showed knowledge of the KD's therapeutic uses, drawbacks, and advantages. People's primary justification for choosing this diet was weight loss. The study also emphasizes the value of pre-diet counselling for people thinking about the KD. Such counselling offers helpful direction to ensure people know all facets of the diet and the proper methods for putting it into practice.

Authors Contribution

Hussain Q: Conception and design.

Kaur K: Data acquisition and analysis.

Amreen R: Writing and revising the draft.

Declaration of Interest

None.

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