

Original Article :

Knowledge and Perception Towards The Keto Diet Among The General Population in Baghdad City, Iraq

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Abstract

Background and Aims:

The ketogenic diet or keto diet (KD) is a recently used diet regime by a lot of the population for weight loss. The purpose of this study was to examine the general population's knowledge and perceptions regarding the KETO diet in Baghdad, Iraq.

Methods:

This study included 203 respondents who completed an internet-based survey. A questionnaire adopted from a previous study was used to assess the knowledge and perception of the respondents.

Results:

Almost all the participants (98.5%) had heard of the ketogenic diet, 41.8 percent were currently following it, and 26% had tried it before. The longest time spent following the keto diet was one month (26%), and 44.3% of participants admitted to taking supplements while on the diet. Around half of the respondents (44.8%) said that the keto diet helped them lose weight and keep it off. In general, most of the participants had good knowledge of the keto diet, except for 2 parts, nutritional ketosis, and long-term studies on the keto diet effect, where the majority answered don't know (70.9%, 43.3%) respectively. In terms of perception, around half of the respondents (42.8%) agreed that the keto diet should only be prescribed by doctors or nutritionists, while 40.0% disagreed that the keto diet is safe to follow for the long term.

Conclusions:

In conclusion, nowadays the ketogenic diet is a very popular weight loss diet, especially among young adults; however, more health promotion and education are required especially about long-term side effects of it.

Keywords:

Knowledge, Perception, Keto Diet, Baghdad.

Introduction

The ketogenic diet or keto diet (KD) is a recently used diet regime by a lot of the population for weight loss, which is characterized by low carbohydrates, adequate protein, and high-fat contents^{1,2}. It was previously used for the treatment of conditions like uncontrolled epilepsy since 19203. Later, researchers found the benefit of the keto diet in the management of many chronic diseases like Alzheimer's, diabetes, Polycystic Ovarian Syndrome, Parkinson's, and cancer^{4,5}. This diet depends on the use of fat instead of glucose as a major source of energy when no or low carbohydrates are consumed. When the fat is burned inside the human body, it is converted to fatty acids and then to ketone bodies⁶. These ketones are used for fuel production by the most important organs in the body including the brain, kidneys, heart, and muscles⁷. KD was classified into several types according to the carbohydrates limitation including Classical Ketogenic Diet (CKD), Atkins Diet (AD), Modified Atkins Diet (MAD), Medium-Chain Triglyceride Ketogenic Diet (MCTKD), and Low Glycaemic Index Treatment (LGIT)⁸. Even though the benefits of using KD were established among the population in the treatment and prevention of different types of diseases^{2,9-11}, there are a lot of short-term

disadvantages noticed among users known as keto influenza¹². This occurs due to lower glucose allocation to the brain within the first few days of applying the regime leading to the feeling of headache, muscle pain, tiredness, and gastrointestinal symptoms like diarrhea or constipation^{13,14}.

In addition, an excess of ketones in the body can cause unwilling symptoms such as acetone breathing, severe vomiting, and dehydration which may end in coma¹⁵. People have to be cautious when following KD because of side effects in different conditions which proved to be contraindications like pregnancy, breastfeeding, cardiac arrhythmia, and advanced heart failure¹⁶. Previous articles had shown low knowledge (3.4 ± 3.6 out of 15) among medical and science college students in Iraq¹⁷. Another study found that only 47 (37.3%) of epileptic patients from Hail City / Kingdom Saudi Arabia have knowledge of KD¹⁸. While (73.2%) of medical students in Lahore heard about KD and only (40.8%) of them were aware of the low carbohydrate and high fat contents¹⁹.

People have to be aware and oriented to different aspects regarding KD to be used with safety. To our knowledge there is no published study assessing the knowledge of the Iraqi general population regarding KD, so, this study aimed to determine the knowledge and perception of the general

population towards the keto diet in Baghdad City, Iraq.

Methods

A cross-sectional study was conducted among 203 respondents using an internet-based method. Data collection was done from October to December 2021. The convenience sampling method was used to collect data. The questionnaire link was distributed to participants through WhatsApp and Facebook groups. A Google document was used as the hosting website for the questionnaire. After the participants click on the link, they will be directed to Google documents, they need to read the consent form carefully and then click on 'yes' I want to participate in the survey and he/she older than 18 years old. Some of the questionnaires are compulsory to answer, while some are optional.

The questionnaire was adopted from a previous study to measure the knowledge and perception of respondents. The knowledge section consists of 18 questions while the perception section consists of 9 questions.

Regarding knowledge questions, participants were asked questions regarding the history and definition of KD, metabolism, diet components, risks, and benefits. Perception questions consist of 9 questions and respondents answer based on a 5-point

Likert scale where a response of (1) meaning strongly disagree and a response of (5) meaning strongly agree.

A consent form was taken from the respondent before answering the questions and ethics approval was taken from the College of Nursing, Al-Bayan University (CON-HE-03). Statistical analysis was done using SPSS version 25. Means and Standard Deviations (SDs) were used for the presentation of numerical variables while frequency and percentage were for categorical variables.

Results

The majority of respondents were female (83.7%) and working (76.3%) with most of them had a university degree (56.2%) followed by a postgraduate degree (42.95). The mean age of respondents was 31.2 ± 7.34 years old and the mean Body mass index (BMI) was 24.4 kg/m² which indicates normal body weight shown in Table 1.

Figure 1 shows how respondents feel about the keto diet. Almost all participants (98.5%) had heard of the keto diet and Figure 2 shows that 42.0% were currently on it, and 26% had tried it previously. The longest time spent on the keto diet was one month (34.8%), and 52.0% of participants admitted to taking supplements while on the diet. Around half of the respondents

Table 1. Socio-demographic characteristics of the respondents

Parameters	N		%	
Gender				
Male	33		16.3	
Female	170		83.7	
Working				
Yes	155		76.3	
No	48		23.7	
Educational level				
Postgraduate level	87		42.9	
University level	114		56.2	
Secondary school	2		0.9	
	Min	Max	Mean	SD
Age (Years)	19	54	31.2	7.34
BMI (kg/m ²)	15.26	34	24.4	3.9

In general, most of the participants had good knowledge of the keto diet, except for two parts, nutritional ketosis where 70.9% answered that they did not know, and regarding if there are any long-term studies on the effect of the keto diet, 43.3% answered that they did not know. In terms of perception, around half of the respondents (42.8%) agreed that the keto diet should only be prescribed by doctors or nutrition-

(54.3%) reported that the keto diet helped them lose weight and keep it off.

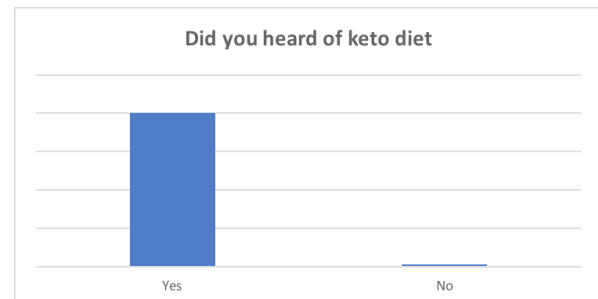


Figure 1: Knowledge about the keto diet

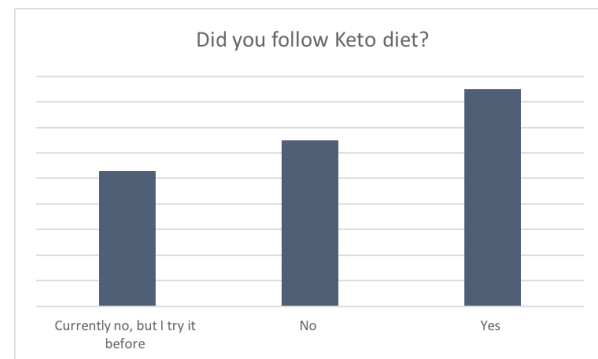


Figure 2: Following Keto diet.

ists and (40%) disagreed that the keto diet is safe to follow for the rest of one's life as shown in Table 2.

Around two-thirds of the respondents answered that the ketogenic diet was originally developed as a therapeutic treatment for individuals suffering from epilepsy (61.0%). Around 95% answered correctly that the ketogenic diet helps to improve hunger cues.

Table 2: Knowledge regarding the keto diet (correct answers)

Knowledge Questions	N	%
The ketogenic diet was initially developed as a therapeutic treatment for epileptic patients.	123	61
The ketogenic diet consists of a high-fat, high-protein, moderate-carbohydrate diet.	137	67.4
The ketogenic diet attempts to force the body to use ketone bodies as fuel rather than glucose.	169	83.2
Carbohydrates are the primary dietary source of ketone bodies.	143	70.4
The ketogenic diet promotes the oxidation and utilization of fatty acids.	144	71

Knowledge Questions	N	%
Being in a metabolic state of ketosis means that ketone bodies are being used as the primary fuel source.	186	91.6
As an energy source, the brain can only use glucose and ketone bodies.	109	53.6
In extreme cases of fasting, ketone bodies are used as a fuel source.	166	81.7
The ketogenic diet aims to mimic a fasted metabolic state without restricting calories.	120	59.1
The type of fat consumed on the ketogenic diet (saturated, monounsaturated, polyunsaturated, and trans fats) is unimportant.	131	64.5
The ketogenic diet comes in a variety of flavours.	142	70
The ketogenic diet aids in the improvement of hunger cues (makes you feel fuller and less hungry).	193	95
Weight loss is not induced by the ketogenic diet.	181	89.1
The ketogenic diet has no effect on blood sugar levels.	163	80.3
The ketogenic diet improves blood cholesterol control (it raises HDL cholesterol while decreasing LDL cholesterol).	144	71
Nutritional ketosis occurs when the blood ketone body concentration is between 1-3 mmol/dL.	43	21.1
The ketogenic diet does not cause stomach upset, nausea, or vomiting.	101	49.8
The ketogenic diet has been the subject of numerous long-term studies.	33	16.2

Regarding the perception of the keto diet, Table 3 shows that the majority of respondents agreed that the keto diet is a popular way to lose weight (55.2%), and around 46.3% believe that following the keto diet, ensures weight loss. About 35.5% agree that following the keto diet is easy and possible. The majority (42.9%) agreed that the keto diet should be prescribed only by doctors. Around 34.0% of participants disagreed that the keto diet is dangerous.

Table 3 Perception of the Keto diet

Responses related to the perception of the keto diet	N	%
I think the keto diet is a popular way to lose weight		
Disagree	6	2.96
Neither agree nor disagree	18	8.87
Strongly agree	64	31.53
Agree	112	55.17
Strongly disagree	3	1.48
Following the keto diet, I believe, ensures weight loss.		
Disagree	10	4.93
Neither agree nor disagree	32	15.76
Strongly agree	67	33
Agree	94	46.31

Responses related to the perception of the keto diet	N	%
I think the keto diet recommendations are high in fat and not enough in protein and carbs		
Disagree	82	40.39
Neither agree nor disagree	36	17.73
Strongly agree	8	3.94
Agree	75	36.95
Strongly disagree	2	0.99
I think the keto diet has more health benefits than health risks		
Disagree	47	23.15
Neither agree nor disagree	29	14.29
Strongly agree	49	24.14
Agree	71	34.98
Strongly disagree	7	3.45
I think following the keto diet is easy and possible		
Disagree	60	29.56
Neither agree nor disagree	18	8.87
Strongly agree	15	7.39
Agree	72	35.47
Strongly disagree	38	18.72
I think the keto diet is safe enough to follow for life		
Disagree	79	38.92
Neither agree nor disagree	26	12.81
Strongly agree	8	3.94
Agree	58	28.57
Strongly disagree	32	15.76
I think the keto diet should only be recommended by a doctor		
Disagree	30	14.78
Neither agree nor disagree	32	15.76
Strongly agree	39	19.21
Agree	87	42.86
Strongly disagree	15	7.39
I think the keto diet is dangerous (i.e. increases a person's risk of developing diseases such as cardiovascular disease, etc.		
Disagree	69	33.99
Neither agree nor disagree	48	23.65
Strongly agree	14	6.9
Agree	26	12.81
Strongly disagree	46	22.66

Responses related to the perception of the keto diet	N	%
I think the keto diet puts people at risk of nutritional and mineral deficiencies		
Disagree	53	26.11
Neither agree nor disagree	13	6.4
Strongly agree	36	17.73
Agree	84	41.38
Strongly disagree	17	8.37

Discussion

The main finding of our study was that the general population has good knowledge and perception toward the keto diet and that was consistent with another study conducted at Fatima Memorial Hospital, College of Medicine and Dentistry, Lahore by Butt 2020¹⁹ in which a total of 250 participants were interviewed. Among all 183 (73.2%) of the participants heard about the ketogenic diet. It was also consistent with another study conducted by Omar AlHaj et al., 2021²¹ which studied KD followers in seventeen Arab countries.

While research shows that successful weight management plans combine diet, exercise, and behavioural therapy, students turn to FAD Diet like the KD in the hopes of losing weight quickly^{22,23}. It is important to note that the KD was not created as a weight-loss method. In fact, the KD was initially developed as a seizure-reduction treatment for patients suffering from epilepsy and other seizure-related disorders²². The KD strict nutrition recommendations (which significantly reduce overall car-

bohydrate intake) come with benefits and risks associated with the chronic use of KD, including its metabolic, endocrinological, and cardiovascular effects²⁴.

According to the current study's findings, approximately 42 percent of respondents use a KD. This result is significantly higher than that of other studies, which show that 18.1 percent of students reported involvement with the KD. Although there are numerous other studies examining KD use, the majority of them concentrate on KD use for chronic disease treatment and prevention rather than weight management or weight loss²⁵.

In this study, 34.8 percent of users have been following or following the KD for less than a month, and only 12.3 percent of users have responded to using the KD for more than 26 weeks (6+ months). These findings show that One-third of the respondents stayed on a KD for a month or less, supporting current research that suggests KD, is not an effective long-term weight management method^{26,27}. Another study found that most of the users are be-

tween 1-6 months, and they believe it is a good short-term diet for weight loss²⁸. One of the reasons why KD, is difficult to maintain long-term is the extreme dietary restrictions that users must immediately adhere to. Such recommendations may necessitate severe calorie and food restrictions, as well as rigorous exercise, both of which are difficult for most people to maintain over time²⁹.

Following the KD, users were also asked about their outcome (or result). KD users could respond with 'weight loss and kept it off,' 'weight loss but gained it back,' 'no change,' or 'other.' Approximately 54.3 percent of users responded to 'weight loss and keeping it off.' This result is consistent with previous studies indicating that the KD is not long-term sustainable²².

Overall, students seemed to struggle with identifying the correct blood ketone body (KB) for nutritional ketosis (question 17). The purpose of the KD is by restricting carbohydrate intake and increasing fat intake, the body is forced to enter a state of nutritional ketosis, where fat becomes the primary fuel source over carbohydrate³⁰. Blood ketone body concentration is the most accurate measurement when testing for nutritional ketosis. The current study results suggest all respondents, have a poor understanding of ketosis biomarkers. This result proposes a disconnect between

KD users' perceived usage of the KD versus their actual usage of the KD.

Regarding the ketogenic diet perception among respondents, the results showed that overall perception scores of the KD were significantly higher or more 'favorable' among males and users versus females and non-users. Overall, the study showed that on average, health-related major groups, and non-health-related non-users, who were males, had the highest perception scores among all groups. These findings show that for males, higher perception scores were significantly affected by health-related major and non-user groups. Among females, non-health-related majors who were users had the strongest feelings towards the KD. These findings show that for females, higher perception scores were significantly impacted by major types and user groups. Overall, females within both major groups, who were non-users, were not in favor of the KD, with the lowest mean perception scores of, $2.70 + 0.5$ (health-related) and $2.79 + 0.49$ (non-health related). Among these groups, female, health-related, and non-users, were responsible for two of the lowest-scoring perception questions (questions 6 & 9), $1.88 + 1.0$ and $1.93 + 0.8$ respectively. This data suggests female, health-related non-users (1) do not believe that the KD is

safe enough for someone to follow for the long term (2) believe the KD does not put individuals at risk for nutrient deficiencies.

Overall, male, health-related majors, who were users, seemed to be most in favour of the KD, scoring the highest (3.53 + 0.35) among all students in this section. Although this result was considered significant, even this group conveyed an overall neutral perception of the KD. Thus, the true significance of this result suggested an overall neutral feeling towards the KD among students. Male, health-related majors, who were users, were also responsible for the highest scoring question (4.5 + 0.5 for question 1), which stated, 'I believe the ketogenic diet is a popular weight loss method used today.' and that parallel with the findings from another study (Butt et al., 2020). This result shows overall, respondents agree that the KD is a frequently chosen weight management method utilized today. This outcome supports current research, that college students are aware of their overweight and obesity risk and are taking the initiative to become more health conscious by shifting their attention to weight loss and weight management methods³¹. While that result was not supported by other findings from other studies which found all sociodemographic variables; gender, age, area of living, living status, and family income have shown no associ-

ation with using KD¹⁷.

Conclusion

The keto diet is a popular weight loss diet nowadays, and the public is aware of it, but more health promotion and education are required.

Conflicts of interest

The authors declare no conflicts of interest.

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