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Knowledge and Perception about Ketogenic Diet

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ABSTRACT

Background and Objectives: Obesity now is pandemic that many strategies are growing to cope with. Ketogenic diet, with its pros and cons, is one of the promising yet query obesity's treatment strategies.

Objectives: This study was aimed to assess the prevalence of using Ketogenic diet as weight losing method among overweight and obese persons and the overall perception towards it.. The objective of this study was to determine the prevalence and Perception about ketogenic diet, its therapeutic uses, possible side effects and benefits among overweight and obese persons visiting primary health care centers in Baghdad. ***Methods:*** Cross sectional study conducted in Baghdad, on a convenient sample of 456 overweight and obese persons attending Family Medicine Based Primary Health Care Centers over a period from 1st September- 1st March 2023). A self-administered structural questionnaire was used for data collection and the persons were interviewed after taking informed consents.

Results: One-thirds of participants were aware of Ketogenic diet as a weight losing method. Whereas the prevalence of being on Ketogenic diet was 18.2%. The awareness rate was found to be influenced mostly by age, gender and educational level. The majority had built their information according to what they read and saw on social media while specialists' support ranked last with only 12% depending on. Overall poor perception level was observed with Ketogenic diet followers, those who took their information from specialists and unemployed participants demonstrated the best perception's levels.

Conclusion: Many people are familiar with the ketogenic diet, but much of what they believe comes from social media, where misinformation spreads easily. This gap between perception and reality leads to confusion about its actual benefits, side effects and needed follow up.

Keywords: *Ketogenic diet, Awareness, Weight loss, medical students.*

1. INTRODUCTION

Obesity rates have doubled since 1990, with 2.5 billion adults now overweight—890 million of whom are living with obesity. In Iraq alone, 30% of the population is affected, with another 30% at risk.(1) (2).This growing crisis is fueling serious health conditions such as type 2 diabetes, cardiovascular diseases, and hypertension, placing an immense burden on healthcare systems.(3)(4).

Following recent studies on obesity treatment, there remains no definitive protocol to address both short- and long-term management effectively (5). Over the years, various approaches have been explored, including dietary modifications, antiobesity drugs, and bariatric surgery. However, each of these methods presents limitations such as cost, side effects, contraindications, or restrictive eligibility criteria.(2)(6)(7)(8).

Recently, clinicians have shifted their focus toward the ketogenic diet (KD) as a potential solution.(4) Originally, Russel Wilder introduced the KD in 1921 to treat epilepsy (9). Its use was fade with the introduction of anti-epileptic drugs and lately started to re-gain importance but for losing weight this time (10). KD is a very low-carbohydrate, high-fat diet that

contrasts sharply with conventional dietary recommendations. (10) Beyond weight loss, KD has shown positive effects on fasting blood sugar, HbA1c levels, and lipid profiles.(11).

For most people, the KD requires making big shifts in how they usually eat. Many traditional foods are sources of carbohydrates such as bread, rice, fruits, vegetables, whole grains, milk and yogurt. Moreover, the proportional higher consumption of fat often carries along a higher intake of saturated fatty acids and high-processed animal-based product.(12).

The ketogenic diet (KD) has created a dilemma.(16) due to limited literature about its exact mechanism of action and long term complications, so we see many experts taking the pro position toward it and as many taking the cons position (16) Whereas short term side effects are documented such as micronutrient deficiencies, dyslipidemia, appetite modifications, and general discomfort (e.g., nausea, constipation, and fatigue –often termed "keto flu"-),. Concerns remain about its potential side effects and long-term implications.(16) (17) such as nutritional imbalances due to restricted food choices, leading to deficiencies in fiber, vitamins, and antioxidants, increased risk of kidney stones, hepatic steatosis, cardiovascular risk regarding lipid profile, and hypoproteinemia(4) (13) KD is not suitable for everyone and requires nutritionist guidance to avoid complications due to restricted food choices.(14) Additionally, close monitoring of ketones, renal function, and electrolytes is essential and transition back to standard diet should be gradual and well-controlled.(10) (15).

Several conditions contraindicate the use of KD, including type 1 diabetes, organ failure, or recent cardiovascular events. Given the limited research on KD's long-term effects, expert opinions remain divided. Safe implementation requires professional guidance, close monitoring of ketones and electrolytes, and a gradual transition back to a standard diet when necessary.(18)(19).

In preventive medicine, highlighting sources of resistance and misconceptions is crucial for developing effective strategies.(20) Here comes the importance of conducting a study on the prevalence and perception of the ketogenic diet among overweight and obese individuals in Baghdad. While this diet has potential benefits, it also carries risks, making it essential to assess public perception before considering widespread advocacy.

To date, no studies have explored how people in Iraq view the ketogenic diet. Understanding its acceptance and feasibility could provide valuable insights for fighting obesity and subsequently helping people make informed decisions about their health rather than relying on misleading online content.

2. METHODOLOGY

A cross-sectional study conducted on 456 overweight and obese individuals attending five family medicine-based Primary Health Care Centers (PHCC) in Alkarkh, Baghdad, chosed by a lottery from a list of total PHCC in Alkarkh. Over a sixmonth period (1st Sep- 1st March), we gathered data through structured questionnaires, assessing participants' awareness and perception of the KD as a method for obesity management. Participants were selected based on BMI measurements taken at PHCC nutrition rooms, adults with BMI 25 and above were included.

2.1-The questionnaire was structured into three parts:

1- Demographics & BMI: We gathered socio-demographic data, including age, gender, occupation, and health history. BMI was calculated to classify participants as overweight (BMI 25-29.9) or obese (BMI 30+). Those below 25 were excluded from the study along with attendants below 15 years, pregnant and lactating women and illiterate people.

2- KD Awareness: Participants were asked if they were aware of KD as a method for obesity treatment. Those unaware were excluded from further questions. Those who proceeded specified their information sources, categorized as specialists or non-specialists, and the duration they followed KD (less than 1 month, 1-3 months, or more than 3 months).

3- Perception Assessment: A 20-question evaluation measured participants' understanding of KD. Correct answers received 1 point, and incorrect or unknown responses received 0. The total score of perception was calculated by dividing number of correct answers by 20 (total number of questions) multiplied by 100. Scores below 50% indicated poor perception, while 50% and above were categorized as fair to good perception levels.

2.2 Definition of variables:

1- Age. Divided into (≤ 45 years - > 45 years)

2- Gender (Male, female)

3- Marital status whether (Single, Married, others whether divorced or widowed)

Education level (Primary, intermediate, university and above)

4- Occupation (Employed, un-employed)

5- History of chronic diseases (positive or negative).

6- Source of information (Specialist, non-specialist)

7- Weight status (Overweight or obese)

2.3 STATISTICAL ANALYSIS

The collected data were introduced into SPSS V24 statistical program. The descriptive statistics were presented using tables and graphs Chi square test was used to find out significance of association between related categorical variables. P value less than .05 was considered as a discrimination point of significance.

2.4 Pilot study

Prior to the data collection, pilot study was conducted on 10 overweight and obese attendants to AlAdil family medicine based PHC to pretest the questionnaire that was used in the study to assess its applicability and to explore if there is any difficult questions or administrative obstacles. No major changes were done, and the ten participants were excluded from the study sample.

3. RESULTS

Table (1): Association between studied variables and awareness of KD

Studies variables		**Total**	**Are you aware of Ketogenic Diet?**				**P value**
			No 298		**Yes 158**		
			N	**%**	**N**	**%**	
Age	≤45 year	318	196	61.60	122	38.40	0.011
	>45 year	138	102	73.90	36	26.10	
Gender	Male	156	110	70.50	46	29.50	0.010
	Female	300	188	62.70	112	37.30	
Education	Primary or below	76	74	97.40	2	2.60	0.001
	Secondary	184	112	60.90	72	39.10	
	University, above	196	112	57.10	84	42.90	
Marital status	Single	66	36	54.50	30	45.50	0.116
	Married	342	228	66.70	114	33.30	
	Other	48	34	70.80	14	29.20	
Occupation	Employed	224	138	61.60	86	38.40	0.099

	Unemployed	232	160	69.00	72	31.00	
CD	No	368	238	64.70	130	35.30	0.534
	Yes	88	60	68.20	28	31.80	
Weight status	Overweight	158	98	62.03	60	37.97	0.277
	Obese	298	200	67.11	98	32.98	

Table (1) shows that being divorced or widowed significantly associated with using KD than married or single participants with (P.value=0.017) . Surprisingly, those who are free from chronic diseases showed to use KD significantly more than those with chronic diseases with (P.value=0.005) .

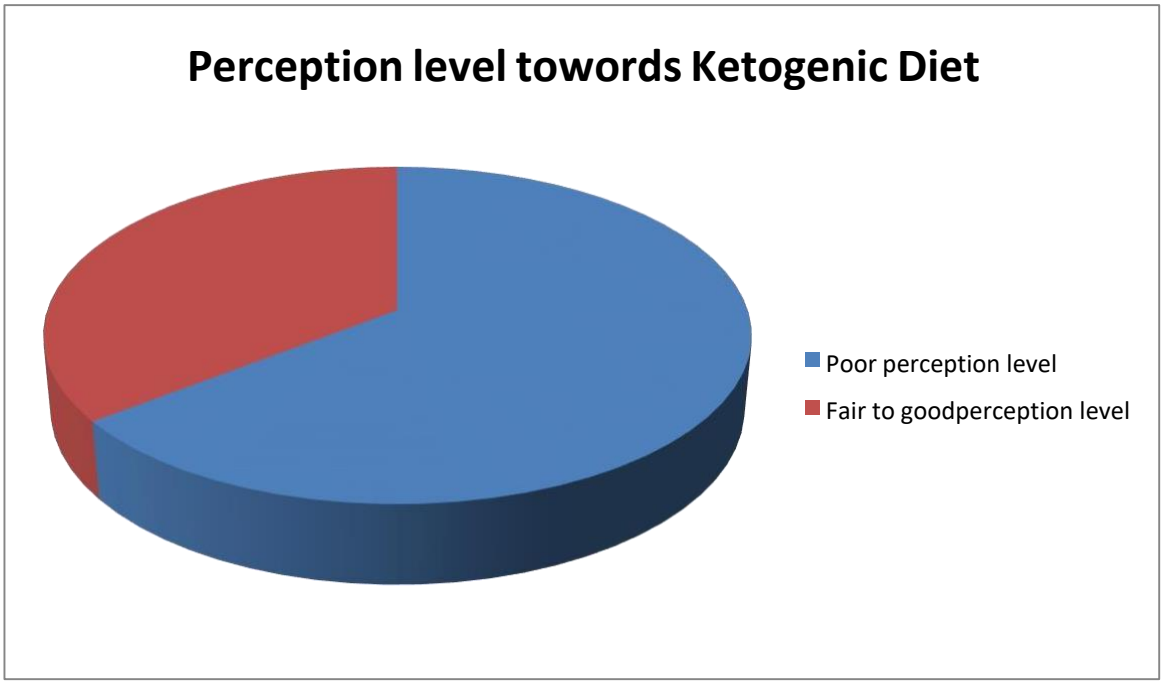
However, those who obtained information from specialists are using KD more than those who obtained their information from non-specialists(P.value=0.013). All other variables failed to reach significant levels.

Table (2): Association between studied variables and using KD during the last 2 years among patients aware of KD

Studied variables		**Total**	**Follow KD during last 2 year**				**P value**
			No 75		**yes 83**		
			N	**%**	**N**	**%**	
Age	≤45 year	122	58	47.50	64	52.50	0.973
	>45 year	36	17	47.20	19	52.80	
Gender	Male	46	26	56.50	20	43.50	0.144
	Female	112	49	43.80	63	56.30	
Education	Primary or below	2	2	100.00	0	0.00	0.324
	Secondary	72	34	47.20	38	52.80	
	University or above	84	39	46.40	45	53.60	
Occupation	Employee	86	38	44.20	48	55.80	0.367
	Unemployed	72	37	51.40	35	48.60	
Marital status	Single	30	18	60.00	12	40.00	0.017
	Married	114	55	48.20	59	51.80	

	Other	14	2	14.30	12	85.70	
CD	No	130	55	42.30	75	57.70	0.005
	Yes	28	20	71.40	8	28.60	
Source of information	Specialist	19	15	78.94	4	21.05	0.013
	Non-specialist	139	68	48.92	71	51.07	
Weight status	Overweight	61	28	45.90	33	54.09	0.185
	Obese	97	55	56.70	42	43.29	

Overall poor perception level was observed. With 64.5% of those who were aware of KD having poor perception level., as shown in Figure (3.5)



Figure(1) Perception level of people who are aware of KD towards it.

Table (3) shows that following KD during last 2 years was significantly associated with good perception level, (P.value= 0.005).

Table (4): Association between following KD and perception level toward it

	Perception level		**P value**
	Poor	**Fair-good**	

		N	%	N	%	
Followed KD during last 2 year	No 75	60	80%	15	20%	0.001
	Yes 83	42	51%	41	49%	

Table (5) shows that being employed was significantly associated with worse perception level (P-value=0.030). Along with the source of information where specialists significantly associated with better perception level. All other variables failed to reach significant levels.

Table (5): Association between studied variables and perception.

			Perception level				P. value
		Total	Poor 102		Fair-good 56		
			N	%	N	%	
Age	≤45 year	122	82	67.20	40	32.80	0.199
	>45 year	36	20	55.60	16	44.40	
Gender	Male	46	34	73.90	12	26.10	0.115
	Female	112	68	60.70	44	39.30	
Education	Primary or below	2	2	100.00	0	0.00	0.217
	Intermediate	72	42	58.30	30	41.70	
	University or above	84	58	69.00	26	31.00	
Occupation	Employee	86	62	72.10	24	27.90	0.030
	Unemployed	72	40	55.60	32	44.40	
Marital status	Single	30	22	73.30	8	26.70	0.486
	Married	114	72	63.20	42	36.80	
	Other	14	8	57.10	6	42.90	

CD	No	130	80	61.50	50	38.50	0.087
	Yes	28	22	78.60	6	21.40	
Source of information	Specialist	19	5	26.31	14	73.69	0.002
	Non-specialist	139	97	69.78	42	30.22	
Weight status	Overweight	61	35	57.37	26	42.62	0.134
	Obese	97	67	69.07	30	30.92	

4. DISCUSSION

KD is gaining popularity for losing weight emerging the need for a comprehensive studies discussing the prevalence of the KD for weight loss and the perception towards it.

In the current study, the prevalence of obese and overweight persons who were aware of KD and those who followed it goes in line with another study held in Saudia Arabia among 1999 Saudi adults where they reported 24% of the participants followed KD. However, Alhaj et al, in their multinational study across 17 countries, counteract this prevalence as they reported 72% (1929) were following KD. (22)(25)

The variation in prevalence may be clarified by dietary tradition for each country. As KD depends on very low carbohydrate meals, whereas traditional Iraqi food tends to be very high in carbohydrates, making KD more challenging. Moreover, since the current study was conducted through direct interviews rather than being web-based, participants had no opportunities to search for information, which may have further influenced the reported prevalence. For comparison, a web-based study among general population in Baghdad showed that 98.5% from total of 206 participants were aware of KD, while 41% were currently using it(22).

Other studies targeting specific groups, such as medical students, showed varying rates of awareness and adoption (23) (24). Being held among medical students, high prevalence rate was expected as KD is part of their specialty.

Associated variables with prevalence of KD-aware subjects:

Various Socio-demographic factors were found to influence the prevalence of awareness among participants towards KD. Younger age group (below 45 years old) is significantly more familiar with KD, likely due to their focus on body image and more engagement with social media, making them more familiar to diet methods' updates and more accepting untraditional methods than older age group. Being female associated with higher awareness rates, which is expected as females used to be driven by their interest in beauty and body shape more than male. Also, female are more susceptible to obesity making them good candidate for searching about new method for losing weight, KD is just one of those methods(1)(27).

Educational level plays a role in awareness about KD, having a primary school degree or below is less likely to be familiar with KD suggesting an expected link between education and health awareness.

Interestingly, majority of KD followers reported being on KD for less than 3 months which gave a clue that it is difficult to stick to. This result is supported by by Alhaj et al, and other past studies suggesting the KD is not sustainable for long-term (25)(28)

Associated variables with prevalence of KD followers:

Married participants exhibited a significantly lower prevalence of following KD. This trend could possibly comes from social obligations and responsibilities that come with marriage.

Surprisingly, those who were free from chronic diseases exhibited higher rate of following KD than those with chronic diseases despite KD's privilege for improving their health along with weight losing. This might be due to habitual medical advice of decreasing fat intake, which is against the concept of KD or patients focusing their efforts to treat the disease itself without thinking of improving its root, e.i obesity.

Unexpectedly, participants who got their perception from Non-specialists sources were associated with higher rate of following KD, which creates a dilemma between what people thought they master and what they are really mastering.

Perception of participants to KD

The overall perception score of the KD was poor, partly due to nature of targeted sample which was taken from general population were diverse range of educational levels are faced but mostly due to un-authorized source of information participants used to gather their information from, such as social media where false information is spreading faster and far beyond truthful ones.

This result goes against Alhaj. et al, where good perception level was found in across 17 arabic countries. A cross sectional study by Hasan and Ghazi, 2019. conducted on the general population of Baghdad, has also shown a good perception toward KD (30). diverse perception levels reported in many studies among medical students This diversity might be attributed to targeted sample, whether in their basic or clinical years. (31) (29) (35). diverse perception levels reported in many studies among medical students This diversity might be attributed to targeted sample, whether in their basic or clinical years.

Variables influencing perception level

Those who followed KD during past two years had significantly higher perception level than non-followers. Which goes in line with the results obtained from D'Agostino et al, 2019(21). The motivation to investigate a what they are going through often leads to a more informed understanding, which may account for the followers' greater realistic perception of the KD versus non-followers. It's notable that the overall mean KD perception was still below average.

Socio-demographic variables were found unassociated with perception level, that is apart from occupation as we found that being unemployed was significantly associated with better perception level, likely due to having more leisure time to explore KD, and being less susceptible to employee communities where rumors and misinformation could be easily spreading.

Non-specialist- sources of information (Social media mostly) shown to have significant association with poor perception level. This is expected as falsehood information tends to spread faster and far beyond trustworthy information on social media(41). Similar results were obtained from a study held among college students at Palestine, 2021. (23). That's in contast to AlHaj et al, who reported 43% of Arab adults heard about KD from specialist, .(25). Is it because of the huge gap of trust between Iraqi doctors and patients, or is it just riding the wave of underestimation to healthy standards of living? This result reflected a real challenge as half – baked information gained from haphazard sources and adopted without the direction of a specialist would lead to serious health complications.

5. CONCLUSION

1- The prevalence of those who were aware of KD among obese and overweight persons in Al- Karkh, Baghdad was 35%.

Younger age groups, females and highly educated participants demonstrated significant association with higher awareness prevalence rate.

2- The prevalence of using KD as weight losing method among overweight and obese persons in Al-Karkh, Baghdad was 18.2%. Those who are free from chronic diseases had significantly associated with higher prevalence rate along with being divorced or widowed and having information from non-specialist sources.

3- The vast majority was getting their awareness from social media

4- Over all poor perception level regarding KD was assessed, with users better than non users.

5- Apart from being unemployed, all variables failed to demonstrate a statistically significant effect on the level of perception.

LIMITATIONS OF STUDY

The limitations of the study are that only students of MBBS were enrolled and data were collected from a single medical college. In future, studies with larger sample size are recommended in which perception of students of other colleges and universities may also be evaluated.

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CONFLICT OF INTEREST

None to declare.

FINANCIAL DISCLOSURE

None to disclose.

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