

ARE YOU ON A “KETO” DIET? Should you worry about side effects?

When I say “*true*” *keto* I say that because I hear people say they are doing Keto but not completely like the book says. <50g carbs. I am *addressing a true keto diet in these examples*.

Some negative effects are:

- 1) A higher prevalence of kidney stones.
- 2) Imbalance of sodium and potassium.
- 3) Below RDI in many areas.
- 4) Explosive strength may be reduced.

I would classify the KETO diet strategy as an *elimination diet*. What does that mean? If you eliminate food groups or specific categories of foods you are using an “*elimination diet strategy*”. This may be out of necessity due to a sensitivity or allergy to a particular food or food group OR you are doing it because you want to shed some body fat and have heard a “low fat”, “low carb”, “non-dairy”, “vegan” and the list goes on, may be the ticket to easy or fast weight loss. When you eliminate a particular food group you are usually eliminating some nutrients that are contained in that food and are more bioavailable or more easily assimilated due to the nature of that particular food. In a Keto diet you are eliminating, or almost eliminating carbohydrates, and also eating moderate protein and a high amount of fat. Some people prefer this eating style because it helps them curb their appetite, although studies show compliance is low for most people.







A “Keto diet” is a specific sub set in the low carb diet category.

A “true” keto diet has moderate protein, high fat and very low carbs.

<50g carbs, (1.2–1.5 g/kg body weight) protein (OR .545g/lb) & the balance of calories from fat. Another name for it is **Very Low Carb Keto Diet (VLCKD)**.

1) Study: The estimated incidence of **kidney stones in patients on *ketogenic diets is 5.9%***. Its incidence is approximately **5.8% in children and 7.9% in adults**. Uric acid stones are the most prevalent kidney stones in patients on ketogenic diets followed by calcium-based stones. Some studies don’t show a difference between adults and children.

Incidence and Characteristics of Kidney Stones in Patients on Ketogenic Diet: A Systematic Review and Meta-Analysis

Prakrati Acharya ^{1,*}, Chirag Acharya ², Charat Thongprayoon ^{3,*}, Panupong Hansrivijit ⁴, Swetha R. Kanduri ⁵, Karthik Kovvuru ⁵, Juan Medaura ⁶, Pradeep Vaitla ⁶, Desiree F. Garcia Anton ⁶, Poemlarp Mekraksakit ⁷, Pattharawin Pattharanitima ^{8,*}, Tarun Bathini ⁹ and Wisit Cheungpasitporn ^{3,*}

3.2. Type of Kidney Stones among Patients on Ketogenic Diet

Within reported studies, 48.7% (95% CI, 33.2–64.6%) of kidney stones were uric stones, 36.5% (95% CI, 10.6–73.6%) were calcium-based (CaOx/CaP) stones, and 27.8% (95% CI, 12.1–51.9%) were mixed uric acid and calcium-based stones, respectively.

2) K⁺/Na⁺ (sodium potassium ratio) typically 0.47 on keto vs 2.0 and up to 5.0 in ancestral humans. The higher the ratio the healthier we are.

Potassium and Sodium Interactions

Dietary potassium (K⁺) and sodium (Na⁺) are similar to Chinese Ying/Yang philosophy in which seemingly opposite forces are interconnected and complementary. In human nutrition, the dietary K⁺/Na⁺ ratio maintains a huge effect upon our health and wellbeing. The higher the dietary K⁺/Na⁺ ratio, the healthier we are; the lower the ratio, the greater we are at risk for cardiovascular disease, cancer, osteoporosis, kidney disease and other pathologies (31-43). VLCKD not only simultaneously induce dietary potassium deficiencies, but they almost always increase dietary Na⁺ intake (Table 1). These actions reduce the K⁺/Na⁺ ratio to 0.47 (Table 1) which is even lower than the current U.S. value of 0.76 (44), 4.3 times lower than recommended values of 2.0 (Table 2), and even 10 times lower than the estimated K⁺/Na⁺ ratios of ≥ 5.0 in human ancestral human diets (43).

3) Very poor dietary reference intakes due to macronutrient imbalance on keto.

Table 1. The nutritional composition of a popular one-week ketogenic diet meal plan (2) for an adult male consuming 2400 kcal (24). Nutrient values for the meal plan were generated from Nutritionist Pro software (23).

	kcal	PRO(g)	CHO(g)	FAT(g)	CHOL(mg)	SAT FAT(g)	K ⁺ (mg)	Na ⁺ (mg)	K ⁺ /Na ⁺	Ca ²⁺ (mg)	Mg ²⁺ (mg)	Ca ²⁺ /Mg ²⁺	Folate(ug)	Vit C(mg)
Mon	2400	93.2	21.3	218.2	746.7	80.8	1355.9	3135.3	0.43	693.9	137.3	5.05	117.2	15.4
Tue	2400	142.3	40.5	188.8	975.0	92.8	1766.9	3338.4	0.53	2119.8	305.3	6.94	172.5	12.2
Wed	2400	122.5	34.9	197.7	1170.6	93.7	2933.1	7228.2	0.41	974.5	208.6	4.67	314.1	96.8
Thur	2400	80.3	31.7	222.7	379.8	68.4	1701.6	3610.8	0.47	1256.4	209.1	6.01	216.5	27.2
Fri	2400	102.1	34.9	210.8	779.4	63.4	2399.6	4476.5	0.54	908.9	117.8	7.72	225.9	34.8
Sat	2400	96.7	29.6	212.8	863.7	87.0	1875.8	4505.5	0.42	700.9	145.3	4.83	189.9	97.7
Sun	2400	145.5	40.4	145.0	1141.5	114.2	2578.3	5300.3	0.49	1157.5	1224.0	0.95	155.2	57.2
Mean	2400	111.8	33.3	199.4	865.2	85.7	2087.3	4513.6	0.47	1116.0	335.3	5.17	198.8	48.8

Table 2. The U.S. dietary reference intakes (DRI) (25) and dietary guidelines (26) for nutrients displayed in Table 1.

Compare the diet above to the Dietary Reference Intake below.... many discrepancies

	PRO(g)	CHO(g)	FAT(g)	CHOL(mg)	SAT FAT(g)	K ⁺ (mg)	Na ⁺ (mg)	K ⁺ /Na ⁺	Ca ²⁺ (mg)	Mg ²⁺ (mg)	Ca ²⁺ /Mg ²⁺	Folate(ug)	Vit C(mg)
DRI	56	130	76.8	300 mg	24	4700	2300	2.0	1000	400	2.5	400	90

4) After being on VLCKD for several weeks the stored glycogen levels are diminished which can affect explosive strength or sprint type events.

This may not effect an endurance runner but it will typically diminish explosive strength athletes such as sprinters, football, weightlifting and Hockey, just to name a few. This is due to reduced glycogen stores in the muscle. Glycogen is stored carbohydrates and is the stored fuel we use for fast explosive movements. Glycogen is reduced in a keto carb restricted diet. Slowing down burns more fat. Speeding up burns more glycogen.

Any “diet” that eliminates or greatly restricts foods or food groups all have impacts that may not be apparent immediately.

Scott Herkes CISSN
MSc- dip Sports and Exercise Nutrition
QC Nutrition Specialists