

Weight Gain and the Risk of Kidney Stones

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Abstract:**Aim:**

To do a survey on weight gain and risk of kidney stone.

Background:

The cohorts are given questionnaire that provides detailed information on diet, medical history, medications and about the incidence of newly diagnosed diseases such as kidney stones. For each cohort, information on weight and height was obtained on the baseline questionnaire. The baseline questionnaire also asked about weight in early adulthood (age 21 years in men and 18 years in women).

Reason :

Larger body size may result in increased urinary excretion of calcium, oxalate, and uric acid, thereby increasing the risk for calcium-containing kidney stones. This survey is to create an awareness on risk of kidney stones due to weight gain.

Result:

From the given questionnaire we found that 29.3% of cohorts are at risk of getting kidney stone.

Conclusions:

Obesity and weight gain increase the risk of kidney stone formation. The magnitude of the increased risk may be greater in women than in men.

Keywords: calcium, oxalate, obesity, renal stones.

INTRODUCTION:

Kidney stones are a major cause of morbidity(1-3). About 80% of kidney stones contain calcium, and the majority of calcium stones consist primarily of calcium oxalate. The identification of common, modifiable risk factors for kidney stones may result in new approaches to treatment and prevention(4,5). Obesity is associated with insulin resistance and compensatory hyperinsulinemia, metabolic derangements that may lead to the formation of calcium-containing kidney stones. A recent metabolic trial demonstrated that insulin resistance was associated with defects in renal ammonium production ,(6)and an examination of more than 4500 patients with a history of kidney stones showed that urinary pH was inversely related to body weight.(7) A defect in renal acid excretion could lead to hypocitraturia, an important risk factor for calcium nephrolithiasis. (6,8) Hyperinsulinemia may contribute to the development of calcium stones by increasing the urinary excretion of calcium. (9-11). Although larger body size may increase the urinary supersaturation of calcium salts, prospective data on the relation between body size and the risk of kidney stone formation are limited. We have previously reported on the association between higher body mass index (BMI) and an increased risk of incident ,To date, no prospective study has evaluated the relation between body size and the risk of kidney stone formation in younger women, and no study has determined if weight gain influences risk. In addition, it is unknown if measures of central adiposity, such as waist circumference, are associated with risk. To determine if weight, weight gain, BMI, and waist circumference are associated with incident kidney stone formation(12).

MATERIALS AND METHODS

Self-prepared questionnaire, 100 cohorts, BMI calculator, , weighing machine, measuring tape.

Assessment of Body Size: For each cohort, information on weight and height was obtained on the baseline questionnaire. The baseline questionnaire also asked about weight in early adulthood (age 21 years in men and 18 years in women). Self-reported weight was updated every 2 years. Body mass index was calculated as the weight in kilograms divided by the square of height in meters(13) Self-reported weights from 123 men and 140 women in the 2 cohorts were highly correlated with values obtained Waist and hip circumference . For waist circumference, participants were instructed to measure their waist circumference at the level of the navel, and for hip circumference they were instructed to measure the largest circumference around the hips (including the buttocks). If a tape measure was not available, the questionnaire instructed participants to leave the question blank. The questionnaire also instructed the participants to perform the measurements while standing and to avoid measuring over bulky clothing. Participants reported their waist and hip circumference to the nearest quarterinch. The self-reported measures of waist and hip circumference have also been validated.

Assessment of Diet: The semiquantitative food frequency questionnaire given asked about the annual average use of more than 130 foods and beverages. In addition, respondents provided information on the use of nutritional supplements, taken either alone or in multivitamin form. (21,22) Nutrient intake was computed from the reported frequency of consumption of each specified unit of food and from United States Department of Agriculture data on

the content of the relevant nutrient in specified portions. Nutrient values were adjusted for total caloric intake to determine the nutrient composition of the diet independent of the total amount of food eaten.^{23,24}The intake of supplements (such as vitamin C and calcium) in multivitamins or isolated form was determined by the brand, type, and frequency of reported use.

Questionnaire related to kidney stone incidence:

Symptoms of renal stones

- 1). Have you ever had pain in the lower abdomen?
 - a. never had
 - b. rarely
 - c. frequently
- 2). Have you ever had blood in the urine?
 - a. never had
 - b. rarely
 - c. frequently
- 3). Have you ever felt pain on urination?
 - a. never had
 - b. rarely
 - c. frequently
- 4). Average water intake per day?
 - a. 1l or lower
 - b. 2-3 litres
 - c. 3 litres or more
- 5). Do you get fevers and chills often?
 - a) yes b)no
- 6). Any hereditary problems of renal stones?
 - a)yes b)no
- 7).Have you ever had any renal problems
 - a). yes. b). no
- 8). Have you ever been diagnosed with urinary tract infection
 - a). yes. b). no
- 9). Have you ever been diagnosed with increased urinary excretion of calcium
 - a). yes. b). no
- 10). Do you intake excess of calcium in diet.
 - a). yes b). no

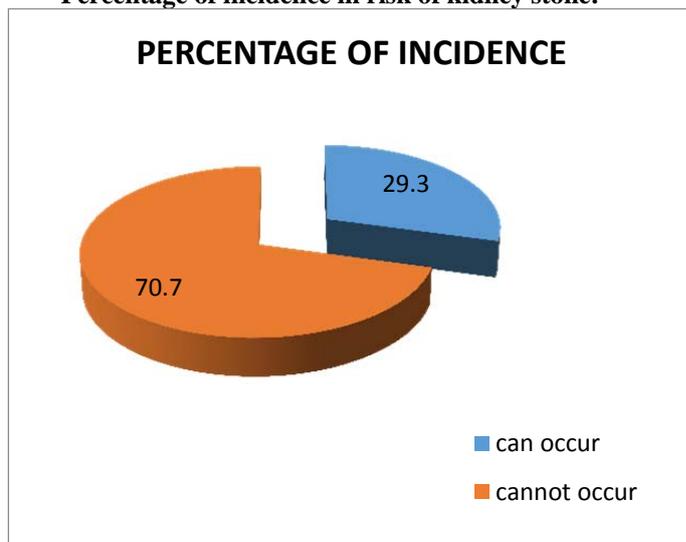
Survey questions are

For calculating BMI

- 1). Weight-Kgs
- 2). Height –m 2
- 3). Any weight related medical problems in the past?

(Over wveeight also increases risk of kidney stone as seen from above)

**RESULT:
Percentage of incidence in risk of kidney stone:**



DISCUSSION:

The evaluation of BMI revealed a high prevalence of overweight and obesity among the study population. Overweight was significantly more frequent in men than in women with calcium oxalate stone disease. It is known that overweight, dietary pattern, and the frequency of diet-related diseases are linked together(18). A case control study indicated that subjects on a low-fat or weight reduction diet had a substantially reduced risk of urolithiasis(19).

In our present study we have calculated BMI and risk of getting kidneystones with increase in weight and some diagnostic questionnaire.

CONCLUSION:

As seen above all questionnaire and the obtained percentage of incidence is 29.3%.And we also conclude that *Obesity and weight gain increase the risk of kidney stone formation. The magnitude of the increased risk may be greater in women than in men.*

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