

A Study On Fast Food Consumption And Its Risk On Kidney Disorder

Catherine Julie Aarthy.C

Assistant Professor (S.G), School of Management, HITS, Chennai, India

Email: catherinej@hindustanuniv.ac.in

ABSTRACT

Kidney failure is fast assuming its alarming proportions according to Indian Renal Foundation. By 2030, more than 2 million people will be receiving treatment for kidney failure (Gilbertson. D *et al*, 2003). Kidney disease is now at epidemic levels and is growing nationally at a staggering rate of 8% per year (Bangboye EL, 2003). Present study analyses the inter-relationship of fast food consumption pattern and incidence of kidney disorder. It progresses on to kidney failure in many proceeding to dialysis or kidney transplantation to survive. Research has shown that early detection and treatment can significantly prevent or prolong the need for dialysis. (Brainlips, 2006). A combination of correct diagnosis, better nutrition, therapeutic and self-help components optimizes to reduce the effects of kidney disorder in future. Several researches show that fast foods have direct impact on water retention and also high calcium levels. Changes in dietary practices may be a key driving force to prevent or succumb to this disease (Romero.V, *et al* 2010).

Keywords

Kidney failure, additives, fast foods, hidden sodium, High calcium levels, renal function, Kidney stones

Article Received: XX Xxx 2021, Revised: XX Xxx 2021, Accepted: XX Xxx 2021

Introduction

Fast food consumption though a form of western culture, has become a common food habit (Tsugana *et al*, 2004). The taste, attractiveness, quick and easy to serve and eat stands high for preferring fast foods. The ingredients and additives in the preparation of fast foods are not always providing a healthy diet for the body. The levels of fat and sodium cause high blood pressure or hypertension. Excess sodium has a negative effect on renal function leading to kidney disease, it also causes stroke, thickening of heart's walls (ventricular hypertrophy) and proteinuria – a condition that indicates kidney damage. There is a lot of hidden sodium present in all the fast food items causing the kidneys to excrete more calcium into the urine (Kimura and Brenner., 1995). High concentrations of calcium in the urine combine with oxalate and phosphorus to form stones (Zerweki *et al.*, 1987).

Kidney Stones are found primarily in three forms: Phosphates, Calcium Oxalate and Urates. Type of Kidney stones can be determined by type of hardness of stones. Most kidney stones contain calcium as a main constituent. Although their cause is often unknown, abnormally elevated urinary calcium (hypercalciuria) increases the risk of developing calcium stones (Heller, 1999). Renal stones can cause an obstruction preventing your kidneys from being able to remove wastes. A

kidney stone may also have rough or sharp edges that can cause damage and scarring in the kidney, which could lead to chronic kidney disease (CKD) and even Kidney failure. Increased dietary salt has been found to increase urinary calcium excretion, and this effect may be more pronounced in patients with a history of calcium-containing kidney stones (Audran, 2000).

This study analyses the inter-relationship of fast food consumption pattern and incidence of kidney disorder. The ingredients and additives in the preparation of fast foods cause ill effects to the body such as diabetes, heart disease, stroke, kidney disease and cancer.

1.1 Objectives of the Study:

1. To assess the fast food consumption patterns of adults age range between 20-40 years
2. To study the dietary pattern and nutrient intake of fast food consumers
3. To find out serum urea, creatinine, sodium, calcium, potassium and phosphorus levels (Biomedical Parameters) of fast food consumers.
4. To find out the risk factors of fast foods on kidney disorders.

Methodology

The research design for this study is ex-post facto and survey method was followed. 100 samples consisting of both men and women were selected

who were fast food consumers from BPO's and Call centers.

The criteria for selection include:

- Fast food consumers in the age group of 20-40 years
- Absence of any chronic kidney disorder
- Willingness of the subject to participate in the study.

A questionnaire was developed in view with the objectives of the study to collect pertinent information. A pilot study was undertaken to check the feasibility and reliability of the questionnaire. Age matched fast food consumers were selected from BPO/ Call centers based on their willingness to participate.

The selected 100 fast food consumers were examined through a questionnaire and investigated their socio economic background, diet survey, personal habits and medical history. Among the 100 fast food consumers 50 were selected according to the degree of disorders they had, and a three-day dietary recall was undertaken. From the 50 samples, ten samples were observed with high level of sodium intake. They were screened for serum urea, creatinine, sodium, calcium phosphorous and potassium

Results and Discussions:

3.1 Fast Food Consumption Pattern of Adults:

It was found that all the respondents had the habit of consuming fast foods, in which 42% of them consumed fast foods 3-4 times per week and the remaining 58% of them consumed more than 4 times per week which is represented in fig 3.1.1. The reasons quoted for the consumption of fast food were: taste (100%), fast / convenient to eat (71%), Easily Available (67%), Easier to Consume (60%) and Cheap (55%) (Percentage exceeds 100 due to multiple responses as represented in fig 3.1.2).

The study further revealed that the majority of fast food consumers consumed high salt foods daily. The table 3.1.1 clearly depicts the pattern of consumption of different foods which are high in salt content.

The frequency explains that there is regular consumption of fast foods which are high in sodium. Only 10-50% of them consumed rarely. The study further showed that 10 percent of the fast food consumers had a familial history of kidney disorder. Out of the fast food consumers 30 percent of them were suffering from kidney stones.

The medical disorder of fast food consumers, 38 percent of the respondents had hypertension, 4 percent had diabetes, 22 percent had cardiovascular disease and 8 percent had hyperparathyroidism. The findings also revealed that these respondents were suffering from several symptoms which is depicted in the following table 3.1.2

The survey also revealed that 58 percent of them consumed fast food more than four times per week out of which 50 of them belonged to sedentary activity category, 6 from moderate activity and 2 from heavy activity category. Since majority of them who consumed fast food belonged to sedentary activity, a dietary recall was confined to 50 sedentary adult men (N=28) and women (N=22).

3.2 Assessment of dietary pattern and nutrient intake of fast food consumers:

The mean energy, protein, fat and sodium intake of the sedentary men and women was found to be high when compared to RDA, it was found to be significant at 1% level (Table 3.2.1). It was also found out that from the 50 samples, men (N=19) and women (N=11) had kidney stones and the others did not have kidney stones (Table 3.2.2). With regard to the incidence health problems it was found to be more among those suffering with kidney stones than those who were not suffering from such complaints and still consuming fast foods.

3.3 Biomedical Parameters:

Among the 30 respondents 10 respondents with very high sodium consumption were selected for screening. The screening results revealed that the mean serum, urea, creatinine, calcium and potassium levels of fast food consumers were very high against normal median values. Further consumption of fast foods may also increase sodium and phosphorus levels in the blood which results in continuous stress on the kidney leading to severe chronic kidney disorder. Hence heavy fast food consumers are at a great risk of developing kidney disorder.

Further Karl Pearson's Correlation between the nutrient intake and serum urea, creatinine, sodium, calcium, phosphorus and potassium levels of fast food consumers (Table 3.3.1) showed that there is a significant positive relationship of energy ($r=0.779^{**}$) with serum calcium at 1% level of

significance, sodium and serum urea ($r=0.957^{**}$), creatinine ($r=0.965^{**}$), calcium ($r=0.871^{**}$) and potassium ($r=0.968^{**}$) and fiber and calcium ($r=0.796^{**}$) at 1 % level of significance, Fiber intake with serum urea ($r=0.670^{**}$), creatinine ($r=0.761^{*}$) and potassium ($r=0.757^{*}$) at 5 percent level of significance.

Higher levels of sodium can lead to increased levels of calcium in the urine a common risk factor for the formation of kidney stones. In a study done by Martini *et al.*, (1998) on individuals who formed calcium oxalate or calcium phosphate stones reported to have higher sodium chloride intake (14g/day) compared to healthy subjects (8g/day). The results revealed that the intake of nutrients is high and the serum urea, creatinine, calcium and potassium levels are also high.

There is no significant positive relationship between protein, fat and serum urea, creatinine, sodium, calcium, phosphorus and potassium levels of the fast food consumers.

3.4 Risk factors of fast foods on kidney disorders

Further correlation between the nutrient intake and incidence of kidney stone of fast food consumers (Table 3.4.1 & 3.4.2), showed a significant positive relationship between incidence of kidney stone with energy ($r=0.398^{**}$), sodium ($r=0.820^{**}$) at 1 percent level of significance and protein ($r=0.293^{*}$) at 5 percent level of significance. Studies identified that people whose diets are high in animal protein and low in fibre and fluids may have a higher risk of stone formation (Fornasieri *et al.*, 1988).

From the above results it was found that as the intake of nutrients of fast food consumers increases the incidence of kidney stones also increases and vice versa.

Conclusion:

More and more research and scientific studies are being done on fast foods, however, general public does not fully appreciate the extent of the damaging effects that fast food causes.

To conclude this study, educating and motivating a healthy meal plan and following certain dietary essential stands is necessary. Choosing foods which are not processed heavily, high fiber diet with frequent consumption of water will improve the quality of the diet and keep sodium intake low. The study confirms the finding that frequent

intake of fast food increases the serum mineral levels and poses threat on kidneys which further leads to kidney disorder. The risk of kidney complaints is primarily through dietary intake. Therefore planning diet with the recommended dietary allowance and consuming high fiber and quantity of water can reduce the risk of kidney disorder.

References

- [1] Audran, M., Legeand, E., 2000., Hypercalciuria Joint Bone Spine., 67(6), 509-515
- [2] Bamgboye EL, 2003, Prevention and Treatment of Renal Disease, Kidney International 63:S93-S95.
- [3] British Heart Foundation, 2004, Scientific advisory committee on Nutrition Salt and Health London, England. <http://www.heartstarts.Urg/Accessed> (5 Nov, 2004).
- [4] Cappuccio, F.P., Markandu, N.D., Beynon, G.W., Shore, A.C., Mac Gregor 1986, Effect of Increasing Calcium in Normotensive subjects. Clin Sci 71:453-56
- [5] Fornasieri, A., Sinico, RA., Maldifassi, P., Paterna, L., Benuzzu, S., Colasanti, G., Di Aminico, G. 1988., The Food Antigen Immune Complexes & IgA. Mesangial Nephropathy. P Nephrol Dial transplant, 3(6), 738-43.
- [6] Gilbertson D, Solid C, Xue JL, Collins AJ. Projecting the U.S. ESRD population by 2030. US Renal Data System: Data presented at the 2003 American Society of Nephrology Annual Meeting.
- [7] Heller, HJ. 1999; The Role of Calcium in the Prevention of Kidney Stone, JAM Col Nutr:18(5), 375-878.
- [8] Kimura, G., Brenner, B.M., 1995., The Renal Basis of Salt Sensitivity in Hypertension 2nd Ed. Laragh J H, Brenner B M, editors. New York: Raven; pp. 1569-1588
- [9] Martini, L.A., Cupper, L., Cunha, M.A., Senior, N., Heilberg, I.P., 1998, Potassium and Sodium Intake and Excretion in Calcium Stone Forming in Patients. J. Ren Nutr: 8(3): 127-31
- [10] Tsugane, S., Sasazuki, S., Kobayashi, M., Sasaki, S., 2004 Salt and salted food intake and subsequent risk of gastric cancer among

middle-aged Japanese men and women. Br. J. Cancer; 90: 128-134
 [11] Victoriano Romero, Haluk Akpinar, G. Assimos, 2010, Kidney Stones: A Global Picture of Prevalence, Incidence, and Associated Risk Factors, Reviews in

Urology, Vol. 12 No. 2/3
 [12] Zerwekhi, J.E., 1987, Pathogenesis of Hypercalciuria, IN PAK CYC ed, Renal Stones Disease, Pathogenesis, Prevention and Treatment, Boston, Mariyimes, Nijhoft.

**ANNEXURE: A
 FIGURES**

Fig 2.1.1: Frequency of consumption of Fast food by selected Respondents:

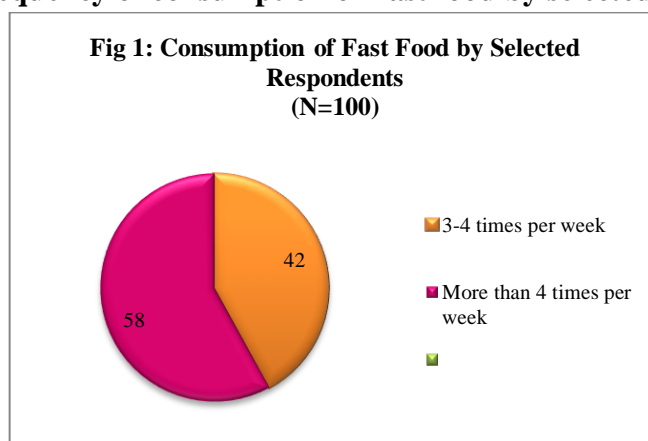
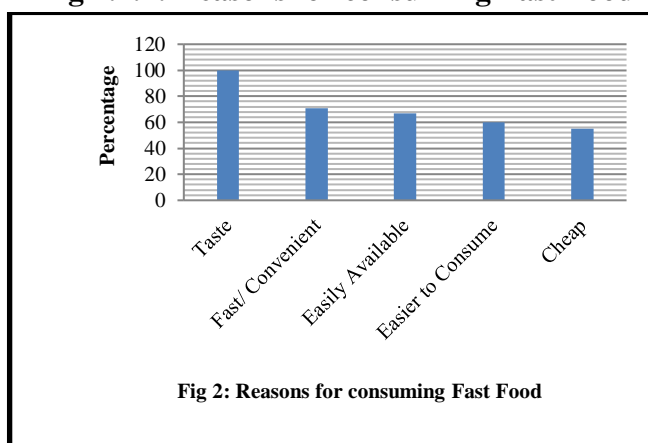


Fig 2.1.2: Reasons for consuming Fast Food



ANNEXURE - B

TABLES

Table 3.1.1: Consumption of High Sodium Foods and drinks by Fast Food Consumers

Consumption of High Sodium Foods and Drinks	Daily	Once In 2 Days	Once in 3 Days	Once in 4 Days	Occasionally	Rarely
Salt	100	-	-	-	-	-
Soya Sauce	50	-	10	10	10	20
Tomato Sauce	80	-	10	-	10	
Processed meats, sausages, pork pies	5	10	15	20	5	45
Hamburgers	10	20	10	20	20	20
Pastries	10	20	10	20	20	20

Sandwiches	20	40	20	10	10	-
Pizzas	25	-	20	5	20	30
Biscuits salted	75	-	20	-	-	5
Ready Meals	50	-	20	-	10	20
Bottled Ketchups	20	-	10	10	10	50
Salted Butter and Margarine	-	-	20	30	10	40
Salad	10	20	10	20	20	20
Gravy Mix	10	-	20	10	10	50
Pickles	30	10	-	20	-	40
Chutneys	30	-	20	-	50	-
Onion Relish	15	-	-	10	20	55
Curries	25	-	-	25	25	25
Cheese	50	-	20	10	10	10
Soups	50	-	10	-	10	30
Pot Noodles	75	-	10	-	10	5
Instant Mashed Potato	80	10	10	-	-	-
Packed Fried Foods	90	-	10			

Table 3.1.2: Medical Complaints of Fast Food Consumers:

Health Complaints	N=100	Percentage	Health Complaints	N=100	Percentage
Anorexia	4	4.0	Pigmentation of Skin	8	8.0
Nausea & Vomiting	18	18.0	Joint Pain	70	70.0
Abdominal Pain	66	66.0	Swelling Around the eyes	10	10.0
Constipation	52	52.0	Fatigue	2	2.0
Muscular Twitching and Convulsions	28	28.0	Excessive urination at night	36	36.0
Mental Changes and Confusions	36	36.0	Frequent and burning Urine	24	24.0
Foamy Urine	30	30.0			

Table 3.2.1: Comparison between Incidence of Kidney Disorder and Health Problems of Fast Food Consumers

Kidney Disorder	N	Mean ± S.D	't' Value	Level of Significance
Complaints				
Yes	30	25.00±2.55		
No	70	22.80±2.44	3.993	1%

Table 3.2.2: Comparison of Nutrient Intake between selected fast food consumers with and without Kidney Stones

Nutrients	RDA	Kidney Stone	N	Mean±S.D	t-value	Level of Significance
Energy (Kcal)	2425	Yes	30	3538.17± 969.38	3.009	1%
		No	20	2803.00± 34.82		
Protein (g)	60	Yes	30	116.89 ± 35.20	2.125	1%
		No	20	95.39 ± 34.32		

Fat (g)	20	Yes	30	176.63± 75.13	1.163	NS
		No	20	148.39± 96.26		
Fiber (g)	20	Yes	30	24.37± 17.47	1.799	NS
		No	20	18.27± 6.70		
Sodium (mg)	1500	Yes	30	6230.20±1137.67	9.942	1%
		No	20	3164.50± 952.37		

Table 3.2.3: Association between Frequency of Fast Food Consumption and Kidney Disorder

Frequency of Fast Food Consumption	Kidney Disorder				χ^2	Level of Significance
	N	NO %	N	YES %		
3-4 times per Week	38	54.3	4	13.3	14.46	1%
More than 4 times per week	32	45.7	26	86.7		

Table 3.3.1: Comparison between Mean Blood Parameters of Fast Food Consumers with Normal Median Value (N=10)

Variables	Normal Values - (Median)	Mean±S.D	t-value	Level of Significance
Urea mg/dl	25.0	97.10 ± 13.568	4.891	1%
Creatinine mg/dl	.850	2.90 ± 0.505	3.866	1%
Sodium mEq/l	140.5	143.40 ± 2.716	1.018	1%
Calcium mg/dl	10.0	10.94 ± 0.347	2.582	1%
Phosphorus mg/dl	3.9	13.35 ± 18.272	0.493	NS
Potassium mEq/l	4.00	4.81 ± 0.351	2.200	1%

Table 3.4.1: Relationship between the Nutrient Intake and Serum Urea, Creatinine, Sodium, Calcium, Phosphorus and Potassium Levels of Fast Food Consumers

Nutrient	Urea	Creatinine	Sodium	Calcium	Phosphorous	Potassium
Energy	0.572	.580	.175	.779**	.180	.579
Protein	0.331	.331	.350	.321	.180	.355
Fat	0.385	.480	.282	.606	-.120	.448
Fiber	0.670*	.761*	-.131	.796**	-.199	.757*
Sodium	0.957**	.965**	.454	.871**	-.152	.968**

** Correlation is significant at 0.01 Level

* Correlation is significant at 0.05 Level

Table 3.4.2: Relationship between nutrient intake and Incidences of Kidney Stones of Fast Food Consumers

Variables	Energy	Protein	Fat	Fiber	Sodium
Incidence of Kidney stones	.398**	.293*	.166	.251	.820**