

**PREVALENCE OF KIDNEY AND BILE STONES IN HUMAN BODY –  
A POPULATION BASED STUDY IN TAMILNADU**

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**ABSTRACT**

Gall Bladder stones are mostly formed by accumulation of bile. Chemicals present in bile result in precipitation of one or more components like Obesity, compression of the liver, untimely food, over eating and hormonal stress during Puberty, Pregnancy, Menopause or Prostate enlargement. Gall stones are found in all age groups. Oestrogen causes more cholesterol to be excreted into bile duct, and obesity. Body mass index >30 is a risk factor. A review of research work since 2000 is presented. The investigation involves a three phase study, survey of 400 respondents for kidney and gall stones / 10 case studies and analysis of gall stones with 20 female and 30 male herbal

respondents. Gall stones of bigger size was found in males (12.33± 1.31 mm). Age and sex based analysis was subjected to Anova and presented as mean ± SD with SPSS software. The results were not significant (p<0.05). A symptomatic classification was made based on the age and metabolic behavior of 100 respondents with cholecystolithiasis & kidney stones.

**INTRODUCTION**

Gall stone disease is mainly viewed as a metabolic syndrome by various Gastroenterologists. Chen L.Y *et al* (2012) Gall stones had been analysed by Fourier transform infrared spectroscopy (Yoo EH *et al*, 2008). Spectroscopic methods had been adapted for analysis by Zeng F *et al* (2001). Cystine stones, calcium carbonate, phosphate, stearate, cholesterol or protein stones occur in different degrees in females and in males of varying age groups. The profile of bile stones also varies with the composition of bilirubin, cholesterol, calcium, carbon, and oxygen. Nitrogen, sulphur and other elements form mixed stones too. Surgical

removal or Laproscopic suction of the bile stones alone cannot be the solution for the Cholecystolithiasis. The present survey aims at giving a symptomatic classification and suggesting a proper supportive and supplementary diet, treating the problem as a metabolic disorder.

## MATERIALS AND METHODS

An exhaustive survey was performed to identify several literatures about the issues relating to kidney, gall bladder and urinary stones (Table 1). To develop a method for systematic classification of gallbladder stones, the clinical characteristics of each type of stone is analysed to provide a theoretical basis for the formation mechanism of different types of gallbladder stones (Tie Qiaq et al, 2013). A survey of 400 kidney and gall bladder stone respondents, a detailed case study of 10 variety of bile stone cases and a symptomatic classification rather than a systematic classification is attempted with 20 females and 30 females.

**Table 1: Number of publications in pubMed.gov database.**

Number of publications in pubMed.gov database						
year	Gall bladder stones	kidney stones	Accumulation of bile	Gall bladder stones in children	Gall bladder stones In women	Gall bladder stones in men
2020	19	254	71	1	0	0
2019	265	798	176	5	15	11
2018	289	853	162	14	17	13
2017	335	833	168	21	18	10
2016	369	794	124	16	20	10
2015	353	757	123	14	21	14
2014	386	693	112	25	29	19
2013	381	732	120	13	20	11
2012	367	619	98	24	15	10
2011	328	558	92	20	21	13
2010	397	483	108	25	31	20
2009	335	489	74	9	23	13
2008	357	491	76	17	22	14
2007	349	426	80	14	22	19
2006	319	462	88	15	26	16
2005	358	480	94	23	21	15
2004	311	437	84	13	25	20
2003	225	428	75	13	15	8
2002	176	428	85	11	9	6
2001	165	339	61	12	11	10
2000	196	380	81	12	12	7

**Table 2: Total Number of publications in pubMed.gov database.**

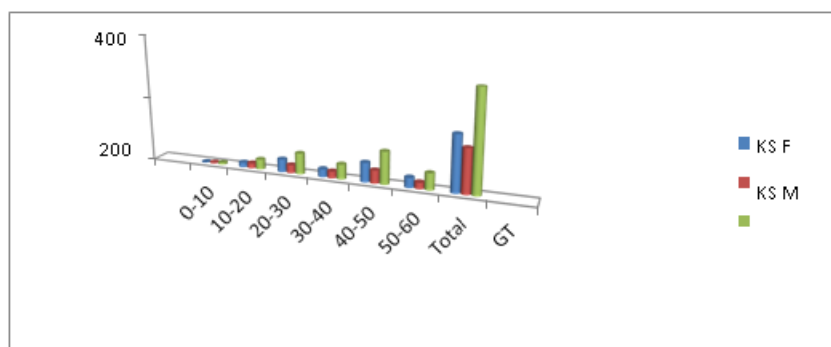
Total Number of publications in pubMed.gov database						
year	Gall bladder stones	kidney stones	Accumulation of bile	Gall bladder stones in children	Gall bladder stones in women	Gall bladder stones in men
2000-2020	6280	11734	2152	317	393	259

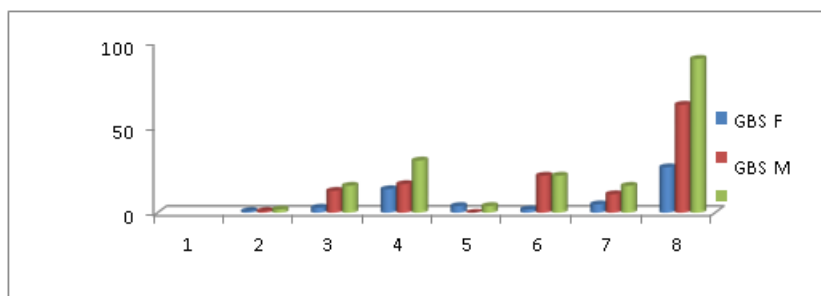
**Analysis of reports**

An analysis of 400 herbal respondents suffering from Kidney, gallbladder and urinary stones were selected for the study (Table 3). Some liver disorders such as gallstones, cirrhosis, or hepatitis occur during pregnancy. Gallbladder problems resulting from hormonal changes during pregnancy cause minor problems and get cleared after pregnancy. In cases of recurring pregnancy or forced abortion, complaints of gall bladder stones remain even during post-delivery lactation period. Some changes show minor symptoms whereas few other symptoms persist for a longer duration upto five years.

**Table 3: Agewise survey of Kidney stone disease (CKD) and Gall stone disease (GBS) in 400 herbal respondents (2015 & 2016).**

Age group	Kidney stone		Gall stone		Total GBS	causes
	F	M	F	M		
0-10	2	+ 4	1	+1	2	Over eating
10-20	15	+16	3	+13	16	Puberty
20-30	40	+25	14	+17	31	Pregnancy
30-40	25	+21	4	+0	4	Obesity
40-50	60	+40	2	+22	22	Menopause
50-60	31	+20	5	+11	16	Prostate/Cholesterol
Total	173	+136	27	+ 64	91/ 400	Hormonal
Grand Total	309/400		91/400			

**Fig 1: Kidney stone occurrence is more in females.**



**Fig 2: Gall bladder stones occur more in males.**

50% of the gall stones are mobile and get easily passed in fluid movement and fresh secretion of bile juice for digestion without showing off in the scan reports. Some gallstones produce noticeable symptoms while many are silent stones. Gallstone can cause inflammation and pain in the right upper abdomen, upper right shoulder lasting from a few minutes to several hours. Other symptoms include nausea and vomiting, fever, and chills. Causes include cirrhosis, the use of birth control pills or hormone replacement therapy, and pregnancy. 80% of all gallstones are called cholesterol stones. Calcium mixed bile pigments bilirubin are called pigment stones. Yellow- green stones are formed by cholesterol and are deposited as hard particles or as mobile stones. Pigment stones are smaller and darker in colour. Hormones, excess fat and cholesterol drugs can form gall stones. Obesity, and Ulcer are two other causes. If 30 to 60 ml of bile stored within the gallbladder is not poured out for digestion it can produce scaly stones inside.

### Case study -1

Since 23-03-2018 a male patient aged 80 years had been suffering from Prostate enlargement and Gall bladder stone of size 5mm. Ulcerous irritation, Frequent scanty urination with severe pain was reported. He became a herbal respondent and expressed willingness to take herbal dosage with Diet therapy for Gall stones. The stone was found at the neck of the bladder, the walls showing no edema or thickening. Prostate enlargement with post voidal residual urine was shown in the scan report. 48 days Rajendra herbal decoction cleared, ulcer and the gall bladder stone. The prostate enlargement had come down to 54.7 c.c in 06-06- 2018. The patient was very strict in diet avoiding all fried items, nuts, Mutton, tomatoes, beans and yellow yolk of egg. The patient is hale and healthy with normal activity. He continues taking apple juice as the only fruit juice.

**Occupational hazard Case study -2**

**Diabetic 60 yr old patients with a decade history of high fasting sugar (FBS)**, often suffer from intraluminal multiple calculi and distended gall bladder. Work pressure, untimely meals and poor intake of water and vegetables bring in low demand of bile. The secreted biliary pigments get deposited as congregated salts or as sludge. This slows down formation and production of Insulin. Diabetic stress leads to indigestion, vomiting and fever. Rapid hair loss, and sleeplessness follow. The patient had to be treated with herbal Otea and green tea to relieve the patient of fever, pain, nausea and sleeplessness. Fasting blood sugar had come down to 120mg % from 216mg %. Upper ureteric single large calculus of 1.4cm causing moderate hydro ureteronephrosis had been voided.

**Case study -3**

Ever since 2000, 41 year old male patient had been suffering from gas trouble and vomiting immediately after lunch. The stones had shark scale shape and had been recurring episodes of severe stomach pain followed by emetic vomiting.

Excess bilious secretion was suspected. Early lunch solanum nigrum decoction early morning in empty stomach with Rajendra herbal decoction cleared all the problems in a short spell of 20 days. The patient was advised to be in a vegetarian regime for 6 months. Orange juice was advised as regular mid-day Juice before lunch. The person is back to his regular busy schedule of teaching and research.

**Case study -4**

40 year old IT professional with a heavy workload of 10 hours and work pressure towards target oriented promotion suffered from nausea, severe gastritis and diarrhoea. The ultrasonographic scan reported multiple bile stones. Recurrent episode of vomiting and giddiness put the Engineer in stress. A 48 days diet and herbal decoction brought him back to the schedule.

**Case study -5**

36 year old male doctor with his busy schedule of taking care of 200 out patients and at least 50 patients in his private clinic till 3p.m, a late lunch and back home driving by car put him out of gear. Ground nuts and bananas had been his brunch and farinated bottle drinks in between to tune and to quench his thirst. Bowel gas formation and late meals had triggered bile production and storage. The unbearable pain and uneasiness stopped on the eternal

application of herbal ash and green therapy. Vegetarianism with apple juice cleared the 1cm bile stone problem.

#### **Case study -6**

45 year old lady preacher fasting almost every other day suffered a spell of fever, pain and nausea. The gall bladder was filled with multiple stones and was advised removal of gall bladder. The herbal ash on external application relieved pain after 24 days of timely vegetarian meals, raw apple juice twice a day and 2 litres of herbal decoction the gall bladder evacuated all the stones. The stones were found to float as green flakes in the loose stool. The lady is back to work with full spirit and health.

#### **Case study -7**

33 year old Pregnant lady in her second trimester had severe pain on her right hip and she was down with severe pain, sweating and nausea. Scan study reported three 5mm stones which persisted upto postpartum 6 months. High level of progesterone was reported as one major cause. The hormonal imbalance lasted till then and got cleared when the baby was put on a weaning schedule of semi - solid food. External application of the Rajendra herbal ash supported her throughout her tenure of pregnancy.

#### **Case study -8**

20 year old Non-pregnant house wife, over eating obese lady, munching oily snacks watching TV for more than 3 continuous hours reported severe nausea, vomiting, giddiness. She was tested negative for pregnancy and had high cholesterol. 60 Kg weight was brought down to 53kg after which she reported gastritis. Scan reports showed gall bladder stones, Lesion in the right ovary and PCOD. Cholesterol was brought down with Rajendra Cholepack, and herbal decoction for bile stone. Herbal ash application, egg white relieved her bile stone problem. Apple therapy was supportive. Nanofert relieved her other problems and she conceived happily. The small stone persisted till her second trimester and got cleared in the seventh month.

#### **Case study -9**

Housewife aged 49 years had been suffering from Menopause associated gall stone disease. Severe stomach pain, gastritis, overbleeding for a continuous 15 days followed by white discharge put her to bed. She was advised removal of uterus suspecting adenomyosis as per ultrascan report. A supportive herbal juice therapy helped the condition. chronic ulcer,

gastritis and diabetes were brought down by Rajendra herbal tea. Obesity during menopause had been another major cause for hypothyroidism and Gall stone formation. Fatty liver associated with cholesterol responds to Rajendra herbal juice and de-cholepack prepared for lowering the level of Cholesterol. No other abnormalities were detected in KUB region except cholelithiasis with multiple stones of 5mm to 6mm.

### **Case study -10**

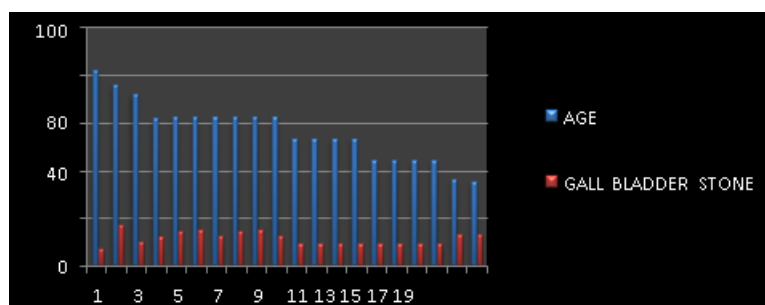
School teacher aged 45 with good exercise food habits and rich diet, had been suffering from severe pain on her right side almost two days a week. Severe sweating, Giddiness and trembling legs had disabled her. Reports on blood parameters, Diabetic check, cholesterol and Blood pressure were all normal.

Haemoglobin was 13gm %. Inviting the teacher for unknown, hidden and mysterious complication leading to depression and psychiatric advice, the patient came for a herbal Counseling. The strange brunching on two plantains and 100gms of boiled ground nuts gave a clue of habitual bile stone formation. Choosing a healthy snack is as important as Lunch. The teacher switched on to Nut free vegetarian diet with less beans and less tomatoes. White yolk of the egg became her permitted non-veg with a ration of fish gravy. The teacher is hale and healthy enjoying her teaching and coaching.

**Gall Bladder Stones(GBS)** are mostly formed by accumulation of bile. Occupational hazards like work pressure, Cholesterol, Obesity and Prostate enlargement are the main causes of Gall stone formation in males. Obesity, compression of the liver, untimely food, over eating and hormonal stress during Puberty, pregnancy or Menopause are common causes of GBS in females. The hormonal imbalance lasted till then and got cleared when the baby was put on a weaning schedule of semi -solid food. External application of the herbal ash supported her throughout her tenure of pregnancy. Size of the stones studied during October-November in 20 females and 30 males is tabulated. (Table 4 & 5).

**Table 4: Survey of Gall Bladder Stone in 20 Females in The Month Of October And November 2017.**

S.No	AGE	GALL BLADDER STONE SIZE IN mm
1	82	7
2	76	17
3	72	10
4	62	12
5	62	14
6	62	15
7	62	12
8	62	14
9	62	15
10	62	12
11	53	9
12	53	9
13	53	9
14	53	9
15	44	9
16	44	9
17	44	9
18	44	9
19	36	13
20	35	13

**Fig 3: Average size of stones  $11.3 \pm 0.62$  mm.**

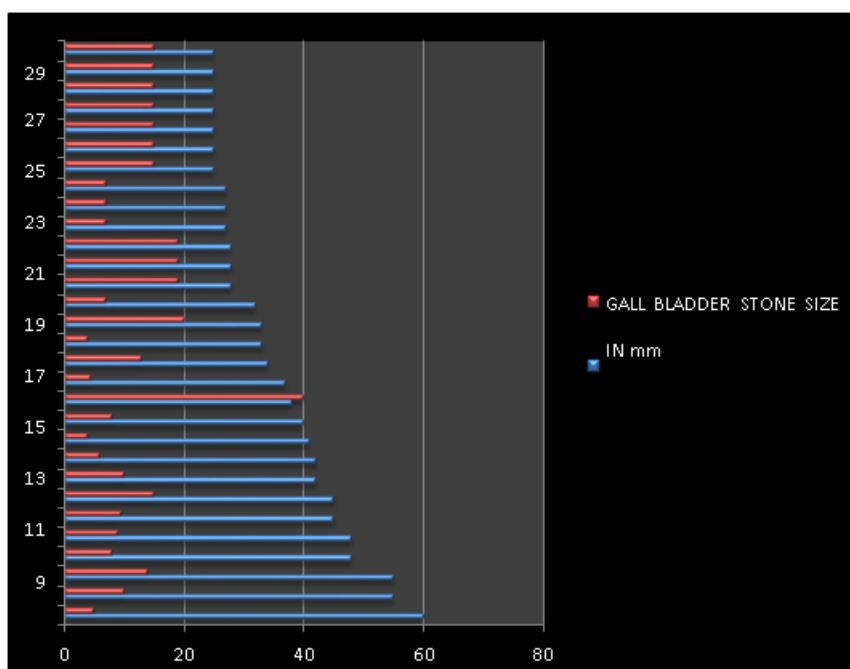
Total Numbers, N	20
Sum, $\Sigma x$	226
Mean (Average), $\bar{x}$	11.3
Sum of the Square of the Values, $\Sigma x^2$	2698
Mean of the Square of the Values, $\bar{x}^2$	134.9
Population Standard Deviation, $\sigma$	2.6851443164195
Population Standard Variance, $\sigma^2$	7.21
Sample Standard Deviation, s:	2.7548999408709
Sample Standard Variance, $s^2$	7.5894736842105
Geometric Mean	10.989243673459
Sample Standard Deviation, s	2.7548999408709
Variance (Sample Standard), $s^2$	7.5894736842105



Population Standard Deviation, $\sigma$	2.6851443164195
Variance (Population Standard), $\sigma^2$	7.21
Total Numbers, N	20
Sum:	226
Mean (Average):	11.3
Standard Error of the Mean ( $SE_{\bar{x}}$ ):	0.61601435389975

**Table 5: Survey of Gall Bladder Stone In 30 Males In The Month Of October And November (2017).**

S.No	AGE	Gall Bladder Stone Size In mm
1	60	5
2	55	10
3	55	14
4	48	8
5	48	9
6	45	9.5
7	45	15
8	42	10
9	42	6
10	41	4
11	40	8
12	38	40
13	37	4.5
14	34	13
15	33	4
16	33	20
17	32	7
18	28	19
19	28	19
20	28	19
21	27	7
22	27	7
23	27	7
24	25	15
25	25	15
26	25	15
27	25	15
28	25	15
29	25	15
30	25	15



**Fig 4: Average size of the stones in the 30 males was  $12.33 \pm 1.31$  mm.**

Total Numbers, N	30
Sum, $\Sigma x$	370
Mean (Average), $\bar{x}$	12.3333333333333
Sum of the Square of the Values, $\Sigma x^2$	6056.5
Mean of the Square of the Values, $\bar{x}^2$	201.883333333333
Population Standard Deviation, $\sigma$	7.0549431055269
Population Standard Variance, $\sigma^2$	49.7722222222222
Sample Standard Deviation, $s$ :	7.1755491599686
Sample Standard Variance, $s^2$	51.488505747126
Geometric Mean	10.683284853294
Sample Standard Deviation, $s$	7.1755491599686
Variance (Sample Standard), $s^2$	51.488505747126
Population Standard Deviation, $\sigma$	7.0549431055269
Variance (Population Standard), $\sigma^2$	49.7722222222222
Total Numbers, N	30
Sum:	370
Mean (Average):	12.3333333333333
Standard Error of the Mean ( $SE_{\bar{x}}$ ):	1.3100700458007

**The f-ratio value is 0. The p-value is 1. The result is not significant at  $p < .05$ .**

TWO WAY ANOVA VassarStats Printable Report 2x2 Factorial ANOVA for Independent Samples standard weighted-means analysis R Calculation.

$$r = \frac{\sum((X - M_y)(Y - M_x))}{\sqrt{(\sum SS_x)(\sum SS_y)}}$$

$$r = 27.033 / \sqrt{((62.508)(112.212))} = 0.3228$$

**Pearson Correlation Coefficient Calculator The value of R is: 0.3228.**

Study was carried out in Rajendra Herbal Research Centre to analyse the causes of Bile stones formation. 32 males and 68 females including 17 pregnant mothers were involved in the analysis. All these patients had both kidney and bile stones.

**Table 6: Types of Bile stones based on the symptoms and causes.**

Type	Age	symptoms	Diet	Treatment
Ulcer	70-80	ulcer Scanty urination, navel Discomfort	Vegetarian, tomatoes	Rajendra herbal pack
High BP	60-70	High blood pressure, Fasting Blood sugar	Salt and sugar restriction	Diabetopack, cholopack,
Obesity	50-60	Obesity, fatigue	Cambogia soup	Cholopack Asparagus
Fever	40-50 M	Fever, nausea, much secretion of saliva	Veg meals, apple juice	Imm booster, Herbal tea
Menopause	40-50 F	Emetic vomiting, ulcer, Back ache	Veg meals, apple juice	Herbal ash application
Hormonal imbalance	30-50	Early irregular periods, Giddiness, headache	Dry grapes, pallak	Herbal ash application
Heart burn	40-50	Hiatus Hernia, Reflux Numbness of fingers	Vegetable, Orange juice	Timely meals Exercise
Stomach Ache, pricks	20-30	Bloating feeling, altered bowel habits	buttermilk	cholopack

Obesity, Fatty Liver, Gastritis, Hepato megalia followed by cholecystitis, Ulcer with Infectious gall bladder had been evaluated. These herbal respondents had Kidney stones also. 16 females and 11 females were obese with the Length and breadth kidney size ratio of  $2.67 \pm 0.12$ . Six males with prostate enlargement had the kidney size ratio of  $2.16 \pm 0.23$ . Ladies with Liver enlargement showed a greater length/breadth of  $2.75 \pm 0.12$ . Gastritis is a primary problem in most of the cases with L/B ratio of  $2.75 \pm 0.21$ .

**DISCUSSION**

As per PubMed. gov. database 6280 research papers on gallbladder stones are available (Table 2). Study of the same gender wise is not recorded in 2020. Since the gall bladder stone cases were on the rise due to metabolic disorders and improper eating habits leading to Obesity, our research team took up a 3 phase study of 400 Human stone patients, 50 willing herbal respondents and 100 chronic sufferers of Kidney and gall stones.

In the present study, voluntary herbal respondents willing to take up supplementary herbal tea towards wellness were selected. Out of the 400 stone patients 309 were chronic Kidney stone

patients and 91 had stones in the gall bladder. The fact was assessed by scan reports showing hyperechoic structures measured and certified by Radiologists. In kidney stone group females were more affected than males (Fig.1). In gall stone group more males exhibited gall bladder stone problem.(Fig.2) The second batch of 50 gall stone patients 20 females had an average stone size of  $11.3 \pm 0.62$  mm gallbladder stone(Fig.3) while 30 males had  $12.33 \pm 1.31$  mm (Fig 4) as the average. The maximum size of the stone was 40 mm in male ,while in female it was 17mm in size. The f value and r values were not significant ( $P < 0.05$ ).

Based on the symptoms the bile stones were classified into 8 symptom based types as ulcer type, High BP, Obesity type, Fever type, Menopause, Hormonal Imbalance, Heartburn and Stomach ache types (Table 6). Diet and supplementary herbal tea suggested are under double blind trial. The herbals used had been tested for toxicity as per Shastric norms. An eco friendly cost effective supplementary diet preparation is under progress.

### Future Envisaged

The investigators wish to present a herbal nutrition schedule as a way of life with a series of symptoms for diagnosis, sensor to identify the location and to design a suitable equipment to push down the bile stones into the intestine. A prediction algorithm with kidney size L/B ratio is prompted for diagnosis of human stones.

### ACKNOWLEDGEMENT

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