

*Original Article***PREVALENCE OF GALL STONE DISEASE IN NEPAL:  
MULTI CENTER ULTRASONOGRAPHIC STUDY**

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**Background:** Gallstone disease is one of the common surgical problems encountered in department of surgery and radiology, but its national prevalence is still lacking in our country. **Objective:** To know the ultrasonographic prevalence of gall stone disease in Nepalese population. **Methodology:** Multi-centered ultrasonography records were reviewed. Positive cases of gallstone disease in different age groups and sexes were systematized to find the comparative and cumulative prevalence rate of gallstone disease representing all five developmental regions of Nepal. Records from all three geographical areas were included from high hilly, mid hilly and plane Terai locations. **Results:** Among the total population (N=4186, male 1642 and female 2544) the records were evaluated, 204 of the individuals were found to be carrying gallbladder stones. Females were more affected than the males ( male N= 44, 2.68% and female N= 160, 6.29%) and male female ratio was found to be 1:2.3. Over all prevalence of gallstone disease was found to be 4.87% and the prevalence was highest in Morang (6.45%) and lowest in Achham

district (2.44%). Female were more affected in all the districts of study and the prevalence was higher in elder age groups. **Conclusion:** The prevalence of gallstone disease in Nepalese population is little high than some of the countries and lesser than the developed countries. For the diagnosis of gallstone disease ultrasonographic survey is the most effective tool, and its utility for screening has been already established, hence timely identification of cases is recommended to prevent complications.

**Keywords**

Prevalence, gallstone disease, ultrasonography.

**Introduction**

The calculus disease of the gall bladder is a varied health problem in the world. 25 million people in the United States are carrying biliary stones and are diagnosed a million of new cases per year. On the other hand, the prevalence of gallstone disease in Asian and African countries tends to be low, normally around or below 5%. Gallstone disease is not considered as a health problem

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in our country inspite of a major number of hospitalizations in surgical departments. Among the total abdominal surgery, operations for gallstone disease is the highest as shown in annual reports every year<sup>1</sup>. After the application of ultrasonography and accessibility of health services in areas including remote centers in the country, there has been increased number in the detection of gallstone disease. In spite of improvement in diagnostic facilities and increased awareness of disease, adequate data on the epidemiology of gallstone disease is still lacking. To improve the understanding of gallstone disease we reviewed the sonographic records those carried out during health camps in various four centers (Myagdi, Achham, Sindhuli, and Darchula), and two Zonal hospitals (Koshi and Lumbini) in the country, hence the study area include all five developmental region covering the hilly and plane Terai areas.

### Methodology

Previous records of ultrasonographic evaluation in Myagdi (2052 Jestha), Achham (2059 Chaitra), Sindhuli (2060 Magh), Darchula (2062 Baisakh), Rupandehi (2059 Shrawan Bhadra) and Morang (2063 Magh) were reviewed, which was recorded during specified years. Data was tabulated separately and cases for positive and negative for gall stone disease were identified. Number of positive cases classified as the population having gall stone (new) and cases who undergone cholecystectomy (old) for gallstone disease. Cases evaluated in health camps were organized by ministry of health

and it was completely free of cost for the people. Participants were with or without abdominal symptoms and most of them were presented for general check up because ultrasonography service was available free of cost and for limited period of time. Therefore the representing population was logically satisfactory for the identification of disease prevalence at the specified period. Ultrasonographic evaluation was done by one same radiologist in five different centers with portable ultrasound scanner and in one center two different radiologists were involved for the examination. Cases were recorded as positive for gallstone disease if they have presenting echoes in gall bladder lumen with acoustic shadows or no gall bladder in subjects with previous history of cholecystectomy. Ultrasonography records of a total 4186 individuals were studied. Cases with positive stone disease were further classified for the age and sex prevalence. In such a way standardization was made easy to compare the data of different centers, age groups and sexes. Standardized prevalence rates of our findings were compared to the prevalence of some of the other countries.

### Observation and Results

Out of 4186 cases (male N=1642, female N=2544) studied in different centers the total number of positive cases to gallstone disease were 204, i.e. 4.87% of total study population. And gall stone disease was positive in 44 male and 160 female. Result showed that the occurrence of gallstone disease in female was higher than the male (male 2.68% and female 6.29%). The male

female ratio was 1:2.3, it corresponds to other studies (Table: 2). Highest prevalence was found in Morang district (study population 464, positive N=30, prevalence rate 6.45%) and lowest rate was observed in Achham (study population 738, positive N=18, prevalence was 2.44%). And in Darchula district it was 5.64% where the number of

population studied was 815 (positive N=46). In Myagdi, Sindhuli and Rupandehi its prevalence was found to be 4.89%, 5.88% and 4.75% respectively. In all of the districts female population are found to be affected more than the male. Result can be observed in tables (1 and 2).

**Table 1: Population studied in different centers and cases with positive gall stone disease.**

| District centers | Total popn studied by USG | Total Male popn studied | Total Female popn studied | Total gall stone cases | Male popn with gall stone | Female popn with gall stone |
|------------------|---------------------------|-------------------------|---------------------------|------------------------|---------------------------|-----------------------------|
| Myagdi           | 838                       | 325                     | 513                       | 41                     | 9                         | 32                          |
| Achham           | 738                       | 334                     | 404                       | 18                     | 5                         | 13                          |
| Sindhuli         | 510                       | 178                     | 332                       | 30                     | 6                         | 24                          |
| Darchula         | 815                       | 428                     | 387                       | 46                     | 5                         | 41                          |
| Rupandehi (LZH)  | 821                       | 219                     | 602                       | 39                     | 11                        | 28                          |
| Morang (KZH)     | 464                       | 158                     | 306                       | 30                     | 8                         | 22                          |
| <b>Total</b>     | <b>1642</b>               | <b>2544</b>             | <b>4186</b>               | <b>204</b>             | <b>44</b>                 | <b>160</b>                  |

**Table 2: Age and sex distribution of positive cases of gallstone disease in different district centers.**

| Study centers   | 11-20 yrs |          | 21- 30 yrs |           | 31- 40 yrs |           | 41-50 yrs |           | 51-60 yrs |           | 61-70 yrs |           | 71+ yrs  |           | Total      |
|-----------------|-----------|----------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|------------|
|                 | M         | F        | M          | F         | M          | F         | M         | F         | M         | F         | M         | F         | M        | F         |            |
| Myagdi          | 1         | 0        | 2          | 6         | 0          | 7         | 0         | 4         | 2         | 9         | 2         | 4         | 2        | 2         | 41         |
| Achham          | 0         | 0        | 1          | 1         | 1          | 5         | 1         | 4         | 2         | 3         | 0         | 0         | 0        | 0         | 18         |
| Sindhuli        | 0         | 1        | 1          | 3         | 1          | 6         | 0         | 12        | 2         | 1         | 1         | 0         | 1        | 1         | 30         |
| Darchula        | 0         | 1        | 0          | 11        | 2          | 12        | 3         | 6         | 0         | 5         | 0         | 3         | 0        | 3         | 46         |
| Rupandehi (LZH) | 0         | 0        | 1          | 6         | 2          | 7         | 3         | 5         | 0         | 6         | 3         | 1         | 2        | 3         | 39         |
| Morang (KZH)    | 0         | 0        | 2          | 4         | 2          | 6         | 0         | 4         | 2         | 5         | 2         | 2         | 0        | 1         | 30         |
| <b>Total</b>    | <b>1</b>  | <b>2</b> | <b>7</b>   | <b>31</b> | <b>8</b>   | <b>43</b> | <b>7</b>  | <b>35</b> | <b>8</b>  | <b>29</b> | <b>8</b>  | <b>10</b> | <b>5</b> | <b>10</b> | <b>204</b> |

**Table 3: Prevalence of gallstone disease in the largest sonographic surveys (study included all age groups).**

| Area/ Country                | No of population studied | Prevalence in male (%) | Prevalence in female (%) | Total prevalence(%) | Reference            |
|------------------------------|--------------------------|------------------------|--------------------------|---------------------|----------------------|
| Sirmione, Italy <sup>2</sup> | 1911                     | 6.7                    | 14.4                     | 10.9                | Barbara et al, 1987  |
| Ulm, Germany <sup>3</sup>    | 1116                     | 5.8                    | 6.3                      | 5.5                 | Kratzer W et al 1999 |
| Okinawa, Japan <sup>4</sup>  | 2584                     | 2.4                    | 4.0                      | 3.2                 | Nomura H et al, 1988 |
| Kashmir, India <sup>5</sup>  | 1104                     | 3.1                    | 9.6                      | 6.1                 | Khuroo et al, 1989   |
| Bangladesh <sup>6</sup>      | 1332                     | 3.3                    | 7.7                      | 5.4                 | Dhar SC et al, 2001  |

Number of cases with gallstone was found more in individuals of fourth decade and number of study population was also higher in this group. Over all prevalence was observed higher with increasing age which corresponds with other reports studied (Table: 3). An important limitation of this study was lacking study of risk factors of gallstone disease, it is because there was no prior plan to reproduce the report with other many parameters including risk factors. Number of females were higher than the male attended for ultrasonography. It may not complicate the result, because the result of such a study is calculated in percentage rather than the number. Population studied to find the prevalence was sufficient in comparing the reports reproduced by others (Table: 3).

## Discussion

Pathogenesis of gall stone is related to supersaturation of bile constituents most notably cholesterol and biliary metabolism. Biliary dis-motility and prolonged intestinal transit also likely play a role in stone formation<sup>7</sup>. These factors may be aggravated by diet,

sedentary life style, and genetic predisposition to stone formation. An increased predisposition to stone formation has been reported in association with obesity, diabetes, use of oral contraceptives, ileal disease, total parenteral nutrition, cirrhosis and spinal cord injury<sup>8</sup>. Most of the people with gallstone disease do not experience symptoms unless it is complicated. If a stone obstructs the cystic duct, it causes biliary colic and if it returns back in the gall bladder pain subsides or if the stone passes into common bile duct, the pain may subside or it may produce recurrent colicky pain. Other complications like obstructive jaundice include Mirizzi syndrome and pancreatitis. Gallstones are found in at least two third of patients with gall bladder carcinoma<sup>9</sup>.

Considering the above facts it is necessary to keep the gallstone disease in priority health problems. Timely diagnosis is valuable for the prevention of possible complications. If the condition is not diagnosed in earlier situation, especially the people in remote areas suffer with high morbidity affecting

their daily work due to acute symptoms. If disease complicates with malignancy it becomes very late to treat, because gall bladder malignancy bears the very poor prognosis. Cases with gallstone may present with vague abdominal symptoms like discomfort, pain, dyspepsia and if complicated may present with severe acute pain, vomiting, fat intolerance, jaundice etc, but no symptoms are specific.

Here comes the importance of ultrasonography in the detection of gall bladder disease. Ultrasound remains the method of choice for the detection of gallstones with high sensitivity and accuracy (more than 95%).<sup>10</sup> Ultrasound is safe noninvasive procedure, lacking ionizing radiation, relatively low cost and can be performed with portable handy equipments. The characteristic findings in gallstone at ultrasound are dense echoes casting strong distal acoustic shadow and mobility of the stone on repositioning the individual. The distal shadowing is extremely important to the specificity of the technique, because nonshadowing structures are less likely to represent gallstones<sup>11</sup>. When the gall bladder is full of stones the appearance is called wall-echo-shadow sign<sup>12</sup>. Ultrasonography has other several advantages, other organs like liver, pancreas, kidneys, spleen and pelvic organs etc can be evaluated at the same time. Once the gallstone is diagnosed the curative treatment is surgery, so the individual can be referred to the center where the surgical facility is available or follow up can be done in remote health centers till the first symptoms.

## Conclusion

Gallstone disease is one of the common surgical problems in Nepalese population and its prevalence found to be 4.87%. Females found to be more affected than the male and ratio between male and female was 1:2.3. Highest prevalence found to be in Morang (6.45) and lowest in Achham (2.44). Ultrasonography is an easy, noninvasive, cost effective technique and the modality of choice in the detection of gallstone disease.

## Recommendations

A periodic USG services in remote centers is the effective mean for early diagnosis of gall stone disease.

Study of possible aetiological factors of gallstone diseases to be studied in the community.

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