

Risk Factors for Gall Stone Diseases in Patients Presenting to General Practice Out Patient Department in a Tertiary Care Center in Nepal

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ABSTRACT

Introduction

Gallstone disease (GSD) is a major public health problem that is associated with a number of risk factors. This study aims to analyze the risk factors of GSD in patients visiting General Practice Outpatient Department of Tribhuvan University Teaching Hospital.

Methods

A case-control study of 174 participants comprising 85 cases with GSD and 89 controls without GSD, as confirmed by ultrasonography of abdomen was conducted as hospital based in outpatient department of General practice, Tribhuvan University Teaching Hospital, Kathmandu from 1st February 2018 to 31st January, 2019. The participants were asked questions regarding putative risk factors for development of GSD and underwent physical and ultrasonographic examination. Risk factors included were age, sex, BMI, occupation, co-morbidities e.g. diabetes mellitus, hemolytic diseases, family history of GSD, smoking status, alcohol consumption, parity if applicable and dietary history. Data analysis was done by univariate method.

Results

The mean age of the case group was 47.82 years whereas mean age for the control was 46.51 years ($p=0.355$). 22% of cases were male and 78% were female whereas in control group 29% were male ($p=0.3030$). Majority of the participants in both group were housewife by occupation and Hindu by religion.

Mean BMI of the cases and control were 24.05 kg/m² and 21.13kg/m² respectively. BMI was found significant for the gall stone diseases ($p<0.001$). Similarly, Diabetes mellitus was found significant for GSD ($p=0.001$). 98% cases and 61% in control group were Non-vegetarians with significant p value of 0.021. Smoking ($p=0.005$), Non-vegetarian diet ($p=0.021$), family history of gall stone disease ($p<0.001$) and parity ($p<0.001$) were also found significant for the gall stone disease.

Conclusion

High BMI, non-vegetarian diet, family history of gall stone disease, diabetes mellitus, smoking and increased parity were associated with gall stone diseases.

Keywords: Gall stone diseases, parity, risk factors, smoking, tertiary center

INTRODUCTION

Gallstone disease (GSD) is a major public health problem in many countries and is a significant cause of morbidity in Nepal. The highest prevalence was found to be in Morang and lowest in Achham.^{1,2} GSD is the most common disease of the biliary system and most cases are asymptomatic. Still, GSD contributes substantially to health care costs, and its complications are sometimes life threatening.

For the prevention of developing GSD, it is important

to be familiar with the complete spectrum of demographic and biological markers which may be related to development of GSD.

Depending on their composition, gallstones are often divided into three major types: cholesterol-, black pigment- and brown pigment stones. Black pigment stones are more common among patients with haemolytic diseases. Brown stones are often caused by stasis and infection in the biliary system. Important factors in the development of cholesterol stones are supersaturation of cholesterol in bile, nucleation and

growth of crystals in the gallbladder and gallbladder dysmotility resulting in impaired emptying.

Putative risk factors for GSD analyzed in our study were gender, age, religion, occupation, body mass index (BMI), diabetes, drugs (estrogen containing), history of hemolytic diseases, family history of GSD, diet, history of abdominal surgery, smoking, alcohol consumption and parity, if applicable in female populations.

METHODS

Aim of study was to determine the association with the putative risk factors for gall stone in Nepalese population who presented to tertiary hospital. It was a case control study, done in OPD of General Practice and Emergency Medicine Department, Tribhuvan University Teaching Hospital, Nepal from February 2018 to January 2019.

All patients who were diagnosed by ultrasonography (USG) abdomen as stone in gall bladder and ready to participate in our study voluntarily were taken as case.

Almost equal numbers of patients who have no stone in gall bladder as shown by USG but presented to OPD for abdominal pain were taken as control.

Patients who were younger than twenty year were excluded from the study.

All patients fulfilling the criteria for GSD who presented to OPD were considered as cases. Questions regarding putative risk factors for GSD were asked and recorded. Height and weight of the patients were measured along with general physical examination.

Those patients who presented to OPD for abdominal pain and did not have gall stone in USG abdomen were taken as control group, then questions regarding putative risk factors for gall stone asked then patient's height by measuring metallic tape and weight by digital weighing machine were taken and physical examinations done as noted.

All data were entered in SPSS 24.0 and univariate analysis was done using Chi square test.

RESULTS

Total number of participants were 175 out of them total number of case and control were 85 and 89 respectively. Mean age of the cases was 47.8 years whereas that for the control was 46.5 years. 22% of cases were male and 78% female whereas in control group 29% were male. However, age ($p=0.355$) and sex ($p=0.3030$) were not found significant for GSD.

The majority of the participants in both group were housewives and Hindu. Occupation ($p=0.4$) as well as religion ($p=0.9$) were not found significant for GSD.

Mean BMI of the cases was 24.05 (2.13) whereas

mean BMI of the control was 21.13. BMI was found significant for the gall stone diseases ($p<0.001$). Regarding the co morbidities, Diabetes mellitus was found significant for GSD ($p=0.001$). 34% cases were smoker where as 13% in control group. Likewise, 98% cases and 61% in control group were Non-vegetarians.

Family history of gall stone disease in cases and control groups were 44% and 12% respectively. Regarding the parity in female participants, 62% of female in case group had more than three children whereas Nine percent of female in control group had more than three children.

Thus, Smoking ($p=0.005$), Non-vegetarian diet ($p=0.021$), family history of gall stone disease ($p<0.001$), parity ($p<0.001$) were also found significant for the gall stone disease.

DISCUSSION

Individuals with or without USG evidence of gallstones were compared. The numbers of participants in each group was almost equal and participants were nearly all consecutively enrolled in this study. The result of this study confirm and expand upon those of previous studies investigating BMI, diabetes mellitus, family history, smoking, diet, parity etc.

In our study, most of the patients (62.4%) with gall stones were between the age of 40-60 years of age and maximum number were female (77.6%). However, the association between age and gallstones was not significant.

BMI was observed significant with the development of GSD.¹ A number of reports suggest that the relative risk for GSD is markedly higher for the obese individuals.³ Obese individuals are exposed to higher levels of biliary secretion of cholesterol from the liver and induce precipitation of monohydrate cholesterol crystals.⁴

In our study, diabetes mellitus was found risk factor for the gall stone diseases. Gall stone development is associated with common metabolic disorders such as obesity, diabetes mellitus and dyslipidemia.^{5,6} This idea was supported by findings in epidemiological studies.⁷ But the matter is controversial since other studies found no such correlation.^{8,9,10} Positive family history was found significant for the development of GSD in our study. Most^{11,12,13} but not all studies¹⁴ show a relationship of gall stone occurrence with a family history of gall stone disease.

Other variable smoking was also observed significant. Data in the literature is conflicting as to whether smoking is predisposing or protective. It has been suggested that smokers are protected against the development of gallstones through the mechanism, which leads to a decrease in prostaglandin synthesis and mucus production in gall bladder epithelium.¹⁵ Another study by Stamper et al. came to the opposite

Table 1. Association of different variables with gallstone disease

	Variables	Case (n=85)	Control (89)	p-value
Age	Less than or equal to 39	21	26	0.355
	40-59	53	53	
	>60	11	10	
Sex	Male	19	26	0.303
	Female	66	63	
Occupation	Home maker	55	48	0.484
	Farmer	11	23	
	Job holder	19	18	
Religion	Hindu	62	65	0.989
	Buddhist	23	24	
BMI	<18.5	0	3	<0.001
	18.5-24.9	54	86	
	>25	31	0	
Co-morbidities	None	54	86	0.001
	Diabetes	17	1	
	Diabetes+Hypertensive	4	0	
	Hypertensive	8	2	
	Parkinsonism	1	0	
	Hemoglobinopathies	1	0	
Personal history	None	51	70	0.005
	Alcohol	5	7	
	Smoking	15	5	
	Alcohol+Smoking	14	7	
Diet	Vegetarian	2	10	0.021
	Non- vegetarian	83	79	
Family history	Present	37	11	<0.001
	None	48	78	
Parity	Equal and less than 3 children	23	57	<0.001
	4-5 children	34	6	
	>5 children	9	0	

conclusion when they found smoking to be an independent risk factor in women smoking heavily (>35 cigarettes/day) 16. In a large British cohort study, smoking was identified as an important risk factor for the development of GSD.¹⁷

According our study, parity (more than three) was also shown significant for GSD. Most studies document an elevated risk associated with childbearing and parity.^{18,19,20}

In a large Danish study Jorgensen et al showed that differences in prevalence between men and women could be explained by estrogen therapy and childbirth.²¹

Diet was also shown as the important factor for having GSD. Consumption of high fat foods is associated with a higher risk for gall stone disease.

Nunes and Beckingham²² observed that consumption of saturated fat is associated with GSD.

CONCLUSION

Most of the patients with gall stones were between the age of 40-60 years of age and maximum number were female. High BMI, positive family history, smoking, increased parity, diabetes, non-vegetarian diet were found as the risk factors for the development of gall stone diseases.

RECOMMENDATION

Further studies could be done in multiple centers, in a large scale including multiple putative risk factor variables for the development of GSD.

CONFLICT OF INTEREST

None declared.

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