

## Prevalence and Determinant Factors of Chronic Calculous Cholecystitis among Senile Population Arar, KSA

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### ABSTRACT

**Background:** chronic calculous cholecystitis is an inflammatory disease which affects the gallbladder wall and causes motoric-tonic dysfunctions of the biliary system accompanied by gallstones in the lumen of the gallbladder and biliary pain. Among aging study groups, the prevalence of gallstone disease is likely to increase.

**Aim of the Work:** to determine the prevalence and determinant factors of chronic calculous cholecystitis among senile population in Arar, KSA.

**Patients and Methods:** the present cross sectional community based study was conducted in Arar city, Northern Border Province, KSA on 217 adult people aged 50 years and more. Data were collected through personal interviews with the study population and filling the questionnaire which guided us to the data of socio-demographic status, smoking, chronic diseases, already previously diagnosed with chronic calculous cholecystitis, after ensuring the diagnosis by reviewing the accompanied health reports and/or prescriptions and asking the accompanied caregivers about the case.

**Results:** the mean age of the participants ( $\pm$  SD) was 69.9 ( $\pm$ 9.3) years; male to female ratio was 43.8 to 56.2. The overall prevalence rate of chronic calculus cholecystitis found in this study was 6.9%. There was a relationship between chronic calculus cholecystitis and age group, sex, DM, BMI group, Thyroid disease and Hypertension. The prevalence of chronic calculus cholecystitis was more in females compared to males (9.0% vs. 4.2%).

**Conclusion:** female gender, diabetes and obesity are significantly associated factors in the development of gallstones. Thus, understanding the gallstones pathogenesis would result in life style modifications and weight loss which would decrease the rates of the disease.

**Keywords:** Chronic Calculous Cholecystitis, Prevalence, Determinants, Senile Population, Arar, KSA

### INTRODUCTION

Calculous cholecystitis is a hepato-biliary system disease caused by cholesterol and/or bilirubin metabolic disorder. It is characterized by the formation of gallbladder and/or biliary tract stones<sup>[1]</sup>. It is the most common type of cholecystitis as gallstones are highly prevalent, but most (80%) are asymptomatic<sup>[2]</sup>. Gallstones prevalence is associated with geographical and ethnic variations<sup>[3]</sup>. In the study of **Bateson**<sup>[4]</sup>, it was estimated that up to 28% and 42% of senile British men and women, respectively, aged 80–89 years have gallstones. Of these, 30% are symptomatic, and are seen by surgeons around the country<sup>[4]</sup>. However, it is less prevalent in China, Japan and Egypt, compared to Western communities<sup>[5,6,7]</sup>. In Saudi Arabia, gallstones prevalence is not well defined, and more studies need to be done throughout the country. However, recent studies indicated high prevalence and incidence<sup>[8]</sup>. The chronic type of calculous cholecystitis affects the gallbladder wall and causes motoric-tonic dysfunctions of the biliary system, accompanied by presence of

gallstones in the gallbladder lumen, and reveals as biliary pain<sup>[9]</sup>. The risk of developing gallstone disease and its complications increases with age. Among aging study groups, the prevalence of gallstone disease is more likely to increase. The health of the gallstone patients is improving secondary to the improvement of the diagnostic and therapeutic technologies<sup>[10]</sup>. In the study of **González et al.** who thought that the different therapeutic methods that are at present in use, should be applied to this group, and whether surgical or long-term medical treatment should be applied, it was found that elderly patients can undergo surgery in selected cases with an acceptable mortality rate and high morbidity. Surgery is recommended with those of a lesser age, not always possible as many of them lacked prior symptoms<sup>[11]</sup>. As this field is not well studied in Northern Saudi Arabia, this study was carried aiming at determining the prevalence and determinant factors of chronic calculus cholecystitis among elderly in Arar city, the capital of the Northern area of Saudi Arabia.

## AIM OF THE WORK

To determine the prevalence and determinant factors of chronic calculous cholecystitis among senile population in Arar, KSA.

## PATIENTS AND METHODS

The present cross sectional community based study was conducted in Arar city, the capital of Northern Borders Governorate on 217 adult people of age 50 years and more. The sample size was calculated using the sample size equation:  $n = z^2 p (1-p) / e^2$ , considering target population more than 1000, and study power 95%. Systematic random sampling technique was followed. After identifying the first house randomly in the selected area, every 9th house was visited to include all the adult subjects residing in those selected houses till the required sample is covered. Data were collected through personal interviews with the sampled population and filling the questionnaire which guided us to the data of the socio-demographic characteristics such as age, sex, educational status and marital status, it also included smoking status and certain chronic diseases that may be prevalent among adults suggested to affect the gall bladder such as obesity, hypertension, diabetes mellitus and hyperlipidemia. The questionnaire included also questions regarding the already previously diagnosed chronic calculus cholecystitis and their determinants, after ensuring the diagnosis by reviewing the accompanied health records and prescriptions and asking the accompanied caregivers about the case. **Ethical considerations:** Data collector gave a brief introduction to the participants by explaining the aims and benefits of the study. Official Esthetical approval to carry out this study was obtained from the health directorate in Arar city. Informed written consent was obtained from all participants. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest. **Statistical analysis:** We utilized the statistical package for social sciences, version 16 (SPSS Inc., Chicago, Illinois, USA) to analyze the study data. The results were displayed as counts and percentages. The X<sup>2</sup> test was used as a test of significance, and differences were considered significant at P value less than 0.05.

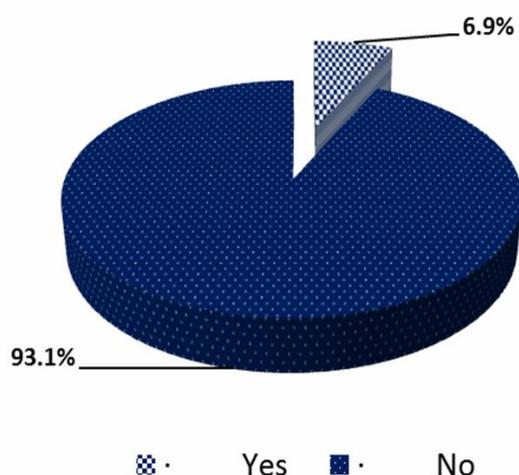
## RESULTS

Table (1) illustrates the sociodemographic characteristics and BMI status of the studied elderly population. The table showed that mean age ( $\pm$  SD) was 69.9 ( $\pm$ 9.3) years, male to female ratio was 43.8 to 56.2, married were 61.3 while 35.5 were widow, illiteracy constitutes 51.6%, primary school literates

were 18.9%. As regards working, 15.3% were shepherd, 64.2% were not working and 20.5% were retired. Figure (1) shows the percentage distribution of chronic calculus cholecystitis among the elderly population. The overall prevalence rate of chronic calculus cholecystitis found in this study was 6.9%. Table (2) demonstrates the prevalence of chronic calculus cholecystitis and other related chronic diseases among the studied population. Hypertension was found in 44.9%, Myocardial infarction in 11.6%, hypothyroidism in 12.3%, diabetes 37.0%, diabetic nephropathy in 5.8% and renal insufficiency in 6.5%. As regards the BMI, about half (45.7%) were obese, 26.8% overweight and only 24.6% had normal weight. Table (3) shows the relationship between Chronic calculus cholecystitis and age group, sex, DM, BMI group, Thyroid disease and Hypertension in the studied elderly population. All of gallstones affected the participants aged 60-70 years old. The female gender showed insignificant association with gallstones where 9.0% of females suffered from gallstones compared to 4.2% of males. Gallstones prevalence was 10.1% in obese, 5.4% in overweight, 3.6% in normal and 0% in underweight. BMI group, Diabetes Mellitus and Hypertension showed significant association with prevalence of gallstones ( $P < 0.05$ ). Thyroid disease and Smoking showed non-significant association with prevalence of gallstones.

**Table (1):** Socio-demographic characteristics and smoking among the studied elderly, Arar, 2017 (N=238)

Variables	Frequency (No.)	Percent (%)
<b>Age group</b>		
60-	141	65.0
70-	56	25.8
80+	20	9.2
Mean age ( $\pm$ SD)	69.9 $\pm$ 9.3	
<b>Sex</b>		
Female	122	56.2
Male	95	43.8
<b>Education</b>		
Illiterate	112	51.6
Primary	41	18.9
Secondary	19	8.8
University or more	29	13.4
Preparatory	16	7.4
<b>Working status</b>		
Shepherd	35	15.3
No work	147	64.2
Retired	47	20.5
<b>Marital status</b>		
Widow	77	35.5
Single	3	1.4
Married	133	61.3
Divorced	4	1.8



**Figure (1):** Prevalence of chronic calculus cholecystitis among elderly population in Arar city, Northern Saudi Arabia, 2017.

**Table (2):** Prevalence of Chronic calculus cholecystitis and other related chronic diseases among the studied elderly population, Arar, 2017 (N=229)

Chronic calculus cholecystitis	No.	%
Yes	15	6.9
No	202	93.1
<b>Cardiovascular diseases</b>		
Hypertension	108	49.8
Ischemic heart diseases	37	17.1
Previous myocardial infarction	24	10.1
<b>Thyroid diseases</b>		
Hyperthyroidism	12	5.5
Hypothyroidism	26	12.0
<b>Diabetes</b>		
Yes	89	41.0
No	128	58.9
<b>Renal problems</b>		
Diabetic nephropathy	11	5.1
Renal insufficiency	15	6.9
Chronic renal failure	2	.9
<b>Body Mass Index (kg/m2) status</b>		
Underweight	7	3.2
Normal	55	25.3
Overweight	56	25.8
Obese	99	45.6
<b>Mean BMI (± SD)</b> <b>29.9±9.4</b>		
<b>Smoking</b>		
Ex-Smoker	150	69.1
Smokers	16	7.4
Non smoker	51	23.5

**Table (3):** The relationship between Chronic calculus cholecystitis and age group, sex, DM, BMI group, Thyroid disease and Hypertension in the studied elderly population, Arar, 2017

Variables	Chronic calculus cholecystitis		Total (N=229)	P value
	Yes (N=65)	No (N=173)		
<b>Age group</b>				
60-	15 10.6%	126 89.4%	141 100.0%	0.013
70-	0 .0%	56 100.0%	56 100.0%	
80+	0 .0%	20 100.0%	20 100.0%	
<b>Sex</b>				
Female	11 9.0%	111 91.0%	122 100.0%	0.132
Male	4 4.2%	91 95.8%	95 100.0%	
<b>Diabetes Mellitus</b>				
Yes	13 14.6%	76 85.4%	89 100.0%	0.001
No	2 1.9%	126 98.1%	128 100.0%	
<b>Thyroid disease</b>				
Hyperthyroidism	0 .0%	12 100.0%	12 100.0%	0.181
Hypothyroidism	0 .0%	26 100.0%	26 100.0%	
No thyroid disease	15 8.4%	164 91.6%	179 100.0%	
<b>BMI group</b>				
Underweight	0 .0%	7 100.0%	7 100.0%	0.036
Normal	2 3.6%	53 96.4%	55 100.0%	
Overweight	3 5.4%	53 94.6%	56 100.0%	
Obese	10 10.1%	89 89.9%	99 100.0%	
<b>Hypertension</b>				
Yes	0 .0%	109 100.0%	109 100.0%	0.001
No	15 13.9%	93 86.1%	108 100.0%	
<b>Smoking</b>				
Ex-smoker	11 7.3%	139 92.7%	150 100.0%	0.466
Smoker	2 12.5%	14 87.5%	16 100.0%	
Non smoker	2	49	51	

	3.9%	96.1%	100.0%	
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## DISCUSSION

Chronic cholecystitis is mostly caused by repeated attacks of acute (sudden) cholecystitis. Most of the attacks are caused by stones present in the gallbladder. The gallstone diseases are the most common cause of acute abdominal diseases in which patients are admitted to hospital for immediate intervention in the developing countries [12]. They cause the walls of the gallbladder to become thicker leading to shrinkage of the gallbladder. Over time, its ability to concentrate, store, and release bile decreases. Chronic cholecystitis is more common after age 40 and they are more prevalent among women [13, 14]. The classic patient suffering from chronic cholecystitis is fatty, over 40, fertile, and female [15]. According to **Khan et al.** pregnancy and birth control pills are risk factors of gallstones [16]. Our results showed that the prevalence of chronic calculus cholecystitis was 6.9%. This prevalence was slightly lower than that found in another study conducted in KSA where the overall prevalence of gallstones was 11.7% [17]. Also, the average of the prevalence was 4-12% in Middle Eastern countries [18]. On the other hand, the prevalence was higher compared to that reported from different parts in the world as in (Baghdad) 3.3%, [19] China (3.2%) [20] and Tiwan 6.12% [21]. In our study, the prevalence of chronic calculus cholecystitis was more in females than males (9.0% Vs 4.2%). **Alishi et al.** [22] reported that, the female gender showed a significant association with gallstones where 72.1% of females suffered from gallstones compared with 27.9% of males and 51% of females in the control group. **Bateson** [4], reported that, among 80–89 years British elderly, 28% of men and 42% of women have gallstones. Other previous studies were also reported that the disease showed a significant prevalence in females which could be due to the estrogen hormone that would increase the saturation of cholesterol in the bile which in turn enhance the formation of gallstone [23-24]. In the current study, gallstones prevalence was 10.1% in obese, 5.4% in overweight, 3.6% in normal and 0% in underweight. Diabetes mellitus showed significant association with prevalence of gallstones (P<0.05). **Sodhi et al.** [25] reported that patients with type II Diabetes had higher probability of having gallstones compared to the

general population. They found also that female sex and higher BMI were independently associated with gallstone disease. Diabetes was also a risk factor for gallstones formation in **Alishi et al.** [22].

## CONCLUSION

The overall prevalence of gallstone disease among elderly in Arar, KSA was 6.9%. Female gender, diabetes and obesity are significant factors associated with the formation of the gallstones. Thus, understanding the gallstones pathogenesis would result in life style modifications and weight loss which would decrease the rates of the disease.

## CONFLICTS OF INTEREST

There are no conflicts of interest.

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