



## ULTRASOUND PREVALENCE OF GALL STONES IN A CROSS-SECTION OF OBESE NIGERIAN PATIENTS

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### ABSTRACT

**Background:** Obesity is becoming a public health challenge even in developing countries where it was previously uncommon. This increase may be expected to influence the prevalence of obesity related comorbidities and disorders such as gall stones. The aim of this study was to evaluate the prevalence of gall stones in a cross-section of obese patients presenting for abdominal ultrasound in a Nigerian community. **Methods:** All the adult patients, presenting for abdominal ultrasound for various indications over a year period had their weight and height measured to determine the body mass index (BMI). Those whose BMI were in the obese range ( $\geq 30 \text{ Kg/m}^2$ ) had a hepato-biliary scan to determine the presence or absence of gall stones. **Results:** A total of 116 obese patients were studied. Of these there were 91 females and 25 males. Their ages ranged from 25 to 70 years with a mean age of  $40.5 \pm 4.3$  years. The mean Body Mass Index was  $34.68 \pm 1.2 \text{ Kg/m}^2$ . There were 23 patients with gall stones accounting for a prevalence of 20%. The age, gender and degree of BMI did not significantly influence the presence of gall stones in this study. **Conclusion:** The prevalence of gall stones in this study suggests that there may be an increase in the burden of gall stone disease in our environment with the rising trend of obesity. This trend is a call for measures to control obesity.

**KEYWORDS:** Gall stones, Obesity, Ultrasonography.

### INTRODUCTION

Obesity is a global health problem with an exploding prevalence reaching epidemic proportions in both developed and developing nations of the world.<sup>[1]</sup> This has not excluded the sub-Saharan Africa where the prevalence has also been shown to be on the increase.<sup>[2,3]</sup> This may not be unrelated to the increased adoption of western diet and lifestyles.<sup>[4]</sup> As obesity increases, there is also a tendency towards an increase in related comorbidities such as hypertension, heart disease and cancers.

Obesity is also known to be a risk factor for the development of gall stones.<sup>[5-7]</sup> In the developed world where obesity is more prevalent, gall stones are equally common. In the United States of America, 10-15% of adults are estimated to have gall stones thus making cholecystectomy a very common operation in the United States of America.<sup>[8-10]</sup> In Nigeria as well as most parts of Sub-Saharan Africa, gall stones are believed to be relatively uncommon with a prevalence of about 4.4% from a community based study in South-Eastern Nigeria.<sup>[11]</sup> This may not be used to generalize the true prevalence as the majority of the inhabitants of this area still consume more of local foods that are rich in fibers. The prevalence of gall stones in the cities and urban

communities are likely to be higher due to westernization of diets. However, the lower prevalence compared to Caucasian populations may be due to the consumption of more dietary fibers and less fatty diets.<sup>[12]</sup> With increased adoption of Western lifestyle coupled with increased use of diagnostic facilities, there may be an increase in the prevalence. With the documented increase in the prevalence of obesity in Nigeria<sup>[13]</sup> which is a risk factor for the development of gall stones, there is likelihood of the concomitant increase in the prevalence of gall stones as well. At least 25% of morbidly obese individuals have evidence of gallstone disease.<sup>[14]</sup>

The best epidemiological screening method to accurately determine point prevalence of gall stone in a defined asymptomatic population is trans-abdominal ultrasonography. Ultrasonography is a safe imaging technique being noninvasive and an ideal means to quantitate the frequency of gallstone.

This study therefore aimed to evaluate the ultrasound prevalence of gall stones in a cross-section of obese patients presenting for abdominal ultrasound for various indications over a year period. Findings from this study may serve as a reference range for evaluating the trend over time.

## METHODS

All adult patients, 18 years and older, who presented at the radiology department of Ekiti State University Teaching Hospital (EKSUTH) for abdominal ultrasound scanning between January and December 2016 were studied. The details of socio-demographic characteristics of patients including their body mass index (BMI) were obtained. The degrees of obesity were defined by BMI that was calculated as weight in kilograms divided by height in meters squared. The patients with BMI less than 30 Kg/m<sup>2</sup> were excluded while those with BMI in the obese range (30kg/m<sup>2</sup> and above) were further categorized into mildly obese (30-34.9), moderately obese (35-39.9) and severely or morbidly obese ( $\geq 40$ ). All these obese patients had hepatobiliary scan in addition to the indication for which they presented for ultrasound.

Ultrasound diagnosis of gall stones was defined by the presence of echogenic structures within the gall bladder casting posterior acoustic shadows. Two ultrasound machines were utilized during the study (GE Logic 6 and Medison Sonoace C5). Findings on ultrasound were characterized as positive or negative for stones. The data was analyzed using the statistical package for the social sciences (SPSS, version 22; SPSS Inc., Chicago, Illinois, USA) software.  $P < 0.05$  was considered significant.

## RESULTS

A total of 116 obese patients were studied over a year period. Of these, there were 91 females and 25 males. Their ages ranged from 25 to 70 years with a mean age of  $40 \pm 5.1$  years with the modal age group in the 5<sup>th</sup> decade of life (Figure 1). The mean BMI was  $34.68 \pm 2.2$  Kg/m<sup>2</sup> with the majority (60.9%) in the category of mild obesity while 9 (39.1%) had moderate obesity. There was none in the morbidly obese group. There were 23 patients with gall stones with a prevalence of 20%. The age, gender and the degree of obesity were not significantly associated with the presence of gall stones in the studied population ( $P$  value: 0.330, 0.247 and 0.115 respectively).

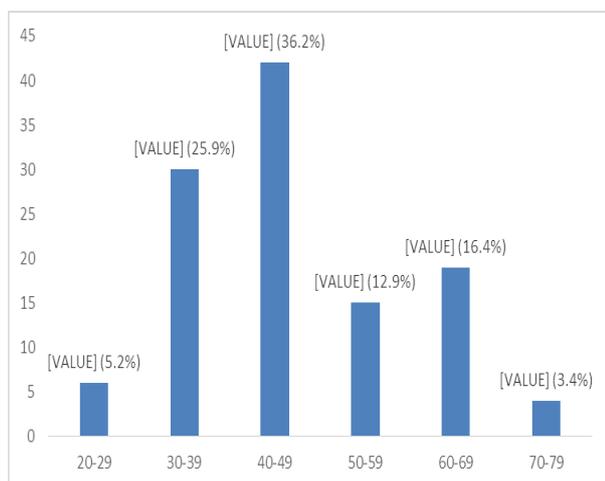


Figure 1: Age distribution.

## DISCUSSION

Obesity which is fast becoming a global health challenge is a well-established risk factor for gall stone. The rising trend of obesity in this part of the world where it was previously uncommon may be associated with an increase in the prevalence of gall stones in the nearest future. In this present study, one in five obese individuals was diagnosed with gall stones. A similar study conducted in Ibadan, though among diabetic patients, found a gall stone prevalence of 17.5% with the highest prevalence of 32.7% among individuals in the obese category.<sup>[15]</sup> However, much lower figures were reported in the studies conducted among non-obese pregnant women in Ibadan and Ile-Ife with a prevalence of 2.1% and 2.9% respectively.<sup>[16,17]</sup>

The wide difference in the prevalence of gall stones in these categories of obese and non-obese groups demonstrates the risk associated with obesity with respect to the development of gall stones. It is therefore possible to hypothesize that with the rise in the prevalence of obesity, more cases of gall stones are likely to be encountered in our practice. This undoubtedly will translate to more cholecystectomy operations being performed in our environment in the nearest future. Presently, it is the most common elective abdominal surgery performed in the United States with over 750,000 operations being performed annually.<sup>[18,19]</sup> The motivation to control the scourge of obesity is therefore not limited to the inherent risks of the condition alone but also that of other related diseases.

With availability of abdominal ultrasound, asymptomatic gall stones are being diagnosed with increasing frequency. While the majority of sonographically diagnosed gall stones are silent, there is a risk of about 15-18% becoming symptomatic over time and the approximate rate at which the subjects develop biliary colic per year is about 2%.<sup>[20,21]</sup> Symptomatic gall stones is an indication for cholecystectomy which can either be performed by open or laparoscopic technique. However, it is most commonly performed laparoscopically in the developed parts of the world because it is safe with low postoperative pain and quick recovery time. As a result of dearth of facilities, this technique has not been widely practiced except in a few tertiary institutions in Nigeria.<sup>[22]</sup>

In developing countries where there is limited infrastructural capabilities, a more economically viable approach is to address the growing burden of obesity. Measures such as exercise, promotion of African diet and avoidance of sedentary life style will inevitably help reduce obesity and its untoward consequences in addition to reducing the prevalence of gall stone diseases. The adoption of preventive modalities in the management of diseases is usually better and cheaper not only in the economically deprived settings but also worldwide.

The point prevalence of gall stones using trans-abdominal ultrasonography in asymptomatic obese

patients in our setting was 20%. This further lends credence to the direct association between obesity and the development of gall stones. Adding the burden of non-communicable diseases to the already existing unresolved challenges of infective conditions and the rising trend of trauma related injuries makes the need to advocate for preventive measures more imperative.

### CONCLUSION

There is strong association between obesity and gallstone disease. With increasing obesity, concurrent increase in gallbladder disease and cholecystectomy operations may be inevitable in the nearest future. Preventive measures should be instituted to reduce the modifiable risk factors of obesity and its untoward consequences.

### CONFLICT OF INTEREST

None.

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