



Frequency of gallstones in female healthcare workers of childbearing age in Malatya region

Hulya Aladag^a, Murat Aladag^{b,*}

^aTurgut Ozal University, Malatya Training and Research Hospital, Department of Obstetrics and Gynecology, Malatya, Türkiye

^bTurgut Ozal University, Malatya Training and Research Hospital, Department of Internal Medicine, Malatya, Türkiye

ARTICLE INFO

Keywords:

Gallstones
Obesity
Healthcare workers

Received: Dec 25, 2022

Accepted: Mar 17, 2023

Available Online: 24.03.2023

DOI:

[10.5455/annalsmedres.2022.12.391](https://doi.org/10.5455/annalsmedres.2022.12.391)

Abstract

Aim: Gallstones are seen more frequently in women and in both sexes in the society, causing serious health problems and reducing the quality of life. In this study, we aimed to evaluate and present the frequency of gallstones among female healthcare professionals of reproductive age in the Malatya region. This is the first study in our country in the field of gallbladder stone frequency among female healthcare professionals of childbearing age.

Materials and Methods: We included all female employees of childbearing age working in our hospital, and the frequency of gallstones was found by retrospectively evaluating the routine records of healthcare professionals in the hospital. The frequency of gallstones in the patients was obtained from routine abdominal ultrasonography records made during health checks and abdominal tomography records when necessary. Frequency of data was used as number and percentage for statistical evaluation of data, and Fisher's chi-square test was used for evaluation of non-numerical data.

Results: The average age of female employees of childbearing age is 30.02 ± 5.42 years and the age range is 19-50 years. Of 1224 healthcare workers, 65 (5.3%) had gallbladder stones and 1.6% had polyps, and 35 (2.8%) had a history of cholecystectomy. Only the difference between gallstone rates according to body weight was statistically significant ($p < 0.01$). There was no statistically significant difference between birth, number of miscarriages and height between those with and without gallstones ($p > 0.05$). In our cases, it was determined that gallstones increased in parallel with age and weight.

Conclusion: As a result, the frequency of gallstones among female healthcare workers of reproductive age was statistically significantly proportional to body weight. The incidence of gallstones was directly proportional to weight, patient age, and working time in the hospital.



Copyright © 2023 The author(s) - Available online at www.annalsmedres.org. This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Introduction

Gallstones are very common all over the world [1-4]. In the United States, for example, about 6 percent of men and 9 percent of women have gallstones [3]. The prevalence of gallstone disease increases with age in both sexes, reaching a plateau after 50 and 60 years of age in women and men, respectively [2,3].

The prevalence of cholelithiasis varies widely by geographic region and appears to be higher in White and Native American populations compared to Eastern European, African-American, and Japanese populations [4-12]. The variability in the prevalence of gallstones can be attributed to both genetic and dietary factors.

Those with gallstones may be asymptomatic for years, sometimes they may present with complications related to biliary colic or gallstone disease. When gallstones become symptomatic, they most often apply to the physician with biliary colic [6-9].

These symptoms are sometimes seen with biliary colic. Atypical symptoms reported in patients with gallstones include: belching, postprandial satiety/early satiety, regurgitation, abdominal bloating, epigastric or retrosternal burning, nausea or vomiting alone, chest pain, nonspecific abdominal pain [12-14].

The most common complication of gallstones is cholecystitis, choledocholithiasis and gallstone pancreatitis with and without cholangitis. Rare complications of gallstones are gallbladder cancer, gallstone ileus and Mirizzi syndrome [15-17].

*Corresponding author:

Email address: murataladag@hotmail.com (Murat Aladag)

Evaluation typically begins with a transabdominal ultrasound, as this is the most sensitive method for detecting gallstones. In patients with typical biliary colic but no gallstones on ultrasonography, transabdominal ultrasound should be repeated, usually within a few weeks, to detect missed gallstones. Particular attention should be paid to areas of the gallbladder where stones are easily missed in re-examination [14,15]. If repeated transabdominal ultrasound is negative, additional evaluation should be done with endoscopic ultrasound, and if it is negative, sludge or microlithiasis can be detected by bile microscopy [18,19].

Other imaging studies, including abdominal radiography and abdominal computed tomography (CT) scan, are less sensitive than ultrasound to detect gallstones. Only 10 percent of gallstones contain enough calcium to make them radiopaque enough to be seen on a plain radiograph. Because gallstones are isodense with bile, they may be missed on CT. The sensitivity of scanning gallstones with CT is 55-80% [6,17].

Transabdominal ultrasonography is generally considered the most useful test for detecting the presence of gallstones, as it is noninvasive, readily available, relatively inexpensive, and does not expose the patient to ionizing radiation. On ultrasonography, gallstones are seen in the lumen as a mass that creates an acoustic shadow [18,19]. Gallbladder polyps have a similar appearance to gallstones, but they do not form an acoustic shadow.

Most patients with gallstones are asymptomatic and will remain so throughout their lives. About 15 to 25 percent of those with incidental (asymptomatic) gallstones will become symptomatic after 10 to 15 years of follow-up [17-19]. Patients who develop symptoms initially report biliary colic rather than symptoms associated with complications of gallstone disease (such as cholecystitis, pancreatitis, and choledocholithiasis). When a complication develops in a patient with gallstones, the risk of more severe complications is approximately 30 percent per year [20-21].

Gallstones impair the person’s quality of life, reduce work efficiency, and even rarely lead to mortality with serious complications. In this study, we aimed to retrospectively evaluate the incidence of gallstones in women of childbearing age in our hospital. This study is the first study on the frequency of gallstones among female employees of childbearing age working in the health sector in our country.

Materials and Methods

We included 1,224 female employees of childbearing age working in our hospital. The findings of the health workers were obtained from the hospital electronic resources and the records of the workplace physician, where the routine examinations of the institution employees in the hospital were recorded in the last two years. In all cases with abdominal ultrasonographic examination, age, weight, height, cholecystectomy, number of births, miscarriage, and gallstones in cases with gallstones, biliary colic, postprandial bloating, nausea, vomiting, pain after fatty foods, indigestion and gallbladder stones. It was evaluated whether it was single or multiple.

Statistical analysis

The obtained data were evaluated using number and percentage calculations. Gallbladder stones, gallbladder polyps and operated gallstones detected in ultrasonography were evaluated as number and percentage calculations. Fisher’s exact test was used to evaluate qualitative data. The relationship between age (19-25, 26-35, 36-45 and over 45 years) and working time (<1, 2-5, 6-10, >11 years) was analyzed by using a multiple logistic regression model. Statistical Package for the Social Sciences (BM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM) program was used for statistical evaluation of the data.

Results

The average age of female employees of childbearing age is 30.02 ± 5.42 years and the age range is 19-50 years. Of our personnel, 211 (17.2%) are doctors, 750 nurses (61.2%), 57 (4.6%) anesthesia technicians, 20 (1.6%) are in the dialysis unit, 60 are laboratory professionals (4.8%), 6 people (0.49%) were emergency medicine technicians, 80 cleaning personnel (6.5%) and 40 people (3.2%) were working as x-ray technicians.

In the anamnesis of 65 female employees with whom we detected gallstones, 40 cases (61.5%) had a history of biliary colic that came from time to time. Fifty-four (83%) of these cases described bloating, abdominal pain, and occasional nausea and vomiting after fatty foods. All 35

Table 1. Demographic findings of healthcare workers and gallstones.

Parameters	With gallstones	Without gallstone	p
Weight average (kg)	70.3	65.4	<0.05
Height average (cm)	161.4	160.2	>0.05
Average birth	2.4	2.1	>0.05
Average abort	0.5	0.3	>0.05
With cholecystectomy	35 (%2.8)		

Table 2. Working time of healthcare workers and frequency of gallstones.

Working time	n	%	Gallstone (n)	Gallstone %
0-1 year	150	12.2	2	1.3
2-5 year	280	22.8	15	5.3
6-10 year	600	49.01	38	6.3
More than 11 years	194	15.8	6	3.0

Table 3. Age groups of healthcare professionals and the frequency of gallstones

Age groups	n	%	Gallstone (n)	Gallstone %
19-25	180	14.7	3	1.6
2-5 year	280	22.8	15	5.3
6-10 year	544	44.4	34	6.25
More than 11 years	220	17.9	13	5.9

healthcare workers who had undergone cholecystectomy were operated for nausea, vomiting, abdominal distension and biliary colic.

Of 65 patients with gallbladder stones detected in ultrasonography, 5 (7.6%) had a single stone and 60 (92.3%) had multiple stones. Of 1224 healthcare workers, 65 (5.3%) had gallbladder stones and 1.6% had polyps, and 35 (2.8%) had a history of cholecystectomy. When we look at the studies conducted in our country, the operation rate for gallstones was similar to the rates in our hospital staff. When we look at the international literature, the rate of cholecystectomy due to gallstones is lower in our country.

It was observed that gallstones were more common in our study group among individuals who had worked for longer years (Table 2), were older (Table 3), were overweight, and had a higher number of pregnancies (birth and miscarriage) (Table 1). Gallstones were observed with the highest rate of 6.3% in the group who worked in the hospital for 6-10 years (Table 2). Gallstones were most common in the 36-45 and 45-50 age groups, with a rate of 6.24% and 5.9%, respectively (Table 3). Only the difference between gallstone rates according to body weight was statistically significant ($p < 0.01$). There was no statistically significant difference between birth, number of miscarriages and height between those with and without gallstones ($p > 0.05$). In our cases, it was determined that gallstones increased in parallel with age and weight.

Discussion

When many epidemiological studies in western countries are examined, it is seen that the frequency of gallstones is increasing [2-4,22-24]. It is observed that the frequency of gallstones is higher in women than in men, and this frequency increases with age, weight, number of births and diabetes [22-24]. Similarly, in some studies, it is seen that the frequency of gallstones is associated with diet, physical activity and even smoking.

Barratta et al., in their study in Italy, found the frequency of gallstones in women to be 22%, and stated that this frequency was higher in women with obesity, hypertensive and metabolic syndrome [22]. Similarly, Gillman RH et al. found the prevalence of gallstones to be 4-10% in men and 18-20% in women [23]. They showed that while the prevalence of gallstone disease increased significantly with age and body mass index, it decreased significantly with alcohol consumption [23]. Studies have shown that obesity is the most important risk factor for gallstones in women and statistically significant in men [22,23]. Promoting appropriate eating habits may result in a reduction in body mass and thus indirectly reduce other risk factors for cholelithiasis (type II diabetes incidence and serum triglyceride level) [24,25].

In our study, diabetics constituted 5% of healthcare workers, and the rate of gallstones in these individuals was higher than non-diabetic patients, but the difference was not statistically significant ($p > 0.05$). In our study, it was observed that those with gallbladder stones and cholecystectomy were older and heavier individuals, and this is consistent with the literature. In studies conducted in our country, Özütemiz et al. reported the incidence of

cholelithiasis in the normal population in the Aegean region as 7.79%, and Beyler et al. reported 5.25% (7% in women, 3.5% in men) [26,27].

Studies have shown a striking increase in the risk of gallstone disease with obesity; women with a body mass index (BMI) above 45 kg/m² had a seven-fold higher risk of gallstones compared to those with a BMI below 24 kg/m² [28]. In our cases, we observed that those with gallstones were more overweight than those without. There was a statistically significant difference in weight between those with and without gallstones. There was a statistically significant difference in weight between those with and without gallstones ($p < 0.05$).

Gallstones are more common in some groups with liver disease than others. For example, in cirrhotic patients, Ökten et al. reported the incidence of gallstones as 24% (33% in women, 17% in men), and Koşar et al. reported as 30.9% [29,30].

J Koshiol et al. in their study in Chile, found the frequency of gallstones to be 36%, especially in obese women with an average age of 59 (50-74 years), and reported that the frequency of gallstones was closely related to female gender, advanced age and diabetes [31]. Yuan S et al., in their study in 2022, reported that obesity, type 2 diabetes and smoking are independent risk factors in gallstone disease [32]. The frequency of gallstones in diabetic patients in our country was determined by Güneri S et al. 35%, Kadıköylü et al. reported that 13% of female patients and 10.5% of male patients had cholelithiasis [33,34]. The frequency of gallstones increases with age. In our country, Karayalçın R et al. reported the frequency of gallstones as 15.4% in postmenopausal women [35].

In a study by A Kichloo friends in the United States, they found that 149259 of patients with more than 14 million hospitalizations had non-alcoholic fatty liver disease (NAFLD). The prevalence of NAFLD was 64% of women with gallstones and 35% of men. There is a higher rate of gallstones in those with non-alcoholic fatty liver, and significant improvements have been observed in both the frequency of gallstones and metabolic syndrome and NAFLD parameters with the right lifestyle changes and diet in these patients [36,37].

In our study, the frequency of gallstones was found to be lower among female healthcare workers of reproductive age working in the Malatya region than in western countries. Gallbladder stones and body weight were found to be statistically significantly related in healthcare workers of childbearing age. Again, the frequency of gallstones was seen most frequently in the age range of 36-45 and 45-50 years. The incidence of gallstones was found to be higher in those who worked longer in the hospital.

It was observed that gallstones were more common in our study group among individuals who had worked for longer years (Table 2), were older (Table 3), were overweight, and had a higher number of pregnancies (birth and miscarriage) (Table 1). Gallstones were observed with the highest rate of 6.3% in the group who worked in the hospital for 6-10 years (Table 2). Gallstones were most common in the 36-45 and 45-50 age groups, with a rate of 6.24% and 5.9%, respectively (Table 3). Only the dif-

ference between gallstone rates according to body weight was statistically significant ($p < 0.01$). There was no statistically significant difference between birth, number of miscarriages and height between those with and without gallstones ($p > 0.05$). In our cases, it was determined that gallstones increased in parallel with age and weight.

Conclusion

As a result, it was concluded that in order to prevent gallbladder stones and complications related to gallstones, lifestyle changes should be made both among healthcare professionals and the public, exercise habits should be made into a lifestyle to include the whole population, and a healthy diet should be adopted.

Ethical approval

Ethical approval was obtained for this study from Malatya Turgut Özal University Non-Interventional Clinical Research Ethics Committee (Date: 26.05.2022, Decision number: 2022/101).

References

- Heaton KW, Braddon FE, Mountford RA, et al. Symptomatic and silent gall stones in the community. *Gut* 1991; 32:316.
- Zeng Q, He Y, Qiang DC, Wu LX. Prevalence and epidemiological pattern of gallstones in urban residents in China. *Eur J Gastroenterol Hepatol* 2012; 24:1459.
- Everhart JE, Khare M, Hill M, Maurer KR. Prevalence and ethnic differences in gallbladder disease in the United States. *Gastroenterology* 1999; 117:632.
- Kono S, Shinchi K, Ikeda N, et al. Prevalence of gallstone disease in relation to smoking, alcohol use, obesity, and glucose tolerance: a study of self-defense officials in Japan. *Am J Epidemiol* 1992; 136:787.
- Diehl AK, Sugarek NJ, Todd KH. Clinical evaluation for gallstone disease: usefulness of symptoms and signs in diagnosis. *Am J Med* 1990; 89:29.
- LUND J. Surgical indications in cholelithiasis: prophylactic cholelithiasis: prophylactic cholecystectomy elucidated on the basis of long-term follow up on 526 nonoperated cases. *Ann Surg* 1960; 151:153.
- Rigas B, Torosis J, McDougall CJ, et al. The circadian rhythm of biliary colic. *J Clin Gastroenterol* 1990; 12:409.
- Minoli G, Imperiale G, Spinzi GC, et al. Circadian periodicity and other clinical features of biliary pain. *J Clin Gastroenterol* 1991; 13:546.
- Festi D, Sottili S, Colecchia A, et al. Clinical manifestations of gallstone disease: evidence from the multicenter Italian study on cholelithiasis (MICOL). *Hepatology* 1999; 30:839.
- Thistle JL, Cleary PA, Lachin JM, et al. The natural history of cholelithiasis: the National Cooperative Gallstone Study. *Ann Intern Med* 1984; 101:171.
- Friedman GD, Raviola CA, Fireman B. Prognosis of gallstones with mild or no symptoms: 25 years of follow-up in a health maintenance organization. *J Clin Epidemiol* 1989; 42:127.
- Zakko SF, Guttermuth MC, Jamali H, et al. A population study of gallstone composition, symptoms, and outcomes after cholecystectomy (abstract). *Gastroenterology* 1999; 116:A43.
- Berger MY, Olde Hartman TC, Bohnen AM. Abdominal symptoms: do they disappear after cholecystectomy? *Surg Endosc* 2003; 17:1723.
- Johnson CD. ABC of the upper gastrointestinal tract. Upper abdominal pain: Gall bladder. *BMJ* 2001; 323:1170.
- Neoptolemos JP, Hall AW, Finlay DF, et al. The urgent diagnosis of gallstones in acute pancreatitis: a prospective study of three methods. *Br J Surg* 1984; 71:230.
- Barakos JA, Ralls PW, Lapin SA, et al. Cholelithiasis: evaluation with CT. *Radiology* 1987; 162:415.
- Benarroch-Gampel J, Boyd CA, Sheffield KM, et al. Overuse of CT in patients with complicated gallstone disease. *J Am Coll Surg* 2011; 213:524.
- Leopold GR, Amberg J, Gosink BB, Mittelstaedt C. Gray scale ultrasonic cholecystography: a comparison with conventional radiographic techniques. *Radiology* 1976; 121:445.
- Conrad MR, Janes JO, Dietchy J. Significance of low level echoes within the gallbladder. *AJR Am J Roentgenol* 1979; 132:967.
- Brink JA, Simeone JF, Mueller PR, et al. Physical characteristics of gallstones removed at cholecystectomy: implications for extracorporeal shock-wave lithotripsy. *AJR Am J Roentgenol* 1988; 151:927.
- Garra BS, Davros WJ, Lack EE, et al. Visibility of gallstone fragments at US and fluoroscopy: implications for monitoring gallstone lithotripsy. *Radiology* 1990; 174:343.
- F Baratta, D Pastori, N Cocomello, A Colantoni, D Ferro, F Angelico and M Del Ben. Sex related differences in the Association between Metabolic syndrome and gallstone disease. *Int J. Environ. Public Health* 2021, 18, 1958. <https://doi.org/10.3390/ijerph18041958>.
- R H Gilman, G Lescano, J J Bonilla, B Silva, H H Garcia. Gallstone disease in high-altitude Peruvian rural populations. *Am J Gastroenterol*. 1999 Jan;94(1):153-8. doi: 10.1111/j.1572-0241.1999.00787.
- L Ostrowska, D Czapska, J K Karczewski. Body weight gain as the major risk factor of cholelithiasis in women and an important risk factor in man. *Rocz Akad Med Białymst.* 2005;50 Suppl 1:54-6.
- Arslan N, Akbulut G, Süleymanoğlu M, Alataş H, Yaprak B. The relationship between body mass index, anthropometric measurements and GRACE risk score in acute coronary syndrome. *Nutrition & Food Science* 2022. doi:10.1108/NFS-06-2022-0177.
- Özütemiz Y, Batur T, Özgüven Ö. Ege bölgesinde sessiz safra kesesi taşı prevalansı. *Klinik Gelişim* 1992; 5:1737-41.26.
- Beyler AR, Uzunalımoğlu Ö, Gören A, Özden A, Sipahi N, Kesim E, Dökmeçi A. Türkiye'de normal popülasyonda safra kesesi taşı prevalansı. *Gastroenteroloji* 1993; 4: 434-7.
- M J Stampfer, K M Maclure, G A Colditz, J E Manson, W C Willett. Risk of symptomatic gallstones in women with severe obesity. *Am J Clin Nutr.* 1992 Mar;55(3):652-8. doi: 10.1093/ajcn/55.3.652.
- A Ökten, F Beşışık, F Ağan, C Taşcıoğlu, S kaymaköğlu, A Acar, Y Çakaloğlu, S Yalçın. Ülkemizde Karaciğer Sirozunda Safra Kesesi Taşı Sıklığı: 333 Vaka'nın Ultrasonografik Değerlendirmesi. *Türk J Gastroenterohepatol* 1992, 3:241-44.
- K Koşar, C Duran, S Fişekci Oktar. The frequency of gallbladder stones in patients with cirrhosis. *Aegean J Med Sci* 2019;3:97-100.
- Jill Koshiol, Vanessa Van De Wyngard et al.; the Chile BiLS Study Group. The Chile Biliary Longitudinal Study: A Gallstone Cohort. *Am J Epidemiol.* 2021;190(2):196-206. doi:10.1093/aje/kwaa199.
- S Yuan, D Gill, EL. Giovannucci, and SC Larsson. Obesity, Type 2 Diabetes, Lifestyle Factors, and Risk of Gallstone Disease: A Mendelian Randomization Investigation. *Clinical Gastroenterology and Hepatology* 2022;20:e529–e537.
- Güneri S, Koray S, Şimşek I. Diabetes mellitusta safra kesesi taşı sıklığı. *Dokuz Eylül Üniversitesi Tıp Fakültesi Dergisi.* 1997; 2: 9-14.
- G Kadıköylü, C Camcı, H.M Sönmez, A Öge, A.Z Bolaman, T Şentürk. Tip-II Diabette asemptomatik kolelitiazis sıklığı. *ADÜ Tıp Fakültesi Dergisi* 2000; 1(1):17-20.
- R Karayalçın, V Genç, AS Karaca, G Özaksit. Prevalence of cholelithiasis in a Turkish population sample of postmenopausal women. *Türk J Gastroenterol.* 2010 Dec;21(4):416-20.
- A Kichloo, S Solanki, KF Haq, D Dahiya, B Bailey, D Solanki, J Singh, Mi Albosta, F Wani, M Aljadah, H Shah, H Khan, S Jaffri. Association of non-alcoholic fatty liver disease with gallstone disease in the United States hospitalized patient population. *World J Gastrointest Pathophysiol* 2021 March 22; 12(2): 14-24. DOI: 10.4291/wjgp.v12.i2.14.
- B Yaprak, N Arslan, G Akbulut. The relationship between death risk and nutritional factors in individuals with acute coronary syndrome. *Medicine Science* 2022; 11(4): 1660-7.