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RISK FACTORS FOR GALLSTONES;
IS 5 F MNEMONIC STILL VALID?

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ABSTRACT... Objectives: To find out the frequency of already recognized risk factor of Gallstones in population of Pakistan. **Methods:** A total of 50 patients diagnosed as cholelithiasis on ultrasonography were included in the study. Data collection through interview included age, sex, marital status, parity, height and weight. On the basis of height and weight Quetelet's body mass index (weight in kg/height in m^2) was calculated. Data collected also included Lipid profile Data was analyzed by SPSS version 17 for descriptive statistics. **Setting and Period:** This study was done at Department of Surgery, Dow University Hospital for a period of 6 months from February to July 2015. **Results:** 70% of patients were above 40 years of age, 88% were female, and 83.3% were multiparous while only 32% had BMI above 23. **Conclusion:** Female gender, fertility, middle age and flatulence are the common risk factors of gallstone formation while obesity is not a definite risk factor in Pakistan.

Key words: Cholelithiasis, Risk Factors, 5 F.

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INTRODUCTION

Gallstones have become a very common surgical illness worldwide nowadays.[1]Studies have proven that the prevalence of gallstones is 10–15% in western countries, and is 3–5% in African and Asian population.[2] More than 80% of stones are cholesterol stones.[2] Arecent study done in Pakistan also shows that cholesterol stones are more common than other varieties of stones.[3] To identify the different types of risk factors, one should be very well known about the pathogenesis of Gallstones. Basically there are three kinds of pathogenic abnormalities believed to be the cause of cholesterol gallstone formation which are Super saturation of bile in cholesterol, increased nucleation of cholesterolcrystals, impaired gallbladder emptying with stasis and decreased motility of intestine.[4] Cholesterol gallstones are made mainly of cholesterol crystals, which are formed due to defected cholesterol metabolism.

Many researchers have been done for estimation of gallstone prevalence, incidence and of risk factors.[4] To remember the risk factor of gallstones a famous mnemonic is well known which include 5 F's consisting of female, fat, flatulence, fertile and forty and its evidence has been provided by many studies.[5,6] Western studies shows that the contributing risk factors associated with gallstones are ethnicity, genetics, gender (F > M), age,obesity, fertility, metabolic diseases, hepatitis C, cirrhosis, and high caloric intake.[7-10] The relationship between blood cholesterol, LDL, and HDL levels and cholesterol gallstone formation is complex and multifarious.[11] Some studies have suggested that serum lipids are closely linked to the pathogenesis of gallstones.[12-14] and High serum Cholesterol, high serum LDL, and low serum HDL have been associated in formation of cholesterol gallstones. while in some other even major clinical series except hypertriglyceridaemia (type IV hyperlipoproteinaemia) no clear-cut association have been found between serum lipids and gallstones[15] another study shows

again no proper relationship between plasma cholesterol and gallstones, except that suggested that the HDL attributes a "defensive" effect for gallstone formation.[16] The deranged serum lipid profile may be due to mixture of different risk factors like fatty food, obesity, female gender, fertility and other genetic factors which are also proven by studies done in North American Indians[17] and Caucasian.[18-20] Gallstones has also become a major health problem in Pakistan All above mentioned studies are mostly done in western countries while very less amount of data is available from Pakistan. As the population of Pakistan has different lifestyle patterns and different environment so the risk factors here may be different from the western countries.

With the intention of establishment of useful anticipatory and preventive medical and surgical plan for the recognition and prevention of gallstones in Pakistan, this study will be helpful to recognize and appreciate the various risk factors amenable to prevention unique in our population.

METHODS

This study was done at Dow University Hospital for a period of 6 months from February to July 2015. A total of 50 patients diagnosed as cholelithiasis on ultrasonography were included in the study. All cases were interviewed while still in the hospital. The interview included detailed information regarding basic demographic data age, sex, marital status, parity, height and weight. On the basis of height and weight we calculated Quetelet's body mass index (weight in kg/height in m^2). All of them routinely had Lipid profile done (with 12-14 hours fasting overnight). The clinical and laboratory records of the patients were analyzed for serum cholesterol, Triglycerides LDL, HDL levels. Data was analyzed by SPSS version 17 for descriptive statistics

RESULTS

Total 50 patients with symptomatic gallstones were included in the study. Mean age ± standard deviation of patient was 43.7 ± 12.1 years. There were 44 (88%) females and 46 (92%) were married. Demographic profile of all patients is shown in Table-I.

Variable	Value n (%)
Age	43.7 ± 12.1
Sex	
Male	6 (12)
Female	44 (88)
Marital Status	
Single	4 (8)
Married	46 (92)
BMI	
<18.5	16 (32)
18.5-23	18 (36)
23.1-27.5	10 (20)
>27.5	6 (12)

Table-I. Demographic profile of patients with gallstones (n=50)

Table-II shows the frequency of different risk factors. The most common risk factor found was female sex in 44 (88%) followed by multiparity in 38 (83.3) female patients and age > 40 years in 35 (70%) patients. The least common risk factor found was diabetes mellitus in 3 (6%) patients. Mean ± SD cholesterol of patients was 175.0 ± 34.69 mg/dl. Hyperlipidemia with increase in total cholesterol [>200mg/dl] was present in 11 (22%) patients. Mean ± SD High Density Cholesterol was 40.1 ± 11.55 with abnormal results in 24 (48%). All lipid levels with abnormal percentage are shown in Table-III.

Factor	n (%)
Age: More than 40 years	35 (70)
Sex: Female	44 (88)
Family History: Positive	26 (52)
Parity: Multiparity (n=44)	38 (83.3)
Obesity: BMI >23	16 (32)
Diabetes Mellitus: Yes	3 (6)
Hyperlipedemia: Increased Cholesterol	11 (22)

Table-II. Patients with Risk factors and gallstones (n=50)

DISCUSSION

Although the increasing frequency of gallstones has been associated usually to the greater influence of the Western Fatty diet, increased weight, and their specific way of living, in the same way the variations in gallstone composition should be also suggest that there must be some differences as well in the etiology of gallstones in

Parameters	Values found in patients Mean ± SD	Abnormal results n/45 (%)	Standard normal value mg/dL
Total cholesterol mg/dl	175.0 ± 34.69	11 (22)	<200
HDL Cholesterol mg/dl	40.1 ± 11.55	24 (48)	>40
LDL Cholesterol mg/dl	108.6 ± 52.26	9 (18.0)	<130
Triglycerides mg/dl	127.2 ± 54.64	9 (18.0)	<150

Table-III. Lipid profile of patients with gall stones (n=50)

Pakistan as compared to the Western countries. Even though differences in the common type of gallstone in Asian against Western people, we did not find any distinctive risk factors in the population of Pakistan.

Out of 5 F's of the famous mnemonic used to memorize the risk factor of gallstones, the 4 F's have been unquestionably proven by our study as 94% females with 43.7 their mean ages, 84% fertility and 57% complains of dyspepsia. In all over the world, Gallstones are two times common in middle age females as compared to men, similar is found in our study.[21-25]

As 100% of our patients were married so our study also proves another Study done in Australia, which showed major association between marital status and gallstone incidence.[26]

The normal mean values of serum Triglycerides, Cholesterol and LDL found in our study are not in that much accordance with earlier studies of serum lipids and cholelithiasis, which showed elevated Triglycerides, Cholesterol and LDL level but the low HDL values in our study are in evidence that altered serum lipids levels is a risk factor for gallstone formation.[14]

Obesity is a considered as one of the main risk factor for cholelithiasis.[27] In a follow up study done at Harvard School of Public Health, Boston, Mass of 88,837 women, a striking linear relation between obesity and the risk of gallstones was detected. Females with a body mass index (BMI) more than 45 kg/m2 had a seven times increased risk in contrast to those who had BMI less than 24 kg/m2.[28] But this finding is not in accordance with our results in where we found the mean BMI in normal range in our female patients.

The major limitations of our study was that if but if control group was there to compare the whole data, then the study would be more authentic.[29] and only some specific risk factors have been evaluated while other modifiable risk factors like diet, alcohol abstinence, Smoking and Sedentary behavior e.t.c has not been discussed.[30-32]

Therefore, more future studies will be needed to understand the association of these factors to gallstones properly in Pakistan.

CONCLUSION

Female gender, fertility, middle age and flatulence are the common risk factors of gallstone formation while obesity is not a definite risk factor in Pakistan. In spite of variations in gallstone composition we identified no unique and different risk factor among the population of Pakistan as compared to the Western countries.

REFERENCES

1. Narjis H.S,Sabah A.A. **Biochemical and demographical study of lipid profile in sera of patients with gallstone.** Iraqi Journal of Science.2012;53(2):759-767.

2. H.-U. Marschall, C. Einarsson. **Gallstone disease.** Journal of Internal Medicine.2007; 261: 529–542.

3. Channa NS,Khand F, Ghanghro AB, Soomro AM. **Quantitative Analysis of Serum Lipid Profile in Gallstone patients and controls.** Pak. J. Anal.Environ. Chem.2010;11(1):59-65.

4. Acalovschi M. **Cholesterol gallstones: from epidemiology to Prevention.** Postgrad Med J. 2001;77:221–229.

5. Panpimanmas S, Manmee C: **Risk factors for gallstone disease in thai population.** J Epidemiol 2009, 19(3):116–121.

6. Naeem M,Nasir AR,Kazim R,Madiha K,Qazi JA,Marium S, et al. **Assessment of characteristics of patients**

with cholelithiasis from economically deprived rural Karachi, Pakistan. BMC Research Notes 2012, 5:334.

7. Acalovschi M, Buzas C, Radu C, Grigorescu M: **Hepatitis C virus infection is a risk factor for gallstone disease: a prospective hospital-based study of patients with chronic viral C hepatitis.** J Viral Hepat. 2009,16(12):860-866.

8. Stampfer MJ, Maclure KM, Colditz GA, Manson JE, Willett WC. **Risk of symptomatic gallstones in women with severe obesity.** Am J ClinNutr. 1992; 55: 652–8.

9. Amaral JF, Thompson WR. **Gallbladder disease in the morbidly obese.** Am J Surg. 1985; 149: 551–7.

10. Jorgensen T. **Gallstones in a Danish population: familial occurrence and social factors.** J BiosocSci 1988; 20: 111–20.

11. Eckel RH, Grundy SM, Zimmet PZ. **The metabolic syndrome.** Lancet 2005; 365: 1415–28.

12. Olokoba A B, Bojuwoye B J, Katibi I A, Salami A K, Olokoba L B, etal. **Relationship between gallstone disease and serum lipids in normal adult Nigerians.** African Scientist. 2006; Vol 7 (3):113-116.

13. Thijs C, Knipschild P, Brombacher P. **Serum Lipids and Gallstones: A case-control study. Gastroenterology.** 1990 Sep ; 99(3): 843-9.

14. Channa NS,Khand F, Ghanghro AB, Soomro AM. **Quantitative Analysis of Serum Lipid Profile in Gallstone patients and controls.** Pak. J. Anal.Environ. Chem.2010;11(1):59-65.

15. Ahlberg J. **Serum lipid levels and hyperlipoprotinaemia in gallstone patients.** ActaChirScand1979;145:373–7.

16. Petitti D, Friedman GD, Klatsky AL. **Association of a history of gallbladder disease with a reduced concentration of high-density-lipoprotein cholesterol.** N Engl J Med1981; 304:1396–8.

17. PN. **Genetics and epidemiology of gallbladder disease in New World native peoples.** Am J Hum Genet 1984; 36: 1259–78.

18. Danzinger RG, Gordon H, Schoenfield LJ, Thistle JL. **Lithogenic bile in siblings of young women with cholelithiasis.** Mayo ClinProc 1972; 47: 762–6.

19. Gilat T, Feldman C, Halpern Z, Dan M, Bar-Meir S. **An increased familial frequency of gallstones.** Gastroenterology 1983; 84:242–6.

20. Ahlberg J, Angelin B, Einarsson K, Hellstrom K, Leijd B. **Prevalence of gallbladder disease in hyperlipoproteinemia.** Dig Dis Sci 1979; 24: 459–64.

21. Kalloo AN, Kantsevoy SV. **Gallstones and biliary disease.** Prim. Care. 2001;28(3):591-606.

22. Shih-Chang Hung, Kuan-Fu Liao, Shih-Wei Lai, Chia-Ing Li, Wen-Chi Chen. **BMC Gastroenterol.** 2011;11:111.

23. Naeem M,Ali N, Rahimnajjad MK, Khurshid M,Ahmed QA,Shahid SA, et al. **Assessment of characteristics of patients with cholelithiasis from economically deprived rural Karachi, Pakistan.** BMC Research Notes 2012, 5:334.

24. Attili AF, Capocaccia R, Carulli N et al. **Factors associated with gallstone disease in the MICOL experience. Multicenter Italian Study on Epidemiology of Cholelithiasis.** Hepatology.1997;26: 809–18.

25. Panpimanmas S, Manmee C: **Risk factors for gallstone disease in thai population.** J Epidemiol. 2009, 19(3):116–121.

26. Wheeler M, Hills LL, Laby B: **Cholilithiasis: a clinical and dietary survey.** Gut .1970, 11:430–7.

27. Cuschieni, A.; Steels, R.J.C. and Mossa, A.R. 2001. **Essential surgical practice.** 4th ed. Volume 1. Oxford, London. pp:407-415.

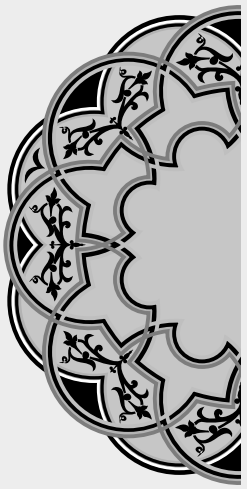
28. Maclure KM, Hayes KC, Colditz GA, et al. **Weight, diet and the risk of symptomatic gallstones in middle-aged women.** NEngl J Med 1989; 321:563–9.

29. ADLinos, V Daras, DALinos, V Kekis, M.M Tsoukas, V Golematis. **Dietary and other risk factors in the aetiology of cholelithiasis: a case control study.** HPB Surgery.1989;1:221-227.

30. Misciagna G, Centonze S, Leoci C, et al: **Diet, physical activity and gallstones — a population based case–control study in southern Italy.** Am J ClinNutr 1999, 69:120–6.

31. Schwesinger WH, Kurtin WE, Page CP, et al: **Soluble dietary fiber protects against cholesterol gallstone formation.** AmSurg J 1999, 177(4):307–10.

32. Leitzmann MF, Giovannucci EL, Rimm EB, et al: **The relation of physical activity to risk for symptomatic gallstone disease in men.** Ann Intern Med .1998, 128(6):417–25.



"Stop cursing the darkness and light some candles."

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Frahat Jaleel	Conception and design.	
2	Khalid Rashid	Statistical expertise, Critical revision of the article for important intellectual content.	
3	Nighat Bakhtiar	Drafting of the article.	
4	Masood Jawaid	Critical revision of the article for important intellectual content.	