

Prevalence of diabetes in patients with gallstones in Shahid Mohammadi Hospital of Bandar Abbas in 2014

Mahshid Torabi¹, Sarah Hadipour¹, Ghasem Sobhani*², Mohsen Azad¹

1 Student Research Committee, Hormozgan University of medical sciences, Bandar Abbas, Iran

2 Anesthesiology, Critical Care and Pain Management Research Center , Hormozgan university of Medical Sciences ,Bandar Abbas, Iran

*Corresponding Author: Ghasem Sobhani, Bndar abbas, Hormozgan Province, IRAN mahshed37@gmail.com

Abstract:

Introduction: Gallstone is among the most prevalent abdominal diseases worldwide which can have different covert reasons such as diabetes. The present research aimed to investigate the prevalence of diabetes among patients afflicted with a gallstone.

Methods: The present descriptive, cross-sectional research was retrospective in nature and was conducted on 347 patients suffering from a gallstone in Shahid Mohammadi Hospital of Bandar Abbas between 2004 and 2013. The required data were collected through a checklist enquiring patients' age, sex, type of diabetes, history of prior disease, smoking and so on derived from patients' medical files. Independent-sample t test, Mann-Whitney u test, one-way ANOVA and Kruskal Wallis analysis of variance were used to compare the mean scores in the research groups.

Findings: The prevalence of disease was in the target research population was estimated as 18.2% (n=63). The majority of this population were afflicted with diabetes type II. The majority of subjects were above 50 years of age (n=167). According to t test findings, subjects' age influenced their affliction with diabetes ($p<.001$).

Conclusion: Due to the high prevalence of diabetes among these patients, further research is suggested to investigate the correlation of diabetes and a gallstone.

Key terms: diabetes, gallstone, prevalence

Introduction:

As a metabolic disease and a multivariate disorder, diabetes is diagnosed by a chronic increase of blood

glucose or hyperglycemia. It is induced by disrupted insulin secretion or function or both (1). According to PAHO's reports, this disease is growing more than ever before. In 1985, it afflicted 30 million patients

which rose to 177 million in 200 and is yet predicted to rise to 370 million patients by 2030 (2). In another report, the prevalence of diabetes type II (which accounts for 95% of all cases of diabetes) was estimated as 1-4% of the public population and was reported to be 5-10% among those above 40 years of age. In their research, Azizi et al. (2005) estimated the prevalence of diabetes in the Iranian population of 30-69 years of age 13.4% (3). Diabetes induced by hyperglycemia can have a multiple side effects and accounts for an annual rate of about 4 million mortalities (4). These patients are more prone to such side effects as loss of eyesight, heart attacks, neuropathy, nephropathy, lower body limb diseases and amputation (5). A body of related literature observed that almost all aspects of one's life can be affected by diabetes. Their life quality and satisfaction is influenced negatively too (6). Gallstone is among the most prevalent metabolic problems worldwide which is induced by many factors including diabetes. There are many factors involved in the formation of gallstones such as liver disease, obesity, diabetes, nutrition and hemolytic anemia (7).

Gallstones have a crystal structure and are formed when the natural or unnatural constituent parts of gall get concentrated (8). The overall prevalence of gallstones in the U.S. has been reported to be 10-15% while in Europe it is 5.18-5.9% (9). About 20 million people suffer from gallstones in the U.S. and an annual number of 500 thousand go through a cholecystectomy (10).

In an investigation by Modir et al. it was indicated that affliction with gallstones among women was

correlated with the age above 40, diabetes and hyperlipidemia (11). The suggested therapy for the majority of gallbladder problems is laparoscopic cholecystectomy (which involves no surgical incision). Although more than 90% of individuals who go through a laparoscopic cholecystectomy get a satisfactory result, a significant number of them experience post-cholecystectomy syndrome and do not recover. They might experience a damage to bile ducts, an acute obstruction of bile ducts, rupture of outer liver ducts and the remaining stones in CBD (12). According to the abovementioned issues and the strong correlation between diabetes and gallstones, the present research intended to investigate the prevalence of diabetes in patients suffering from a gallstone in Shahid Mohammadi Hospital in 2014.

Methodology:

To investigate the prevalence of diabetes in patients afflicted with a gallstone in Shahid Mohammadi Hospital of Bandar Abbas in 2014, the present descriptive, retrospective and cross-sectional study was conducted. The inclusion criteria were a diagnosis of a gallstone in subjects' ultrasound test from 2004 to 2013. Incomplete or defective medical files (those lacking the required information in the present research) were excluded from the study and due to the large size of the research population, finally 347 subjects were randomly selected the size of which was estimated through the following formula:

$$(Sample\ size)\ n = [DEFF * Np(1-p)] / [(d^2/Z^2(1-\alpha/2)^2(N-1)+p^2(1-p))] \ (CI=95\%) \ (\alpha=.05, d=.05, p=.5)$$

The aim of the present research was to provide the findings for the Health Organization in order to enable them to better prevent and control diabetes in patients suffering from gallstones. A checklist was used to collect the required data. It involved such information as subjects' age, sex, type of diabetes, history of prior disease, smoking, blood pressure and hemoglobin. All this information was extracted from patients' medical files but were kept confidential with the researchers. The data entered SPSS v.20 for statistical analysis. Independent-sample t test, Mann-Whitney u test, one-way ANOVA and Kruskal

Wallis analysis of variance were used to compare the mean scores in the research groups.

Findings:

Among the 347 medical files explored, 250 (73.5%) were female and the rest were male. The highest frequency was that of the age group above 50 years (n=167, 48.1%) and the lowest frequency was that of the age group below 10 years (n=3, 9%) (table 1).

Table 1: Distribution of subjects' age in terms of affliction with diabetes

Age	n.	Diabetes	
		Yes	No
<10	3 (.9)	0(0)	3(1.06)
10-20	9(2.6)	0(0)	9(3.20)
20-30	49(14.1)	2(3.12)	46(16.37)
30-40	57(16.4)	4(6.25)	53(18.86)
40-50	62(17.9)	11(17.18)	51(79.68)
>50	167(48.9)	47(73.43)	119(42.34)
Total	347	64	281

63 subjects (18.2%) were diabetic, 27 of whom suffered from diabetes type I (22 female and 5 male) and the rest were afflicted with diabetes type II. The remaining 282 subjects were not diabetic at all.

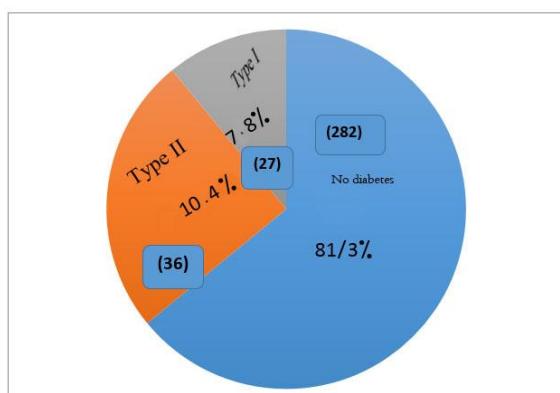


Figure 1: Distribution of diabetes among patients with gallstones

43 of the 62 diabetic subjects had a history of prior diseases. 19 of these diabetic patients (44.2%) suffered from diabetes type I while 24 of them (55.8%) suffered from diabetes type II.

According to t test results, subjects' age affected their affliction with diabetes ($p<.001$). Moreover, the age of those with diabetes type I showed to be significantly different from those with no diabetes ($p=.002$). However, the same group (the healthy group) showed to be significantly different from the diabetes type II group ($p=.012$). As the ANOVA test results indicated, subjects' age showed to significantly affect subjects' affliction (or non-affliction) with diabetes.

100 subjects had a high blood pressure, 14 of whom (51.9%) were also afflicted with diabetes type I and 13 with diabetes type II.

Moreover, among the research subjects, 58 (16.7%) had a history of smoking (cigarettes or hookah). The hemoglobin of the diabetic patients was 11.04 for those with diabetes type II and 11.53 for those with diabetes type I.

Discussion:

The present research sought to investigate the prevalence of diabetes and its risk factors among patients with gallstones who visited Shahid Mohammadi Hospital in Bandar Abbas. The findings revealed that the highest frequency belonged to those above 50 years of age. Similarly, in an investigation conducted in Israel (1983), the mean age of the emergence of gallstones was found to be 51 years (13). A body of related research in the U.K. reported a positive correlation of age and the probability of a gallstone (14, 15). Findings reported in another study in Semnan Imdad Hospital revealed that the highest prevalence of gallstones belonged to those above 40 years of age. All these findings confirm those of the present research.

Investigation of the type of diabetes in the present research revealed that 63 subjects (18.2%) were diabetic. 27 of these diabetic patients (7.8%) suffered from diabetes type I and 36 subjects (10.4%) suffered from diabetes type II. 81.3% were not diabetic in the first place. However, an investigation conducted in Shariati Hospital of Tehran observed no case of diabetes type I as 100% of the subjects were afflicted with diabetes type II which is consistent with the present research findings. Both studies observed a higher rate of diabetes type II in patients with gallstones (16).

According to the present findings, 18.3% of diabetic patients also had a gallstone while 81.7% of the healthy had gallstones. A statistically significant correlation was found between diabetes and having gallstones. This could support the hypothesis that

diabetes is correlated with forming gallstones. Other relevant research findings including the one in Shahid Beheshti Hospital of Kashan confirmed the present findings and approved the effective role of sex, age, history of prior diseases, alcohol consumption, etc. to a certain extent (17).

Research findings reported in Semnan's Imdad Hospital revealed that 31.3% of the patients with gallstones were also diabetic (8). In another investigation in India, the probability of gallstone formation showed to be increased by diabetes for 4.5 times. However, it was not yet considered as an absolute risk factor (18).

Research findings reported in Shariati Hospital of Tehran showed 5% of those with gallstones who got afflicted with diabetes also smoked (16). In the present research, however, 16.7% were found to be smoking. Smoking does not appear to significantly affect diabetes or gallstone formation.

Generally speaking, the present research indicated that diabetes and gallstone were significantly correlated. Such sub-factors as age, sex, diabetes type and blood pressure showed to be involved in this disease. Considering the significance of this disease, the effect of the sub-factors as well as the increasing trend of this disease, further studies are suggested to delve into the correlation of the disease and its sub-factors.

Acknowledgements:

The authors wish to be grateful to kind efforts made by Mr. Sobhani, the head of the Anesthesia Department of Hormozgan University of medical

sciences and all faculty members who contributed wholeheartedly.

1. Ahmadi A, Hasanzade J, Ghaem H, Khosravi S, Raeisi R. Family of diabetes as a representative of genetic factors in first-degree relatives of patients with type 2 1387 Chaharmahal and Bakhtiari. *Journal of Shahrekhord University of Medical Sciences*. 2010;11(2):1-7.
2. Mohammadi B, Hasanzade A. Analysis of risk factors for type 2 diabetes mellitus by analyzing the response surface. *Journal of Shahid Sadoughi University of Medical Sciences* 2012;19(5):655-66.
3. Shakeri M, Rasolian A, Erfanianaghvaei M, Etmadrezaei S, Emazade M. The relationship between anthropometric indices with diabetes. *Medical Journal of Mashhad University of Medical Sciences* 2016;57(8):390-6.
4. Norozi A, Ghafranipoor F, Heydarnia A, Tahmasbi R. Determinants of physical activity based on Health Promotion Model in diabetic women of Karaj diabetic institute. *South Medical Journal*. 2011;13(1):51-41.
5. Abasian M, Delvarian M. Complications of diabetes in patients referred to diabetes clinic in the city. *KNOWLEDGE AND HEALTH anymore University of Medical Sciences and Health Services*. 2008;2(4).
6. Vazirinezhad R, Sajadi M, Maegholi N. The role of diabetes in life. *Shahid Beheshti University of Medical Sciences and Health Services*. 2011;34(140-35).
7. Abadi R, Kosarian A, Kosarian M. The prevalence of gallstones in patients with thalassemia major in Sari. *Journal of Mazandaran University of Medical Sciences*. 2001;10(27).
8. Semnani V, Malek M, Khaniporshekoh S. Prevalence of gallstones and cholecystectomy in patients with risk factors associated with it. *Journal of Semnan University of Medical Sciences*. 2005;6(1).
9. Samani S, Pooranian S, Ghahremani S, Adibi A, Kelishadi R. Compare gallbladder ultrasound findings in children and adolescents with or without overweight. *Lorestan University of Medical Sciences Journal*. 2012;13(1).
10. Ghafoori A. The composition of gallstones and their relationship to the amount of cholesterol, triglycerides, blood calcium and phosphorus. *Research in Medical Sciences*.5(1).

11. Rostami K, Yazdanbad A, Amininaee N, Moharami F. Evaluation of risk factors of gallstone. Journal of Ardabil University of Medical Sciences. 2008;7(3):263-8.
12. Mahmoodlou R, Ghaemkhiavi R, Pirzare F. Evaluating the Risk Factors and the percentage of remaining bile duct stones after laparoscopic cholecystectomy in Imam Khomeini hospital. 26. 2015;1.
13. Gilat T, Feldman C, Halpern Z, Dan M, Bar-Meir S. An increased familial frequency of gallstone Gastroenterology. 1983;84:242-6.
14. Bennion L, Grundy S. Risk factors for the development of cholelithiasis in man. England Medical Journal. 1978;299.
15. Zeman RK GBGNA, 1991; 20(1): 127-56. . Gallbladder imaging. Gastroenterol ClinC North AMERICA. 1991;20(1):127-56.
16. Abaszadehrenjani S, Amini S, Setodemanesh R, Heshmat R, Mohsenijam N, Mohajeritehrani M. The relative frequency of gallstones in patients with diabetes and its risk factors in patients referring to Shariati Hospital diabetes clinic. Iranian Journal of Diabetes and Lipid Disorders. 2011;10(2):180-7.
17. Faghikhashani A, Bitarafan S, Zanganekazemi A, Kabir A. The relationship between gallstones with diabetes. University of Medical Sciences. 2005;11(42).
18. Tandon R, Thakur U, Basak A, Lal k, Jayanthi v, Nijahawan s. Pigment gallstone predominate in south India. Indian Journal Gastroenterol. 1994;13(18).