

High Density Lipoprotein Cholesterol Among Those with Cholecystectomy

Ruaa Sabah Jubair^{1*}, Nawal Mehdi Firhan Alkhalidi², Jawad Kadhim Al-Diwan³

¹ M B Ch B, F I B M S./Family medicine, MOH, Babylon Health Directorate, Al Hilla first sector, Typical Al Asateza primary Health Care Center, Babylon, Iraq

² M B Ch B, CABM, FICMS (GE&H)/ gastroenterology and hepatology teaching hospital, Baghdad medical city, Iraq

³ M B Ch B, M Sc, D C N, F I B M S, F F P H./Department of family and community medicine, college of medicine, University of Baghdad/Iraq

E-mail: ruasabahaldulaimy@gmail.com

E-mail: nawalgastro@gmail.com

E-mail: Jawadkadhim.aldiwan876@gmail.com

Abstract

Background: Symptomatic gallstone disease represents the most common cause of biliary disorders for which cholecystectomy is performed, and more than half of those patients with gallstones have a concomitant lipid disorder. **Objectives:** to assess high density lipoprotein(HDL) cholesterol among those with cholecystectomy and determine the relationship between it and dietary history, exercise and anthropometric measurements. **Materials and Methods:** A cross-sectional study had been done during the period from June 16 2022 to December 16 2022 at Hospital of gastroenterology in Baghdad medical city. 136 patients was studied from the patients admitted to the hospital and underwent cholecystectomy. A questionnaire form including sociodemographic information's, anthropometric measurements, dietary history and using of lipid lowering drugs and obtaining the HDL cholesterol to the patients. The data were collected by direct interview with the patients. **Results:** The results showed that 110 (80.9%) of the participants were with a low HDL cholesterol with significant association with body mass index, waist circumference, the period since cholecystectomy was done, eating pattern, frequency of dining out, mean of calories intake, mean of carbohydrate percentage and mean of protein percentage in 7 days recall. **Conclusions:** Normal HDL cholesterol level presented in those eat usually home prepared food with mean calorie intake of ≤ 2000 calories, mean carbohydrate percentage of $\leq 60\%$ and calories intake of $\leq 20\%$ from proteins in 7 days recall.

Keywords: HDL cholesterol, cholecystectomy.

1. Introduction

Gallbladder diseases are very common in both developing and developed countries. They comprise a large spectrum of disorders caused by changes in bile composition, biliary function and placing a substantial burden on inpatient and outpatient resources. Complicated gallstone disease (i.e., symptomatic disease) represents the most common cause of biliary disorders for which surgery is performed, [1, 2] and more than half of those patients with gallstones have a concomitant lipid disorder. [3]

Today, cholecystectomy is a standard treatment for cholelithiasis. Surgery for complicated gallstone has a significant impact on lipid profile in a large numbers of individuals by increasing fecal bile loss and improving lipid profile in dyslipidemia patients [4]

In considering the huge number of cholecystectomies performed daily worldwide, surprisingly little data has been collected about lipid profile after cholecystectomy. [1]

A prominent increase in cholecystectomies in Iraq in

recent years is noticed [5,6]. Publication on lipid profile of those with cholecystectomy is scarce. Therefore, this study was carried out to assess high density lipoprotein(HDL) cholesterol among those with cholecystectomy and determine the relationship between it and dietary history, exercise and anthropometric measurements.

2. Materials and methods

A cross-sectional study had been done during the period from June 16 2022 to December 16 2022 at Hospital of gastroenterology in Baghdad medical city. 136 patients was studied from the patients admitted to the hospital and underwent cholecystectomy. A questionnaire form including sociodemographic information's, anthropometric measurements, dietary history and using of lipid lowering drugs and obtaining the HDL cholesterol to the patients. The data were collected by direct interview with the patients.

A pilot study was done. Participants in the pilot study were not included with sample

Normal values were regarded ≥ 40 mg/dl in male and in female ≥ 50 mg/dl [7]. Studied variables were

dichotomized. BMI was considered as WHO categories (underweight if <18.5, normal if 18.5- 24.9 and ≥overweight if 25 and above).[8] Normal waist circumference was applied as in Kane K <102cm in male and <88cm In female [9].

3. Results

A total of 136 participants were included in the study, their age was ranged 36- 77 years, giving male to female ratio of 1

The results showed that 110 (80.9%) of the participants were with a low HDL cholesterol (figure 1).

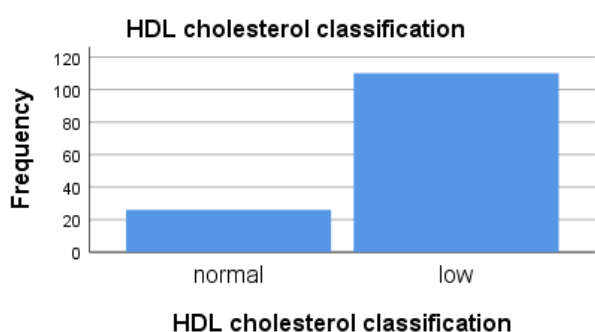


Figure 1: distribution of HDL cholesterol among participants

There was a significant relationship between HDL cholesterol and body mass index(BMI) as (70%,n=70) of those with low HDL are ≥ overweight. Furthermore there was a significant relationship between HDL cholesterol and waist circumference as 68.2%(n=75) of those with low HDL cholesterol had abdominal obesity. Besides, there was a significant relationship between HDL cholesterol level and time after cholecystectomy as (59.1%, n=65) of those with low serum HDL level their cholecystectomy was done before <1 year, Furthermore there was a significant relationship between eating pattern and HDL cholesterol level as 87.3%(n=96) of patients with low HDL cholesterol level were on unrestricted diet. In addition to a significant relationship between food eaten outside the home and HDL cholesterol level as 100%(n=26) of patients with normal HDL cholesterol level were eating <2 times/ week from food prepared outside the home. Whereas no significant relationship between using of lipid lowering drugs and doing exercise with HDL cholesterol level . More details are shown in table 1.

Table 1: Relationship between HDL cholesterol and different variables

variable	HDL cholesterol		Total	P
	Normal	Low		
BMI				
< 25	6 (23.1)	33 (30)	39 (28.7)	0.016*
≥ 25	20 (76.9)	77 (70)	97 (71.2)	
Waist circumference				
No abdominal obesity	26 (100)	35 (31.8)	61 (44.9)	0.0001*
Abdominal obesity	0	75 (68.2)	75 (55.1)	
Time after cholecystectomy				
< 1 year	26 (100)	65 (59.1)	91 (66.9)	0.0001*
≥ 1 year	0	45 (40.9)	45 (33.1)	
Use of lipid lowering drugs				
Yes	0	7 (6.4)	7 (5.1)	0.187
No	26 (100)	103 (93.6)	129 (94.9)	
Exercise				
Yes	0	6 (5.5)	6 (4.4)	0.223
No	26 (100)	104 (94.5)	130 (95.6)	
Eating pattern				
Low fat diet	6 (23.1)	14 (12.8)	20 (14.7)	0.034*
Unrestricted diet	20 (76.9)	96 (87.3)	116 (85.3)	
Eating outside the home				
<2 times/ week	26 (100)	91 (82.8)	117 (86)	0.0001*
≥2 times/ week	0	19 (17.2)	19 (14)	

Moreover there was a significant relationship between HDL cholesterol level and mean of calories intake in 7 days recall as 100%(n=26) of those with normal HDL cholesterol level were took ≤2000 calories. Furthermore there was a significant relationship between mean of carbohydrate % in 7 days recall and HDL cholesterol level as 100% (n=26) of those with

normal HDL cholesterol level had carbohydrate% ≤60%. Besides a significant relationship between HDL cholesterol level and mean of protein % in 7 days as 100%(n=26) of those with normal HDL cholesterol had ≤20% of calories came from protein. No association between fat% in 7 days dietary recall and HDL cholesterol level . More details are shown in table 2.

Table 2: Relationship between HDL cholesterol and dietary history during 7 days recall

variable	HDL cholesterol		Total	P
	Normal	Low		
Mean of calories intake				
≤2000	26 (100)	97 (88.2)	123 (90.4)	0.001*
> 2000	0	13 (11.8)	13 (9.6)	
Mean of carbohydrate %				
≤60%	26 (100)	77 (70)	103 (75.7)	0.004 [†]
>60%	0	33 (30)	33 (24.3)	
Mean of protein %				
≤20%	26 (100)	101 (91.8)	127 (93.4)	0.038 [‡]
>20%	0	9 (8.2)	9 (6.6)	
Mean of fat %				
<30%	19 (73.1)	70 (63.7)	89 (65.4)	0.151
≥30%	7 (26.9)	40 (36.4)	47 (34.6)	

4. Discussion

Cholecystectomy is the best choice of treatment for cholelithiasis[10]. Surgery for complicated gallstone has a significant impact on lipid profile in a large numbers of individuals by increasing fecal bile loss and improving lipid profile in dyslipidemia patients [4]

This study showed a high percent (80.9%) were with a low HDL cholesterol. This finding was compatible with that in the literature [11]. The finding that 70% of those with low HDL are ≥ overweight is similar to that reported by other[12].

Waist circumference impact the lipid profile. This study showed that abdominal obesity is associated significantly with low HDL cholesterol. It is consistent with that in the literature[12].

Low HDL cholesterol level negatively associated with duration after cholecystectomy ($p= 0.0001$), this was similar to the line literature[13]. Eating pattern affect the low HDL cholesterol level i.e., unrestricted diet was associated with low HDL cholesterol. Similar finding was published[14].

Restricted to home diet was associated with normal HDL cholesterol level ($p= 0.0001$). it is in the line with published studies [15].

Normal HDL cholesterol level was associated with intake of ≤2000 calories in 7 days recall ($p=0.001$), this was similar to the study indicated by H Chen et al [16].

Low carbohydrate in diet was associated with normal HDL cholesterol level ($p= 0.004$). it was similar to published data [17].

Besides a significant relationship between HDL cholesterol level and mean of protein % in 7 days as 100% of those with normal HDL cholesterol had ≤20% of calories came from protein, this was similar to the study that was done by Alexandria V [18].

No impact for using of lipid lowering drugs, exercise and fatty food on serum HDL cholesterol level. It is in contrast with published data[17]. The difference might explained by difference in sampling, instruments and cultures.

5. Conclusions

Normal HDL cholesterol level presented in those eat

usually home prepared food with mean calorie intake of ≤ 2000 calories, mean carbohydrate percentage of ≤ 60% and calories intake of ≤ 20% from proteins in 7 days recall.

6. Acknowledgement

The authors would like to express their appreciation to medical city directorate/ Iraq and participants for their assistance in facilitating this study but views explained in this article are solely those of the authors.

Financial support and sponsorship:
Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Carraro A, Elmazioum D, Bini F. Health related quality of the life outcomes after cholecystectomy. *World journal of gastroenterology*. 2011; 17(45): 49-45
- Festi D, Dormi A, Capodicasa S, Staniscia T, Attili AF, Loria P, et al. Incidence of gallstone disease in Italy: results from a multicenter, population-based Italian study (the MICOL project). *World J Gastroenterology*. 2008;14:5282–5289.
- Osman A, Ibrahim A, Alzamil A, Alkhalifa A, Badghaish D, AL- Dera FH et al. Is cholecystectomy in patients with symptomatic uncomplicated cholelithiasis beneficial in improving the lipid profile?. *PMC*. 2020; 12(1): 12- 21. DOI: 10.7759/CUREUS. 6729. PMID: 32015935; PMCID: PMC6977672.
- Sergeve J, Keren N, Naftali T, Konikof F. Cholecystectomy and Biliary sphincterotomy Increase Fecal Bile Loss and Improve lipid profile in Dyslipidemia. *NIH*. 2020; 65(4): 1223- 1230.
- Ahmad H. Colorectal cancer risk after cholecystectomy in Ai- Kadhymia teaching hospital. 2011; 9(3): 231-235.
- Abdul Hassan B. Changing pattern and incidence of gallstone diseases in Al- Kadhymia teaching hospital. 2011; 9(2) : 176- 183.
- Kelli Boi M, Christense B, Theresa M, Sara O, Jennifer S, Kary W. William' Basic nutrition and diet therapy. 15th. Edition, Elsevire: St, Louis, Missori;

2017.

8. R Janice, M Kelly. Krause and Mahan's food and the nutrition care process. 15th. Edition, student resources on evolve: Elsevier; 2021.

9. Kane K, Prelack K. Advanced Medical Nutrition Therapy. Jones & Barlett Learning: Burlington; 2019.

10. Warchalowski L, Luszcki E, Bartosewicz A, Dereri K, Warchalowska M, Olesky L, 'et al.' The analysis of Risk Factors in the conversion from Laproscopic to Open Cholecystectomy. *Int J Environ Res Public Health*. 2020;17(20):37-100. DOI- 10.3390/ijerph17207571.

11. Hey J, Joo K, Y Kyung, Moon S, Jung Y, Do K, 'et al.' Cholecystectomy increases the risk of metabolic syndrome in the Korean population: a longitudinal cohort study. *Cdn. Amegroups. Cn*. 2022;21(10): 22-201.

12. Bora K, Sakia M, Borah P, Das D. Association of Decrease High Density Lipoprotein Cholesterol With Obesity And Risk Estimates For Decreased HDL-C Attributable To Obesity: Preliminary Finding From a Hospital Based Study in a City From Northeast India. *Journal of Primary Care And Community Health*. 2017;8(1):26-30. DOI:10.1177/2150131916664706.

13. Moazeni M, Kheiri S, Gourbanbour K. The effects of cholecystectomy on serum lipids during 1 year follow up. *Research*. 2014;1094(1):24-10. DOI-org/10.13070/rs.en.1.1094

14. Bardagji A , Steinberge F. Relationship between HDL Functional Characteristics and Cardiovascular Health and potential Impact of dietary patterns: A Narrative Review. *MDPI*. 2019;11(6):12-31. DOI. Org/10.3390/nu11061231

15. Choi M, Lee Y, Heo Y, Hyun T, Lyu E, Park H, 'et al.' Association between the frequency of Dinning Out and the Risk of Obesity, Diabetes Mellitus and Dyslipidemia among Korean Adults. *Ecology of Food and Nutrition*. 2019; 58(6): 560-574. DOI.org/10.1080/03670244.2019. 1644327

16. Chen H, Chuang S, Chang H , Pan W. Energy intake at different times of the day: Its association with elevated total and LDL cholesterol levels. *Nutrition, Metabolism and Cardiovascular diseases*. 2019;29(4):390-397.

17. Lee H , An H. Ratios on Hypo- HDL- Cholesterolemia Risk and HDL- Cholesterol levels over a 12- year Follow-up. *Scientific Reports*. 2020;913(10):41-57. DOI. Org/10.1038/s41598-020-57931-w

18. Alexandria V. Dietary Patterns and Risk of Cardiovascular Disease: A Systematic Review [Internet]. 2020 Dietary guidelines Advisory Committee: Dietary Pattern Subcommittee; (accessed on 2020 Jul 15). Available from: <http://www.ncbi.nlm.nih.gov>