



## Original Article

Evaluation of Lipid Profile in *H. Pylori* Infected Coronary Artery Disease PatientsMehk Memon<sup>1</sup>, Nosheen Aghani<sup>1</sup>, Waseem Akram<sup>2</sup>, Ghulam Qadir<sup>3</sup>, Mehwish Memon<sup>4</sup> and Mahrish Memon<sup>5</sup><sup>1</sup>Department of Biochemistry, Peoples University of Medical and Health Sciences for Women, Nawabshah, Pakistan<sup>2</sup>Department of Pathology, Peoples University of Medical and Health Sciences for Women, Nawabshah, Pakistan<sup>3</sup>Department of Surgery, Peoples University of Medical and Health Sciences for Women, Nawabshah, Pakistan<sup>4</sup>Bakhtawar Ameen Medical College, Multan, Pakistan<sup>5</sup>Institute of Physiotherapy and Rehabilitation Sciences, Peoples University of Medical and Health Sciences for Women, Nawabshah, Pakistan

## ARTICLE INFO

## Key Words:

Triglycerides (TG), Low Density Lipoprotein (LDL), High Density Lipoprotein (HDL), Total Cholesterol (TG)

## How to Cite:

Memon, M. ., Aghani, N. ., Akram, W. ., Qadir, G. ., Memon, M. ., & Memon, M. (2023). Evaluation of Lipid Profile in *H. Pylori* Infected Coronary Artery Disease Patients: Evaluation of Lipid Profile in Coronary Artery Disease Patients. *Pakistan BioMedical Journal*, 6(07).

<https://doi.org/10.54393/pbmj.v6i07.903>

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Received Date: 1<sup>st</sup> July, 2023

Acceptance Date: 24<sup>th</sup> July, 2023

Published Date: 31<sup>st</sup> July, 2023

## ABSTRACT

Increase in low density lipoprotein level and decrease in high density lipoprotein level result to coronary artery disease. Metabolism of lipids regulated during host response to *H. pylori* infection. **Objective:** To analyze the serum levels of lipid profile in *H. pylori* infected coronary artery disease patients. **Methods:** It was a comparative Cross-Sectional study. This study was done at the Department of Biochemistry, Peoples University of Medical Health Sciences for Women (PUMHSW) from 1<sup>st</sup> July 2022 to 15<sup>th</sup> December 2022. A sample of 60 subjects was divided into 2 groups. Group A (Control) comprised of 30 subjects and group B (cases) of 30 subjects. 5 mL of blood from each participant was collected under aseptic conditions. For the Lipid profile, 2 mL of the blood was collected in the Gel test tubes. A Spectrophotometer was used to perform the lipid profile. *For the data analyzes SPSS Version-22.0 was used.* **Results:** In this study we found that *Helicobacter pylori* positive subjects have higher levels of serum LDL-C, Triglycerides and total cholesterol. The outcomes of present research showed that *H. pylori* is associated with low level of HDL-C. The present study results shown an association among *H. pylori* infection and coronary artery possibility influence. **Conclusions:** We concluded in this study that serum levels of lipid profile become worse in positive *H. pylori* infected patients as compared to the control group participants which were negative *H. pylori* with coronary artery disease.

## INTRODUCTION

*H. pylori* is a gram-negative bacterium, initially sequestered in gastric mucosa by Marshall and Warren in 1983 [1]. *H. pylori* had known to be the cause liable of maximum of the cases of gastric mucosal damage. Mostly *H. pylori* infection does not harm but most of times they are responsible for stomach ulcer and also ulcer of small intestine [2]. Coronary artery disease progresses once the main blood vessels come to be damaged or diseased. Cholesterol comprising deposits in arteries and inflammation leads to

coronary artery disease [3]. The relation of coronary artery disease and *H. pylori* infection is based on 3 main evidences. Microbial, pathological and epidemiological mechanism of postulation [4]. There are many ways in which infection organism introduce and enhances atherosclerosis. This goes through protruding invasion into vessels wall causing response of inflammation which enhances macrophages, lymphocytes, cytokines production and factors of tissue growth [5, 6].

Lipopolysaccharides releases endotoxins due to systemic effect of infection cause release of lipopolysaccharides which ultimately damage to epithelium increase in cytokines with enhancing inflammatory parameters and stimulate procoagulants which leads to ischemia and thrombosis which all predisposes towards coronary artery disease [7]. Increase in low density lipoprotein level and decrease in high density lipoprotein level result to coronary artery disease. Metabolism of lipids regulated during host response to *H. pylori* infection [8]. Lipids show host defense with lipoproteins for infectious particles like endotoxins. This is mediated through cytokines like TNF  $\alpha$ , interleukin 6, interleukin1 and interferon. Cytokines also decreases lipoprotein lipase activity and clearance of triglycerides and also increase very low-density lipoprotein levels [9].

## METHODS

This study was done at the Department of Biochemistry Peoples University of Medical Health Sciences for Women Nawabshah Shaheed Benazirabad (PUMHSW) from 1<sup>st</sup> July 2022 to 15<sup>th</sup> December 2022 along the cooperation with Medicine OPD/Ward PMCH. The analysis of sample had been done at diagnostic and research laboratory PUMHSW, Shaheed Benazirabad (SBA). Study design was comparative cross sectional. Sample technique was non probability purposive sampling. Both male and female subjects were included in the study which were diagnosed cases of Myocardial infarction from age 35 to 65 years with *H. pylori* infection and coronary artery disease. The patients with hepatic carcinoma, renal or hepatic failure and using drugs that affect the *H. pylori* were excluded. The sample size of study was based upon 60 subjects divided into two groups. Group A (Control) comprised of 30 participants with *H. pylori* negative coronary artery disease and group B (Cases) comprised of 30 participants with *H. pylori* positive coronary artery disease. We collected complete medical data and pertinent information from every subject through filling out a proforma. All participants gave verbal and written agreement after being informed about the study's purpose. Blood sample collection was done by venipuncture of the participants. 5 mL of blood from each participant was taken under aseptic conditions. For the Lipid profile, 2 mL of the blood was collected in the Gel test tubes. The blood was centrifuged for 10 minutes at 3500 rpm, fractionated, and conveyed to eppendorf cups before being stored at  $-20^{\circ}\text{C}$  until analysis. The material was allowed to reach room temperature before being utilized. A Spectrophotometer was used to perform the lipid profile. For the data analyzes SPSS Version 22.0 was used. Results were shown as mean and standard deviation. Total cholesterol, HDL, LDL, TAG was performed using spectrophotometer. Lipoproteins are fractionated,

after centrifugation, the supernatant contains chylomicron, which may be detected using the CHOD-PAP assay and lipid clearing factor (LCF) while LDL and VLDL were fractionated and precipitated by addition of polyethylene glycol (PEG). This study had been approved by the Review Committee of PUMHSW Nawabshah.

## RESULTS

Total 60 cases of coronary artery disease were analyzed and they were equally divided in to two groups. Group A, *H. pylori* negative (n=30) and group B, *H. pylori* positive (n=30) subjects. Table 1 shows the age distribution of the study participants. In group A the mean age of study subjects was  $46.7 \pm 5.7$  years. In group B the mean age of study subjects was  $55.7 \pm 9.6$  years. The other main finding of the study was that the *H. pylori* positive subjects were older than the negative subjects. There was statistically significant difference of age between group A and group B subjects shown in Table 1.

**Table 1:** Distribution of Subjects According to Age in Years n=60

Group A H. Pylori -Ve	Group B H. Pylori +Ve	t-value	p-value
46.7 $\pm$ 5.7	55.7 $\pm$ 9.6	16.51	0.03

The mean and standard deviation of lipid profile of study groups is shown in Table 2. The mean triglycerides of group A subjects was  $177.5 \pm 77.25$  while in group B the mean triglycerides were  $232.01 \pm 65.53$ . Subjects with *H. pylori* positive have significant higher triglyceride concentrations. In group A subjects the mean low-density lipoproteins were  $110.3 \pm 21.6$  while in group B was  $126.94 \pm 49.8$ . Low density lipoprotein concentration was significantly lower in subjects with *H. pylori* negative groups. The mean high-density lipoprotein level in group A subjects was  $43.4 \pm 10.11$  while in group B the mean high-density lipoprotein level was  $40.3 \pm 11.76$ . Subjects with *H. pylori* positive have insignificantly decreased high density lipoproteins concentrations compared with control group. The mean total cholesterol level in group A subjects was  $165.35 \pm 31.40$  while in group B total cholesterol level was  $179.47 \pm 46.31$ . Subjects with *H. pylori* positive have significantly higher total cholesterol concentrations compared with control group subjects.

**Table 2:** Comparison of Lipid Profile Variation in *H. Pylori* -Ve And *H. Pylori* +Ve

Variables	Group A H. Pylori -Ve	Group B H. Pylori +Ve	p-value
Triacylglycerol (mg/dl)	177.52 $\pm$ 77.25	232.01 $\pm$ 65.53	0.01
HDL-C (mg/dl)	43.4 $\pm$ 10.11	40.3 $\pm$ 11.76	0.69
LDL-C (mg/dl)	110.3 $\pm$ 21.6	126.94 $\pm$ 49.8	0.001
Total Cholesterol (mg/dl)	165.35 $\pm$ 31.40	179.47 $\pm$ 46.31	0.02

## DISCUSSION

In this study we found that *Helicobacter pylori* positive subjects have higher levels of serum LDL.C, Triglycerides

and total cholesterol. These results are supported by Kucukazman *et al.*, who found total cholesterol and LDL concentrations increased in *H. pylori* positive patients than in negative *H. pylori* patients [10]. Similarly Sung *et al.*, also reported the increased levels of TG, TC and LDL but decreased levels of HDL-C in *H. pylori* infected patients [11]. The results of present study showed that *H. pylori* is associated with low level of HDL-C. Hoffmesister *et al.*, and Takashima *et al.*, demonstrated that *H. pylori* causes low HDL-C level [12, 13]. The results of present study consistent to the study done by Malekiet *et al.*, who found in his study that there is a relationship in *H. pylori* infection and cardiovascular diseases [14]. Higher occurrence of *H. pylori* was found among CAD patients. When related to *H. pylori* triglyceride levels were increased in positive than that in negative cases, on the other hand HDL-C levels were in positive cases. Shimamoto *et al.*, estimated the association between *H. pylori* infection and the serum lipid profile revealed that *H. pylori* infection is positively associated with LDL-C, TC, and TG and negatively associated with HDL-C [15]. Findings of the current study showed similar results. Guzman *et al.*, reported that gastric *H. pylori* infection does not have significant relation with the presence of dyslipidemia [16]. The alteration of the serum lipid profile was discreetly higher in the patients infected by *H. pylori* but they were not statistically significant. Hissun *et al.*, reported that the serum of level of total cholesterol were significantly increased in group which had *H. pylori* positive and coronary artery disease, while in other group which had *H. pylori* positive without coronary heart disease the serum levels of LDL was significantly increased. These results are inconsistent with the present study [17]. Nam *et al.*, estimated increased low-density lipoprotein (LDL) and decreased high-density lipoprotein (HDL) than *H. pylori*-negative group which was comparative to the present study [18]. Abdu *et al.*, reported that serum LDL levels were high in *H. pylori* positive coronary artery disease patients as compared to the *H. pylori* negative patients which was similar to the present study findings [19]. The results of present study were consistent to the study of Longo-Mbenza *et al.*, who found in his study that there is a relationship in *H. pylori* infection and cardiovascular diseases [20].

## CONCLUSIONS

The present study results shown a relation between *H. pylori* infection and coronary artery risk factors. *H. pylori* infection affects the development of cardiovascular disease as it introduces the chronic long-term infection in epithelium, which leads to locally and systematically inflammation. *H. pylori* infection enhances the risk of cardiovascular disease by decreasing the level of HDL concentration and it may be understood as a risk factor of

developing atherosclerosis.

## Authors Contribution

Conceptualization: MM<sup>1</sup>, NA, WA

Methodology: GQ, MM<sup>2</sup>, MM<sup>3</sup>

Formal analysis: GQ, MM<sup>2</sup>, MM<sup>3</sup>

Writing-review and editing: MM<sup>1</sup>, NA, WA

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

## Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

## REFERENCES

- [1] Vafaeimanesh J, Hejazi SF, Damanpak V, Vahedian M, Sattari M, Seyyedmajidi M. Association of *Helicobacter pylori* infection with coronary artery disease: is *Helicobacter pylori* a risk factor? The Scientific World Journal. 2014 Jan; 2014: 516354. doi: 10.1155/2014/516354.
- [2] Haeri M, Parham M, Habibi N, Vafaeimanesh J. Effect of *Helicobacter pylori* infection on serum lipid profile. Journal of Lipids. 2018 Jun; 2018: 6734809. doi: 10.1155/2018/6734809.
- [3] Al-Ghamdi A, Jiman-Fatani AA, El-Banna H. Role of Chlamydia pneumoniae, *Helicobacter pylori* and cytomegalovirus in coronary artery disease. Pakistan Journal of Pharmaceutical Sciences. 2011 Apr; 24(2): 95-101.
- [4] Temesgen GB, Menon M, Gizaw ST, Yimenu BW, Agidew MM. Evaluation of lipid profile and inflammatory marker in patients with gastric *Helicobacter pylori* infection, Ethiopia. International Journal of General Medicine. 2022 Jan; 15: 271-8. doi: 10.2147/IJGM.S345649.
- [5] Abdu A, Cheneke W, Adem M, Belete R, Getachew A. Dyslipidemia and associated factors among patients suspected to have *Helicobacter pylori* infection at Jimma University Medical Center, Jimma, Ethiopia. International Journal of General Medicine. 2020 Jun; 13: 311-21. doi: 10.2147/IJGM.S243848.
- [6] Nam SY, Ryu KH, Park BJ, Park S. Effects of *Helicobacter pylori* infection and its eradication on lipid profiles and cardiovascular diseases. *Helicobacter*. 2015 Apr; 20(2): 125-32. doi: 10.1111/hel.12182.
- [7] Jukic A, Bozic D, Kardum D, Becic T, Luksic B, Vrsalovic M, *et al.* *Helicobacter pylori* infection and severity of coronary atherosclerosis in patients with

- chronic coronary artery disease. *Therapeutics and Clinical Risk Management*. 2017 Jul; 13: 933-8. doi: 10.2147/TCRM.S142193.
- [8] Ndebi ME, Guimtsop YA, Tamokou JD. The assessment of risk factors, lipid profile, uric acid and alanine aminotransferase in *Helicobacter pylori*-positive subjects. *International Journal of Research in Medical Sciences*. 2018 Sep; 6(9): 2889. doi: 10.18203/2320-6012.ijrms20183623.
- [9] Sharma V and Aggarwal A. *Helicobacter pylori*: Does it add to risk of coronary artery disease. *World Journal of Cardiology*. 2015 Jan; 7(1): 19. doi: 10.4330/wjc.v7.i1.19.
- [10] Kucukazman M, Yavuz B, Sacikara M, Asilturk Z, Ata N, Ertugrul DT, et al. The relationship between updated Sydney System score and LDL cholesterol levels in patients infected with *Helicobacter pylori*. *Digestive Diseases and Sciences*. 2009 Mar; 54(3): 604-7. doi: 10.1007/s10620-008-0391-y.
- [11] Sung KC, Rhee EJ, Ryu SH, Beck SH. Prevalence of *Helicobacter pylori* infection and its association with cardiovascular risk factors in Korean adults. *International Journal of Cardiology*. 2005 Jul; 102(3): 411-7. doi: 10.1016/j.ijcard.2004.05.040.
- [12] Hoffmeister A, Rothenbacher D, Bode G, Persson K, März W, Nauck MA, et al. Current infection with *Helicobacter pylori*, but not seropositivity to *Chlamydia pneumoniae* or cytomegalovirus, is associated with an atherogenic, modified lipid profile. *Arteriosclerosis, Thrombosis, and Vascular Biology*. 2001 Mar; 21(3): 427-32. doi: 10.1161/01.ATV.21.3.427.
- [13] Takashima T, Adachi K, Kawamura A, Yuki M, Fujishiro H, Rumi MA, et al. Cardiovascular risk factors in subjects with *Helicobacter pylori* infection. *Helicobacter*. 2002 Apr; 7(2): 86-90. doi: 10.1046/j.1083-4389.2002.00064.x.
- [14] Maleki VS, Zarkesh EH, Behjati M. *Helicobacter pylori*'s evasion of the immune system could establish an inflammatory environment that potentially induces the development of coronary artery disease. *Jundishapur Journal of Microbiology*. 2013 Jan; 6(3): 242-7. doi:10.5812/jjm.5038.
- [15] Shimamoto T, Yamamichi N, Gondo K, Takahashi Y, Takeuchi C, Wada R, et al. The association of *Helicobacter pylori* infection with serum lipid profiles: An evaluation based on a combination of meta-analysis and a propensity score-based observational approach. *PLoS One*. 2020 Jun; 15(6): e0234433. doi: 10.1371/journal.pone.0234433.
- [16] Guzman E, Montes P, Monge E. Relation between Patients with Gastric *Helicobacter Pylori* Infection and Dyslipidemia. *Journal of Gastrointestinal Disorders and Liver Function*. 2015 Oct, 1(1): 1-4. doi: 10.15436/2471-0601.15.004.
- [17] Hissun Y, Modawe GA, Abdrabo AE. Association between *H. pylori* and coronary heart disease among Sudanese patients. *International Journal of Informative Research and Review*. 2016 Jan; 3: 1589-93.
- [18] Nam SY, Ryu KH, Park BJ, Park S. Effects of *Helicobacter pylori* infection and its eradication on lipid profiles and cardiovascular diseases. *Helicobacter*. 2015 Apr; 20(2): 125-32. doi: 10.1111/hel.12182.
- [19] Abdu A, Cheneke W, Adem M, Belete R, Getachew A. Dyslipidemia and associated factors among patients suspected to have *Helicobacter pylori* infection at Jimma University Medical Center, Jimma, Ethiopia. *International Journal of General Medicine*. 2020 Jun; 13: 311-21. doi: 10.2147/IJGM.S243848.
- [20] Longo-Mbenza B, Nsenga JN, Ngoma DV. Prevention of the metabolic syndrome insulin resistance and the atherosclerotic diseases in Africans infected by *Helicobacter pylori* infection and treated by antibiotics. *International Journal of Cardiology*. 2007 Oct; 121(3): 229-38. doi: 10.1016/j.ijcard.2006.12.003.