PERIÓDICO TCHÊ QUÍMICA
ARTIGO ORIGINAL

AVALIAÇÃO DE ALGUNS PARÂMETROS HEMATOLÓGICOS DE PACIENTES INFECTADOS POR *HELICOBACTER PYLORI*

EVALUATING SOME OF THE HEMATOLOGICAL PARAMETERS FOR *HELICOBACTER PYLORI* INFECTED PATIENTS

تقييم بعض المعلمات الدموية للمرضى المصابين بعدوى الملوية البوابية

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Received 01 June 2020; received in revised form 28 August 2020; accepted 04 September 2020

RESUMO

Helicobacter pylori são bastonetes curvos Gram-negativos que habitam a mucosa gástrica e são considerados as principais causas de úlceras estomacais e duodenais em humanos. O objetivo principal deste estudo foi avaliar as influências da bactéria nos diversos parâmetros hematológicos. Foram incluídos neste estudo 60 pacientes com idades entre 15-40 anos (30 homens e 30 mulheres) e 30 indivíduos saudáveis de mesma idade que foram considerados como o grupo de controle. O sangue venoso (4 ml) foi obtido da população estudada e analisado para hemograma completo utilizando um analisador hematológico automatizado. Os resultados revelaram que há uma diminuição substancial (p <0,01) na hemoglobina (Hb), hemoglobina corpuscular média (HCM) e na largura de distribuição de células vermelhas (RDW) nos pacientes em comparação ao grupo de controle. No entanto, nenhuma diferença significativa nos glóbulos vermelhos (RBC), hematócritos (HCT), volume corpuscular médio (MCV) e na concentração de hemoglobina corpuscular média (MCHC) nos pacientes em comparação com o grupo de controle. Além disso, nenhuma diferença significativa foi encontrada nos glóbulos brancos (WBC) entre pessoas infectadas e não infectadas por *H. pylori*. Caso contrário, existem diferenças significativas (p <0,01) nos linfócitos, monócitos, granulócitos entre os pacientes e os indivíduos saudáveis. Os resultados também descobriram que existem diferenças estatísticas significativas em alguns dos parâmetros hematológicos entre os grupos de estudo de acordo com o sexo. O estudo concluiu que Hb, RDW, linfócitos, monócitos, granulócitos estão reduzidos em pacientes infectados com *H. Pylori*, sugerindo que a infecção pode ter efeitos diretos nos parâmetros sanguíneos.

***Palavras-chave**: Helicobacter pylori, Parâmetros hematológicos, HB, WBC.*

ABSTRACT

Helicobacter pylori are Gram-negative curved rods that habitats the gastric mucosa and considered as the leading causes of stomach ulcers and duodenal ulcers in humans. The main object of this study was to evaluate the influences of the bacteria on several hematological parameters. A total of 60 patients aged between 15 to 40 years were included in this study (30 male and 30 female) in addition to 30 healthy individuals from the same ages who were considered as a control group. Venous blood (4 ml) was obtained from the study population and investigated for complete blood count (CBC) using an automated hematology analyzer. The results revealed that there is a substantial decrease (p<0.01) in Hemoglobin (Hb), Red cell distribution width (RDW), and mean corpuscular hemoglobin (MCH) in patients compared to control. However, no significant difference in Red blood cells (RBCs), Hematocrit (HCT), mean corpuscular volume (MCV) and mean corpuscular hemoglobin concentration (MCHC) in patients compared to control. Also, no significant differences were found in the white blood cell (WBC) between *H. pylori* infected and non-infected persons. Otherwise, there are significant differences (p<0.01) in lymphocytes, monocytes, granulocytes in the patients and healthy individuals. The results also found that there are significant statistical differences in some of the hematologic parameters among study groups according to their gender. The study concluded that Hb, RDW, lymphocytes, monocytes, granulocytes are decreased in *H. Pylori* infected patients suggesting that infection may have direct

DOI: 10.52571/PTQ.v17.n36.2020.1067_Periodico36_pgs_1052_1060.pdf

effects on blood parameters.

Keywords: *Helicobacter pylori, Hematology parameters, HB, WBC.*

الملخص

الملوية البوابية هي بكتريا عصويه سالبة لصبغة كرام توطن الغشاء المخاطي في المعدة وتعتبر من الأسباب الرئيسية لقرحة المعدة وقرحة الاثني عشر في البشر. الهدف الرئيسي من هذه الدراسة هو تقييم تأثير البكتيريا على العديد من المعايير الدموية. تضمن هذه الدراسة (60) مريضاً كعدد كلي منقسم الى (30 رجلاً و30 أنتى) تتراوح أعمارهم بين (15-40 سنة) بالإضافة إلى (30) من الأفراد الأصحاء من نفس الأعمار الذين اعتبروا مجموعة السيطرة. تم اخذ عينة دم وريدي (4 مل) من مجتمع الدراسة وتم قياس تعداد الدم الكامل CBC باستخدام محلل الدم الآلي. أظهرت النتائج أن هناك انخفاضًا كبيراً (P <0.01) في مستوى الهيموكلوبين ومتوسط هيموكلوبين الكرية وعرض توزيع الكريات الحمراء في المرضى مقارنة بمجموعة السيطرة. ومع ذلك ، لا يوجد فرق كبير في الكريات الحمراء ، والهيماتوكرايت ،متوسط حجم الكرية الحمراء ومتوسط تركيز اليموكلوبين بالكريات الحمراء في المرضى مقارنة مع السيطرة أيضا ، لم يتم العثور على اختلافات كبيرة في إجمالي الخلايا البيض بين المصابين بكتيريا الملوية البوابية. خلاف ذلك ، هناك اختلافات كبيرة (P <0.01) في الخلايا اللمفاوية, الخلايا وحيدة النواة والخلايا الحبيبية في المرضى والأفراد الأصحاء. كما وجدت النتائج وجود فروق ذات دلالة إحصائية في بعض المعايير الدموية بين مجموعات الدراسة حسب الجنس. خلصت الدراسة إلى أن اليموكلوبين ,متوسط تركيز الهيموكلوبين بالكرية ,وعرض توزيع الكريات الحمراء ,الخلايا اللمفاوية .الخلايا وحيدة النواة والخلايا الحبيبية تنخفض في المرضى المصابين بالبكتيريا الحلزونية مما يشير إلى أن العدوى قد يكون لها تاثير مباشرة على معايير الدم.

الكلمات المفتاحية: *الملوية الحلزونية، معايير دموية، الهيموكلوبين، الخلايا البيض.*

1. INTRODUCTION

Helicobacter pylori (*H. pylori*) is a spiral-shaped, microaerophilic, Gram-negative curved rods, measuring approximately 3–5 μm in length. Their main habits, the gastric mucosa of humans, were considered the leading cause of stomach ulcers, duodenal ulcers, gastritis, and gastric malignancies (Tamokou *et al*., 2017; Yahya *et al.,* 2017). There specialized traits allowing this organism to flourish in the harsh environment of the stomach include Elaboration of urease, Motility, and Binding of *H. pylori* to gastric epithelial cells via bacterial adhesins; *Helicobacter pylori* elaborate a significant amount of urease (10–15% of total proteins by weight), which produces ammonia and carbon dioxide resulting from endogenous urea hydrolysis, thus buffering (neutralizing) gastric acid in the organism's immediate vicinity. *Helicobacter pylori* possess numerous long flagella, whose flailing movements allow them to swim through viscous gastric mucus with powerful screw-like movements, much like a drill bit spinning. The bacterium colonizes the gastric mucosa by adhering to mucous epithelial cells and the mucus layer lining the gastric epithelium. *Helicobacter pylori* have adhesives that improve the adhesion of gastric epithelial cells by recognizing specific carbohydrate structures, such as the Lewis b blood group antigen and sialyl dimeric Lewis X. Also, Virulence factors such as the cytotoxin-associated pathogenicity island-encoded protein CagA and the vacuolating cytotoxin VacA help in this gastric mucosa colonization (Kusters *et al*., 2006; Kamerling and Boons 2007). Besides, it could cause Mucosa-associated-lymphoid-type lymphoma and non-ulcer dyspepsia (Hajimahmoodi *et al*., 2011; Quaglia *et al*., 2020). Infections with *H. pylori* are usually more frequent in older people than in children (Hashim *et al*., 2019). Although several persons have asymptomatic *H. pylori* infection, peptic ulcers may develop in (10 – 20% as lifetime risk), while (1 – 2% risk) of patients may develop stomach cancer (Kusters *et al.,* 2006). An oral-oral, fecal-oral, and a common environmental source has been proposed as possible transmission routes, with familial transmission associated with *H. pylori* infections (Smith *et al*.,2019; Quaglia *et al.,* 2020).

H. pylori were proposed to be associated with conditions extra-gastrointestinal effects, including those from metabolic, cardiopulmonary, gynecological, dermatologic, endocrinal, pneumatology, and neurologic disorders. *H. pylori* may also be connected with hematological aspects as low serum iron or low serum vitamin B12 levels being defined as having iron or vitamin B12 deficiency (Eledo *et al*., 2018). Moreover, Idiopathic thrombocytopenic purpura (ITP) is a widespread autoimmune hematologic disease that affecting persons of different ages *H. Pylori* was offered to be correlated with ITP (Ibrahim *et al.,* 2018; Rahman *et al*., 2019). Also, their associations between *H. pylori* and serum IL-8 production; Belaia *et al.* (2020) found the majority of patients of peptic ulcer disease (90%) have elevated levels of IL-8.

Anemia is a condition featured by reduced oxygen-carrying capacity and count of red blood cells (RBCs), hemoglobin Hb < 12 g/d in females, and (Hb) < 13 g/d in males. It concerns 50% of all anemia conditions caused by low iron intake, increased iron requirement, iron deficiency,

chronic blood loss, and poor absorption (Elamin *et al*., 2018).

The working by which *H. Pylori* causes iron-deficiency anemia is not abundantly settled. Studies law go preventative hepcidin is increased in patients (Rahman *et al.,* 2019).

In Iraq, no study has considered the effects of *H. pylori* infection on the hematological parameters (Humeida and Abdalla, 2017). Therefore, this study aimed to estimate the effect of *H. pylori* infection on hematological parameters such as hemoglobin (Hb) concentration, Red blood cells (RBCs), Hematocrit (HCT), platelet count, white blood cell (WBCs) and the association of this effect with changes in red blood indices which include mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), mean corpuscular hemoglobin (MCH), red cell distribution width (RDW), in the local population of Maysan province).

2. MATERIALS AND METHODS

2.1.Study Population and Design:

A total of 60 subjects suffering from *H. Pylori* infection (30 women and 30 men) and aging between (15-40) besides, 30 of the same ages and gender healthy persons (control group) are involved in the current study. All subjects were attended in the Hematology Unit of the Al-Sadder Teaching Hospital/Amara, where they were diagnosed and followed-up prospectively between October 2018 and April 2019.

All subjects with *H. Pylori* infection and control group succumbed to complete history taking (particularly age, gender, area, diabetes, hypertension, previous Iron therapy, blood transfusion as well as upper endoscopy state). The exclusion criterion contains patients with malignant hypertension, hepatic, and renal diseases. Over more, those on non-steroidal anti-inflammatory drugs (NSAIDs), proton pump inhibitors (PPI), cytotoxic drugs, or steroids, pregnant women were also excluded. Also, patients with immune thrombocytopenia due to any other causes were excluded.

2.2 Ethical clearance:

Permission to conduct this study is issued by the Health institutional, and the collection of Blood samples of individuals carried out by under public health technician supervision.

2.3. Sampling Procedure:

A 4mL of venous blood is obtained from every patient and healthy case, then separated into two containers, the first container with ethylene diamine tetraacetic acid (EDTA) was used for hematology estimation, and the rested 2 mL was centrifuged for *H. pylori* screening method (Hashim *et al*., 2019).

2.4. Hematology estimation:

The automated hematology analyzer Sysmex KX-21 (Sysmex Corporation, Kobe, Japan) was calibrated according to the instructions of the manufacturer, as the followings:

- 3 fresh blood samples were collected from seemingly healthy individuals known to have an MCV 86 fL – 96 fL, and an MCHC 330 g/L – 345 g/L (33.0 g/dL – 34.5 g/dL).
- The samples were anticoagulated with 1.4 mg/mL - 1.6 mg/mL of K2EDTA or K3EDTA.
- (Note: K3EDTA leads to cells to shrink, resulting in an approximate 2 percent decrease in packed (red) cell volume (PCV) or called Hematocrit (HCT).
- The samples were kept at room temperature and checked within 4 hours. The micropipette used was a Class A, standardized; the volumetric flasks were Class A, calibrated, created of borosilicate glass; the unique capillary tubes used to evaluate the PCV must comply with the requirements of the American Society for Testing and Materials, the plastics or glass cell counting vials must have a mi a minimum volume of 10 mL (American Society for Testing and Materials, 1980; International Committee for Standardization in Haematology, 1988).
- Soon after, the evaluation of hematological parameters, Hb, HCT, MCV, MCH, MCHC, platelet count, WBCs count, and the differential count was managed. The hemoglobin concentration of the samples (two dilutions) was measured using the International Committee for Standardization in Haematology (ICSH) haemiglobincyanide reference method (Zwart, *et al.,*1996; Bull

et al., 2000a). The PCV (hematocrit) was measured (four capillary tubes) using the ICSH selected method for microhematocrit measurement (International Committee for Standardization in Haematology, 1989; Bull *et al.,* 2000b).

- The red cell count was achieved using a semi-automated single-channel counter. It was used to count all cells in a specified displaced volume of the diluted blood sample through electronic means. At the moment, only particle counters with an aperture impedance follow this specification.
- The diluent was a sterile, non-toxic, buffered saline solution. The diluent included < 5 x 10^4 particles/L within a size range of 20 fL = 120 fL, must not crenate or lysis red blood cells, or change the MCV by > 2 fL more than a period of 30 minutes.
- The main dilution of 0.05 mL of blood, plus 25 mL of diluent, was produced, followed by a second dilution of 0.2 mL of main diluted sample + 20 mL of diluent; this resulted in a total dilution of 50 601 times.
- The sample was transferred to the counting vial with diluted and counts completed within five minutes of completing the final dilution stage. There were two dilutions; each was counted twice (International Council for standardization in Haematology, 1994).
- The count of white cells was achieved using an instrument for measuring red cells. The lytic agent used should be capable of lysing red cells completely, leaving no residual material able to contribute to the count. The leukocyte count signal should fall into the size range equal to 45 fL-450 fL, and the count should be stable after preparation for 15 minutes. There were two dilutions produce for each, and it was counted at least twice.
- The platelet count was measured using ICSH selected methods for the determination of the RBC/platelet (PLT) ratio (International Council for Standardization in Haematology, 2001).

Two dilutions were made. For medical facilities, direct whole blood testing of automated hematology analyzers was rarely, if ever, used. This was, however, the cornerstone of the recommended system for assigning values to stable blood calibrators and, as such, was used by those calibrator manufacturers.

2.5. Helicobacter Pylori diagnosis

H. pylori were diagnosed by using enzyme-linked immunosorbent assay (ELISA) test for the detection of *H. pylori* IgG antibodies in serum supplied by (Monobind Inc., USA) following the procedure supplied by kits as the following:

1. It was pipetted 25 µl of the appropriate serum reference calibrator, control, or diluted patient specimen into the assigned well for IgG determination.

2. It was added 100µl of *H. Pylori* Biotin Reagent Solution.

3. The microplate was swirled gently for 20-30 seconds to mix and cover.

4. It was incubate 60 minutes at room temperature.

5. The contents of the microplate were discarded by decantation or aspiration. If decanting, blot the plate dry with absorbent paper.

6. It was added 350 µl of wash buffer decant (blot) or aspirate. It was repeated two additional times for a total of three washes.

7. It was added 100 µl of *H.Pylori* Enzyme Reagent to all wells.

8. It was covered and incubated for thirty (30) minutes at room temperature.

9. Steps 6 and 7 were repeted, as explained above.

10. It was added 100 µl of working substrate solution to all wells.

11. Incubate at room temperature for fifteen minutes.

12. It was added 50 µl of stop solution to each well and swirled the microplate gently for 15-20 seconds to mix.

13. The absorbance was read in each well at 450 nm in a microplate reader.

2.6. Statistics

SPSS package version 20 software was applied for statistical analysis of data obtained in this study. Results are analyzed using an independent T-test, form comparing means. $P<0.05$ was considered statistically significant,

the Chi-square test was used to compare percentages (Ott and Longnecker, 2015).

3. RESULTS AND DISCUSSION:

3.1. RESULTS

The results revealed that the concentrations of hemoglobin (HB g/dl) and MCH were decreased significantly (P-value = 0.003, 0.011, respectively) in *H. pylori* patients against healthy subjects, as seen in Table 1. Also, the percent of RDW is significantly higher (P-value > 0.000) in patients. No significant differences were seen in the other parameters listed in Table 1.

Although no statistically significant difference was found in total WBC between patients and control, numbers of lymphocytes, monocytes, and granulocytes were significantly raised in *H. pylori-infected* subjects against healthy groups, as shown in Table (2). Besides, non-significant variations were found between *H. pylori* patients and the control group in MPV concentration and platelet count, as seen in Table 3. The results also found that hemoglobin concentration was significantly lower in females and males infected with *H. pylori* as compared with healthy women and men (P value=0,040, 0.050, respectively). Differences in the total RBC count and HCT % were not statistically significant between both sexes of patients and control, as showed in Table (4).

Accordingly, Table 5 showing statistically significant differences in the concentrations of MCV, MCH, and the RDW percent in infected females (P-value=0.007, 0.001 and 0.003 respectively), while the differences were significant only in RDW% in infected males when compared with healthy control. Dissension to females patients, *H. pylori-infected* males have a significant increase in WBC counts, lymphocytes, monocytes, and decreased granulocytes percent in comparison with healthy males, see Table 6. On the other hand, Table 7 showed a statistically significant difference in platelet counts and MPV concentration between patients diagnosed with *H. pylori* infection and the control group concerning gender.

3.2. DISCUSSION

The results found that the concentrations of hemoglobin (HB g/dl) and MCH decreased significantly in H. pylori patients, while the percent of RDW is higher than the control group. Ibrahim *et al.* (2018) found no significant difference between hematological parameters, platelet counts, White Blood Cell counts of patients diagnosed with H. pylori, and those without infection. On the other hand, Elamin *et al*., 2018 revealed that parameters of red blood corpuscles (Hb, PCV, MCV, and MCH) were decreased, while the platelet and reticulates count was significantly increased in patients with positive anti-*H*. *pylori* antibodies compared to those without. Otherwise, the differences of MCHC, total differential, and leukocytes count were non-significant and are in line with the results mentioned in tables 2 and 3. The reason for that perhaps due to the immunity that is generated against *H. pylori* infection. Xu *et al.* (2017) reported that hemoglobin level was reduced in persons with *H. pylori* infection than in healthy groups indicating that *H. pylori* infection may cause a case of anemia.

The results also found that all RBC, MCV, MCH, and MCHC levels are different significantly between infected and healthy subjects (all $P < 0.05$). However, these differences were small and had no considerable biologic effects, as mentioned by (Mwafy and Afana, 2018).

Rahman *et al.* (2019), mentioned that no difference in white blood cells was found between control and cases, which could be explained by the presence of inflammation in the study control group. Also, most control population may be complaining of inflammation at the time of diagnosis, which may narrow the difference in WBCs count between control and cases. In contrast, Linz *et al.* (2007) and Kodaman *et al*. (2014) described that infected patients had significantly elevated WBC counts compared with healthy persons, which showed raised total WBC, neutrophil, and monocyte counts. This could elucidate the overstated systemic inflammatory response in cases with *H. pylori* infection. This disagrees with Gupta *et al*. (2002), who observed that infection with *H. pylori* caused autoimmune neutropenia.

Papadaki *et al*. (2005) found a slight decrease in hemoglobin (Hb) (g/dl) level and mean of the corpuscular volume (MCV) in cases versus control, no difference in the mean of corpuscular hemoglobin (MCH) between control and cases, and no statistically significant relationship between cases and control in the number of platelet count.

It is reported that *H. pylori* affect red blood cells by causing extra gastric complications like vitamin B12 deficiency, Iron deficiency anemia (IDA), and some hematological parameters. Patients with *H. pylori* infection are more likely to have anti-parietal cell antibodies and anti-intrinsic

factor antibodies (Annibale *et al.,* 2000; Ayesh *et al*., 2013).

Ciacci *et al.* (2004), proposed a potential pathogenic effect of anemia and interpreted it by blood loss occurring after persistent erosive gastritis and low iron intake secondary to chronic gastritis and hypochlorhydria. The results also found that all RBC, MCV, MCH, and MCHC levels are different significantly between infected and healthy subjects (all $P < 0.05$). However, these differences were small and had no considerable biologic effects, as mentioned by (Mwafy and Afana, 2018).

Similarly, Eledo *et al*. (2018) found that infection with H. pylori caused significant differences between patients and the control group (Hb, PCV, ESR) parameters between males and females. The authors suggested that the pathogen has not an additional impact on a particular gender through patients in a prescribed geographic location. However, among the *H. pylori* patients, the hemoglobin content decreased significantly.

4. CONCLUSIONS:

The infection with *H. pylori* has led to a decrease in MCH, RDW levels, and LYM, MON, GRA counts. In addition to significant differences in MCV, MCH, total WBC, LYM, MON, and GRA according to gender**.** The results suggest that infection with *H. pylori* has pathogenic effects on blood components.

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Table 1. *Effect of H. pylori on (RBC, HB, HCT, MCV, MCH, MCHC, and RDW%) in total patients.*

parameters	RBC(10^6/ mm^3)	HB(g/dl)	HCT(%)	MCV(µM)	MCH(pg)	MCHC(g/dl)	RDW(%)
Patients	4.99 ± 4.99	12.67 ±1.94	39.56 ±4.77	79.96 ±8.08	25.64 ±3.58	31.95 ±1.99	14.00 ±1.99
Control	5.03 ± 5.03	13.75 ±1.12	43.44 ±3.41	87.51 ±3.61	27.44 ±1.84	31.70 ±1.49	12.94 ± 0.66
P value	**0.124^{NS}**	**0.003^{*}**	**0.087^{NS}**	**0.08^{NS}**	**0.011***	**0.232^{NS}**	**0.000^{**}**

NS: Non-Significant. *: Significant at 0.05. **: Significant at 0.001

Table 2. Effect of *H. pylori* on (WBC, LYM, MON, GRA) in total patients.

Parameters	WBCs (10^3/MM^3)	LYM(%)	MON(%)	GRA(%)
Patients	7.92 ± 2.74	35.10 ± 11.43	8.92 ± 4.17	56.27 ± 12.60
Control	8.40± 1.90	33.53 ± 6.68	6.72± 1.79	57.77 ± 7.37
P value	**0.069^{NS}**	**0.004^{*}**	**0.001^{**}**	**0.018^{*}**

NS: Non-Significant. * (P<0.05). ** (P<0.01)

Table 3. *Effect of H. pylori on (MPV and PLT) in total patients.*

Parameters	MPV (µM^3)	PLT(10^3/MM^3)
Patients	7.06 ±0.78	290.03 ±56.322
Control	7.39± 1.08	264.94 ±68.79
P value	0.066^{NS}	0.275^{NS}

NS: Non-Significant

Table 4. *Effect of H. pylori on Red blood cells (RBC), Hemoglobin (HB), Hematocrit (HCT) in patients and control according to sex*

Parameters		RBCs (10^6/mm^3)	HB(g/dl)	HCT(%)
Female	**Patient**	4.72± 0.59	11.87±0.97	37.43±2.36
	Control	4.78±0.32	12.73±0.55	40.71±1.87
	P value	0.262NS	0,040*	0.233^{NS}
Male	**Patient**	5.40± 0.35	13.92± 2.41	42.83± 5.75
	Control	5.21± 0.38	14.46± 0.84	45.49±2.90
	P value	0.702^{NS}	0.050*	0.298^{NS}

NS: Non-Significant,*(P<0.05)

Table 5. *Effect of H. pylori on Red blood cells indices (MCV, MCH, MCHC, RDW) in patients and control according to sex*

Parameters		MCV(μM)	MCH(pg)	MCHC(g/dl)	RDW(%)
Female	Patient	80.00±7.13	25.42±3.22	31.70±1.45	14.03±1.53
	Control	86.06±2.86	27.73±0.87	31.72±1.28	12.71±0.70
	P value	0.007^{**}	0.001^{**}	0.322^{NS}	0.003^{**}
Male	Patients	79.90±9.75	25.96±4.22	32.34± 2.66	13.94±2.21
	Control	88.77±3.67	27.18. ±2.32	31.56±1.59	12.71±0.70
	P value	0.101^{NS}	0.388^{NS}	0.175^{NS}	0.005^{**}

** (P<0.01), NS: Non-Significant.

Table 6. *Effect of H. pylori on (WBC, LYM, MON, GRA) in patients and control according to sex*

Parameters		WBCs (10^3/MM^3)	LYM(%)	MON(%)	GRA(%)
Female	Patient	7.46±2.20	34.32±9.18	8.87±4.28	57.29±9.43
	Control	8.75±2.45	35.63±6.12	6.06±1.51	57.30±6.36
	P value	0.322^{NS}	0.093^{NS}	0.086^{NS}	0.252^{NS}
Male	Patients	8.64±3.42	36.30±14.66	9.00±4.19	54.69±16.78
	Control	8.26±1.32	32.59±6.46	7.10±1.87	57.52±7.83
	P value	0.001**	0.05^{*}	0.000^{**}	0.01^{*}

** (P<0.01), NS: Non-Significant.

Table 7. *Effect of H. pylori on (PLT, MPV) in patients according to sex*

Parameters		PLT(10^3/MM^3)	MPV(μM^3)
Female	Patients	295.17±63.35	7.30±0.83
	Control	303.50±76.17	7.30±1.12
P value		0.404^{NS}	0.063^{NS}
Male	Patients	282.09±45.04	6.70±0.57
	Control	238.13±48.80.35	7.450±1.07
P value		0.850^{NS}	0.104^{NS}

NS: Non-Significant