EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 8
83-86
Year: 2018

ASSOCIATION OF HELICOBACTER PYLORI INFECTION AND VITAMIN B12 LEVEL AMONG SUDANESE PATIENTS IN KHARTOUM STATE-2018

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Article Received on 01/06/2018 **Article Revised on 22/06/2018** **Article Accepted on 12/07/2018**

ABSTRACT
Helicobacter pylori is an organism that is reported to cause deficiency of vitamin B_{12} by producing gastritis and peptic disease which results in vitamin B_{12} malabsorption, the exact mechanism is unknown but the suggested mechanisms are that *H. pylori* decreases the hydrochloric acid content of the gastric juice which effect on vitamin B_{12} absorption. **A** case-control study was conducted in the Military hospital, Khartoum state, Sudan, where H. *pylori* infection was diagnosed. Study done during Feb to April 2018 and included 80 samples, 50 of these samples were collected from patient diagnosed with *H. pylori* as a case group, and 30 samples were collected from apparently healthy individuals as control group. A total of 3 ml venous blood samples were collected to obtain Serum used for estimation of serum B_{12} level by competitive Immunoluminometric assay among tow studied group. The present study showed that There was a significant decrease of S. B_{12} level among case compare with control group with a mean (297.7 ± 289.6, 569.8 ± 171.5) respectively (P; 0.007). Also show there is no correlation between S. B_{12} level in *H. pylori* patient compare with gender, *H. pylori* infection duration, other disease, bloody stool and treatment with P. value (0.949, 0.158, 0.684, 0.339, 0146) respectively. The study concluded that *Helicobacter pylori* has a significant effect on vitamin B12 level and *H. pylori* infection is a cause of vitamin B12 deficiency. Indicate there is an association between S.B_{12} deficiency and *H. pylori* infection.

KEYWORDS: *Helicobacter pylori* is malabsorption, Immunoluminometric and *H. pylori* infection.

I. INTRODUCTION
Vitamin B_{12} deficiency is common seen in clinical practice [Alfawaeir SAA (2013) *et al*]. Vitamin B_{12} deficiency often goes undetected with manifestations that range from asymptomatic to a wide spectrum of hematologic and/or neuropsychiatric features [Gilsing AM (2010) *et al*], and observed in patients with *Helicobacter pylori* infection [Alfawaeir SAA (2013) *et al*], the reported prevalence for vitamin B_{12} deficiency in *Helicobacter pylori* infection was 67% of infected cases [Sarari AS (2008) *et al*].

Helicobacter pylori is a bacteria specially adapted to survive in the gastric lumen. *H. pylori* responsible for widespread infection with more than 50% of the world's population infected, even though 80% of those infected have no symptoms. Infection with *H. pylori* has been recognized as a public health problem worldwide and more prevalent in developing than the developed countries [Devrajani, B.R.(2010)*et al*].

Malabsorption plays a major role in the development of different nutritional deficiencies. Stomach plays very important role especially with respect to vitamin B_{12}. Deficiency of vitamin B_{12} mostly results from gastrointestinal diseases that impair secretion of intrinsic factor from parietal cells of the gastric glands. Major problem of the stomach include gastritis that leads to the development of peptic ulcers, and gastric cancers. It has been reported that the most common cause of gastric problems is *Helicobacter pylori* [Pietroiusti A (2008), Kuipers EJ (2007) *et al*].

Helicobacter pylori is an organism that is reported to cause deficiency of vitamin B_{12} by producing gastritis and peptic disease which results in vitamin B_{12} malabsorption [Lechner K (2005) *et al*]. The exact mechanism is not known but the suggested mechanisms are that *H. pylori* decreases the hydrochloric acid content of the gastric juice [El-Omar EM (1997) *et al*]. Secondly, *H. pylori* neutralizes gastric acidity by producing ammonia, the first required for separating vitamin B_{12} from the dietary sources [Salgueiro J (2004) *et al*]. Thirdly, *H. pylori* cause decreased secretion of the pepsin (a proteolytic enzyme). The above mentioned three factors are necessary for release of vitamin B12

from the food. [El-Omar EM (1997), Salgueiro J (2004) *et al*].
Fourthly, *H. pylori* decreases the release of intrinsic factor from the parietal cells that is a necessary factor for the absorption of vitamin B_{12} from the small intestine [Lechner K (2005), Dierkes J (2003), Carmel R (1997) *et al*].

Arecent review of a number of published studies on the influence of *H. pylori* on nutritional status revealed that the infection appeared to have a definite negative effect on vitamin B_{12} and vitamin C metabolism [Akcam, M.(2010), Stabler S.(2013), Wu, M.C.(2014) *et al]*.

The present study was planned to observe whether *H. pylori* infection in the gastric mucosa is responsible for vitamin B_{12} deficiency, so as early detection and eradication of *H. pylori* can prevent the development of complications as gastritis, gastric, duodenal ulcer and consequence vitamin B_{12} deficiency.

II. MATERIALS AND METHODS

2.1 Study area and population: This case-control study was conducted in the Military hospital, Khartoum state, Sudan, where H. *pylori* infection was diagnosed. Study done during Feb to April 2018 and included 80 samples, 50 of these samples were collected from patient diagnosed with H. *pylori* as a case group, and 30 samples were collected from apparently healthy individuals as control group.

2.2 Sample collection: A total of 3 ml venous blood samples were collected by using sterile disposable syringes and poured into plain containers, immediately centrifuged to obtain serum which separated. Serum used for estimation of serum B_{12} level by competitive immunoluminometric assay among tow studied group.

2.3 Statistical Analysis All values were expressed as mean ± SD. Statistical analyses were done using the Student's t-test to assess differences among study groups. The level of significance was set at P <0.05.

III. RESULTS

The study has been done on 80 participants (31 female and 49 male), 50 f patient with *H. pylori* considered as a case group and 30 apparent healthy individual as control group.

Table 1: Demographic data of two studied groups.

	Case Mean ± SD	Control Mean ± SD	P. value
Age	**32.3 ± 14.7**	**29.9 ± 5.1**	**0.008**

The mean of age among two studied group were found (32.3 ± 14.7, 29.9 ± 5.1) (P; 0.008) of case to control group respectively.

Table 2: Comparison of means and SD of serum B_{12} level among the two studied group.

	Case Mean ± SD	Control Mean ± SD	p. value
S. B_{12} level	**297.7 ± 289.6**	**569.8 ± 171.5**	**0.007**

There was a significant decrease of S. B_{12} level among case group with a mean of case to control group (297.7 ± 289.6, 569.8 ± 171.5) respectively (P; 0.007).

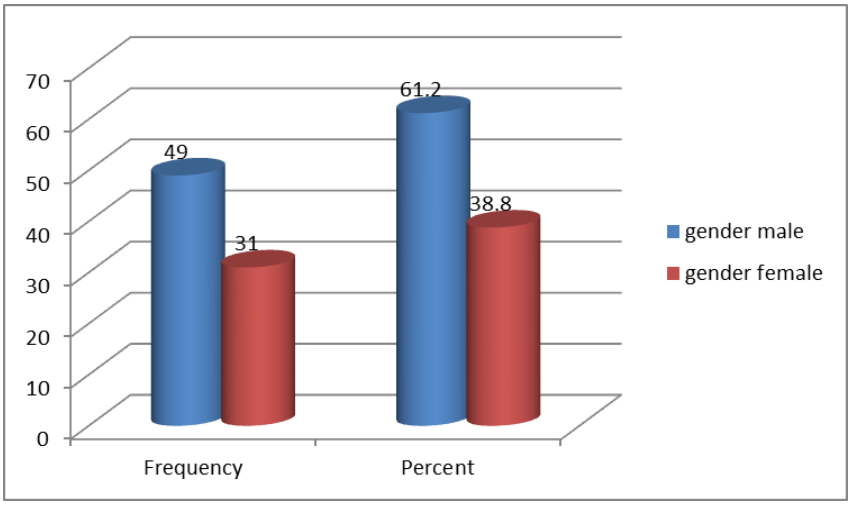

Figure 1: Frequency and percentages of gender among Study population.

The percentage of males was found to be 61.2% while female percentage 49% among study population.

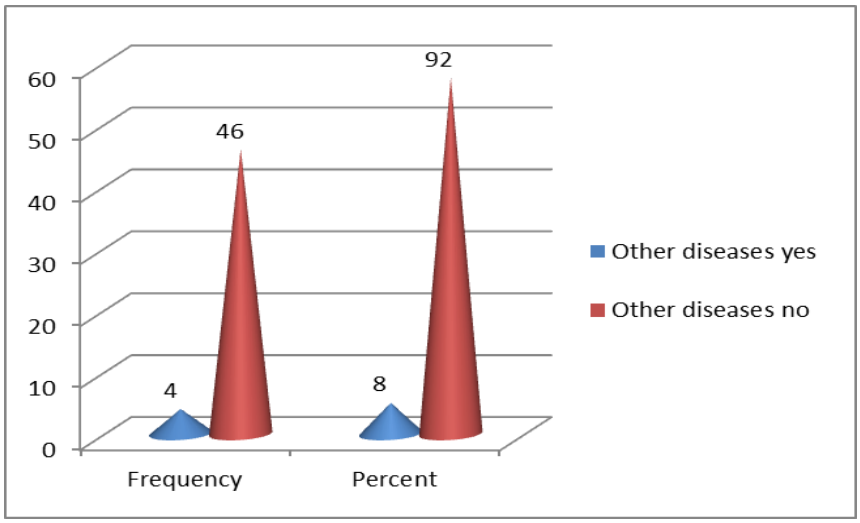

Figure (2): Frequency and percentage of patient with disease other than *H. pylori* infection.

There were 8% of case group has another infection rather than *H. pylori* infection.

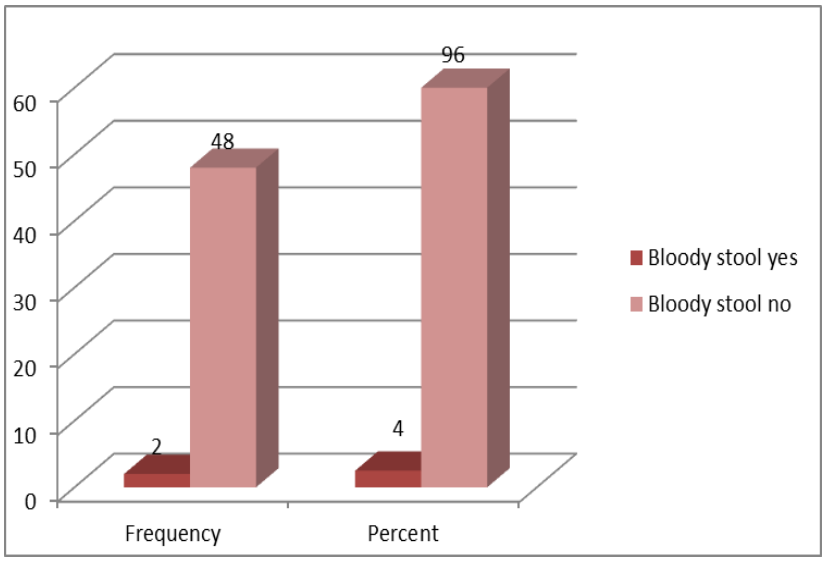

Figure 3: *Frequency and percentages of H. pylori patient who having a bloody stool.*

There were 4% of case group having a bloody stool.

Table 5: Correlation between S. B $_{12}$ in *H. pylori* patient level with gender, *H. pylori* infection duration, treatment and persistence of other disease among case group.

	gender	Duration	Other disease	Bloody stool	treatment
P. value	0.949	0.158	0.684	0.339	0.146

There is no association between S. B_{12} level in *H. pylori* patient compare with gender, *H. pylori* infection duration, other disease, bloody stool and treatment with P. value (0.949, 0.158, 0.684, 0.339, 0146) respectively.

IV. DISCUSSION

Eighty blood sample included in this study, 50 from patient with *H. pylori* infection considered as case group and 30 from Healthy individual included as control group. The mean Result of serum B_{12} in *H. pylori* patient was significant decrease in case group than control group with (P; 0.007). This agree with previous studies, One done by [Ahmed.T *etal* 2017] was conducted in Khartoum-Sudan one hundred and twenty blood sample included 60 from patient with *H. pylori* positive as case and 60 from Healthy individual as control group which concluded that serum B_{12} was found decrease in *H. pylori* positive group (P; 0.00). Our study also agree with study done by [Wesam Mohammed -2016], concluded that the level of Vitamin B12 lower than normal range 200 pg/ml in 21.3% of study population. Also agree with study Done by [kadhim G *et al* -2015 in Malaysia] on one hundred and twenty nine (129) *Helicobacter pylori* infected patients, sixty seven (52%) *H. pylori* infected

patients had normal vitamin B_{12} level, 31 (47%) were males and 36 (53%) were females. Whereas sixty tow (48%) *H. pylori* infected patient had low vitamin B_{12} level (P; 0.02).

Present study show there is no association between S. B_{12} level in *H. pylori* patient compare with gender, *H. pylori* infection duration, other disease, bloody stool and treatment with (P; 0.949, 0.158, 0.684, 0.339, 0146) respectively.

V. CONCLUSION

It is concluded that *Helicobacter pylori* has a significant effect on vitamin B^{12} level and *H. pylori* infection is a cause of vitamin B^{12} deficiency. Indicate there is an association between S.B_{12} deficiency and *H. pylori* infection.

ACKNOWLEDGEMENT

Special thanks to Hanan Maki -Bahri teaching Hospital, Khartoum- Sudan.

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