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Association of Anti Helicobacter Pylori IgG Antibodies in Typhoid Patients in Atbara Teaching Hospital, Sudan

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Abstract: ***Background***: *H. pylori* infection is still the most common bacterial infection that increases a person's risk of contracting typhoid fever and other gastrointestinal illnesses. ***Objective:*** The study's objectives included determining the risk factors for infection as well as the prevalence of H. pylori among typhoid patients at Atbara Teaching Hospital. ***Materials and Methods:*** From May to July 2018, a cross-sectional study was carried out in the city of Atbara. Anti-*Helicobacter pylori* IgG detection using the ELISA technique. ***Results:*** Serum samples from 72 cases were tested for anti-*H. pylori* IgG, and 59 (81.9%) of those samples tested positive. Typhoid fever and the presence of *H. pylori* were significantly correlated, with *P. value* (0.000, 0.006,0.000,001,0.02) respectively, corresponding to age, place of residence, tribe, smokers, and coffee drinkers as risk factors. ***Conclusions:*** In the research population, a strong correlation between *H. pylori* and typhoid fever was found, and this correlation grew stronger with age.

Keywords: *H. pylori*, Enteric fever, IgG, Risk factors, Atbara.

Research Paper

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INTRODUCTION

The spiral-shaped bacteria Helicobacter pylori infect well over 30% of the world's population. It affects more than 50% of the population in some nations. Hence, between 1979 and 1982, this was among the most prevalent bacterial diseases known to humankind. With the identification of *H. pylori* by Australian pathologist Robin Warren and Australian gastroenterologist Barry Marshall and their suggestion of a connection to the emergence of stomach ulcers, the world health organization has classified the bacteria as a class I carcinogen. It has been the cause of up to 95% of duodenal and up to 75% of gastric ulcers and invades the mucosal lining of the stomach. Associated with lymphoma and stomach cancer [1]. Despite extensive research into the *H. pylori* epidemic, the exact mode of transmission is still unknown. The most likely routes at this point are oral to oral or fecal to oral. The majority of infections in children arise in overcrowded conditions. Inadequate hygiene Poor personal hygiene and inadequate water supplies are linked to greater infection rates, which can affect up to 80% of the population in underdeveloped countries [2]. *H. pylori* equally affects both sexes. The majority of those with *H. pylori* are asymptomatic, although the presence of the infection in the stomach causes a persistent, active inflammation in practically everyone who has it. Just 10% of those who have *H. pylori* develop peptic ulcer disease, gastric cancer, or mucosa-associated lymphoma [2]. Almost 20 million individuals worldwide suffer from typhoid fever each year, primarily in developing nations [3]. *Salmonella typhi* infection spreads via the fecal-oral pathway, and risk variables were found in multiple epidemiological investigations that suggested either aquatic transmission or food borne transmission [4]. Concentrating local control measures requires determining the relative impact of several environmental risk factors for disease transmission. Moreover, host-related risk factors for infection have been investigated, identifying concomitant Helicobacter pylori infection and genetic variables [5]. That were interpreted as the source of a decreased gastric acid barrier [6]. According to Kunz and Waddell, patients with surgically induced or other kinds of achlorhydria (pernicious anemia and chronic atrophic gastritis) have been seen to have a high incidence of salmonellosis (1956). Moreover, H. pylori infection may have an impact on gastric acid output. *H. pylori* infection affects over 50% of the world's population [7], with prevalence rates even higher reported in underdeveloped nations [8]. Where acquisition happens earlier than in the developed world [9]. A temporary hypochlorhydria brought on by active *H. pylori* infection may last for several months [10]. Moreover, chronic gastritis of the stomach's body brought on by *H. pylori* lowers acid production, and long-term hypochlorhydria raises the possibility of developing gastric cancer. The serum gastrin concentration rises when the acid-mediated regulation of stomach gastrin release is absent. Contrarily, body-sparing, antral-predominant *H. pylori* gastritis causes increased stomach acid output, which leads to duodenal ulcer disease [11]. As a result, there is some controversy over the link between *H. pylori* infection as a sign of hypochlorhydria and vulnerability to other gastrointestinal illnesses. Anti-*H.pylori* IgG responses have demonstrated a higher susceptibility to enteric infections in *H. pylori*-infected people for cholera and typhoid fever [6, 12]. Although there is inconsistent evidence between *H. pylori* infection and diarrhea [13]. It has even been shown that the infection has a preventive benefit [14].

MATERIALS AND METHODS

Study design:

This was a cross-sectional hospital-based study conducted at Atbara Teaching Hospital.

Study area:

Atbara Town is a town located in River Nile State away from Khartoum about 310 kilometers to the north-east direction, between latitude 14 And 17 degrees north and longitude 33 and 59 degrees east.

Study duration:

The study was performed during the period from May to July 2018 at Royal Laboratory in Atbara City, Sudan.

Study population:

The target people in this study were those with typhoid fever with the exclusion of patients that have been infected with typhoid fever during the last six months.

Sampling and sample size:

Seventy-two serum samples were collected from diagnosed typhoid patients with symptoms of illness using a sterile syringe. The subject's veins were sterilized with 70% alcohol using impregnated cotton then a puncture was made with the needle smoothly and whole blood was collected from the vein in a sterile plain container. Then after the blood was clotted it was centrifuged at 3000 for 5 minutes. Patients were grouped into males and females, and according to age group from 15-30, and more than 30 years.

Ethical Considerations:

Ethical approval for the study was obtained from the Board of the Faculty of medical laboratories sciences, at Shendi University. The written informed consent form was obtained from each guardian of the participant as well as from the subject himself before recruitment into the study. All protocols in this study were done according to the Declaration of Helsinki (1964).

Data analysis:

Data were analyzed using SPSS 25.0, descriptive statistics in terms of frequency, percentages, means and standard deviations, and Chi-square test were calculated. A *p. value* $\leq$0.05 is considered statistically significant.

RESULTS

Of the 72 serum samples taken from patients with typhoid fever who were attending to Atbara Teaching Hospital, 40 (56%) were men, and 32 (44%) were women. 23 (32%) of the study population's residents were from urban areas, while 49 (68%) were from rural areas. According to tribes, there were 23 (32%) from different tribes, including 11 (15%) Shaygia, 17 (24%) Rashayda, and 21 (29%) from the Gaalia tribe. The prevalence of typhoid fever in the study population at various ages, 29 (40%) in the age group (15-30), and 43 (60%) in the age group over 30 years are shown in (Table 1). 92 blood samples were obtained from Atbara Hospital; of the 72 typhoid patients, 59 were positive (81.9%), and of the 20 non-typhoid participants, 10 were positive (10%) (Table 2). The prevalence of typhoid fever in the study population, 59 (81.9%) people had *H. pylori* infection while 13 (18.1%) did not (Table 1). Out of 72 patients, 59 (81.9%) had *H. pylori* infection; of them, 33 (54.9%) were men and 26 (44.1%) were women. The remaining patients did not have the infection, as indicated in (Table 3). The proportion of urban and rural residents with *Helicobacter pylori* was found to be 13 (22% and 46, respectively) (Table 4). There is a correlation between *H. pylori* infection and certain tribes: 18 (30.5%) Gaalia, 8 (13.6% Shaygia), 16 (27.1% Rashayda), and other 17 (28.8%) (Table 5). Considering the association between age groups and *H. pylori* infection, it was shown that 21 (35.6%) people were between the ages of 15 and 30, and 38 (64.4%) were over 30 (Table 6). In risk factors for *H. pylori* infection, 34 (57%) of the patients smoked, whereas 25 (42.4%) did not (Table 7). 37 (62.8%) more were discovered coffee, but the remaining 22 (37.2%) were not, as shown in (Table 8).

Table-1: Demographic data of the participants

Type	*Variable*	*Frequency*	*Percent%*
Gender	*Male*	40	56%
	Female	32	44%
	Total	**72**	**100**
Age	15-30	29	40
	More than 31	43	60
	Total	**72**	**100**
Residence	*Urban*	23	32%
	Rural	49	68%
	Total	**72**	**100**
Tribe	*Gaalia*	21	29%
	Shaygia	11	15%
	Rashayda	17	24%
	Other	23	32%
	Total	**72**	**100**
Infection with H. pylori	*Infected*	59	81.9%
	Non infected	13	18.1%
	Total	**72**	**100**

Table-2: Frequency of *H. Pylori* in typhoid patients and non-typhoid subjects

Sample	*Positive*	*Negative*	*Total*	*Percent%*
Typhoid patients	59	13	72	81.9%
Non typhoid Subjects	10	10	20	50%
***P. value* =0.000**				

Table-3: Relationship between infection with *H. pylori* & gender

Gender	*Positive*	*Negative*
Male	33 (55.9%)	7 (53.8%)
Female	26 (44.1%)	6 (46.2%)
Total	**59 (100%)**	**13 (100%)**
***P. value* = 0.003**		

Table-4: Relationship between infections with *H. Pylori* &Resident

Resident	*Positive*	*Negative*
Urban	13 (22.0%)	10 (76.9%)
Rural	46 (78.0%)	3 (23.1%)
Total	**59 (100%)**	**13 (100%)**
***P. value* =0.006**		

Table-5: Relationship between infection with *H. Pylori* & tribe

Tribe	*Positive*	*Negative*	*P. value*
Gaalia	18 (30.5%)	3 (23.1%)	0.001
Shaygia	8 (13.6%)	3 (23.1%)	0.132
Rashayda	16 (27.1%)	1 (7.7%)	0.000
Other	17 (28.8%)	6 (46.2%)	0.022
Total	**59 (100%)**	**13 (100%)**	

Table-6: Relationship between infection with *H. Pylori* and age

Age group	*Positive*	*Negative*
15 – 30	21 (35.6%)	8 (61.5%)
More than 30	38 (64.4%)	5 (38.5%)
Total	**59 (100%)**	**13 (100%)**
***P. value* =0.000**		

Table-7: Relationship between infection with *H. Pylori* & smoking behavior

Smoking behavior	*Positive*	*Negative*
Smoker	34 (58.0%)	8 (61.5 %)
Non smoker	25 (42.0%)	5 (38.5%)
Total	**59 (100%)**	**13 (100%)**
***P. value* = 0.001**		

Table-8: Relationship between infection with of *H. Pylori* & coffee drinking

Coffee drinking	*Positive*	*Negative*
Yes	37 (62.8%)	3(23.1%)
No	22 (37.2%)	10(76.9%)
Total	**59 (100%)**	**13 (100%)**
***P. value* = 0.02**		

DISCUSSION

Geographical location, age, and race all have a significant impact on the prevalence of *H. pylori* infection. The majority of data on the prevalence of *H. pylori* in geographically and demographically diverse groups come from prevalence studies because it is impossible to determine when infection develops clinically [15]. The main finding of this cross-sectional study was that 59 (81.9%) of the 72 individuals with typhoid had *H. pylori*. Moreover, among 20 samples of non-typhoid controls, 10 (50%) were found. Typhoid patients had a higher prevalence than non-typhoid subjects, which is consistent with an Indian study [6], and it's more probable that *H. pylori* altered the stomach's acid barrier by briefly depleting its chloride stores [2], making Salmonella infection more likely. The prevalence of *H. pylori* was higher in males than in females among the study population, with 33 (55.9%) being male and 26 (44.1%) being female. This is consistent with the finding that *H. Pylori* infection is more common in men than in women [16]. And the reason why males were more likely to contract infections was that they were exposed to risk factors like smoking and drinking more. According to the study, there are more cases of *H. pylori* infection in rural 49 (68%) than in urban 23 (32%) areas. This difference is statistically significant (*P. value* = 0.006), and it is likely caused by the lack of running, non-purified water in rural areas as well as the prolonged storage of water in tanks before use. Regarding *H. pylori* infection and tribes, there were 23 (32%) from other tribes, 11 (15%) from Shaygia, 21 (29%) from Gaalia, and 17 (24%) from Rashayda. Due to their status as members of the area's indigenous population, the Gaalia tribe is more likely to be affected by (*P. value* =0.001). Age groups older than 30 years experienced the highest rate of *H. pylori* infection. 21 people, or 35.6% of the 38 total, were in the 15–30 age range. Noticed that the condition got worse as people got older. Yet, prolonged contact with the causal agent in early childhood may have lowered immunity, which may be the cause of increased infection [17], and a statistically significant connection was found (*P. value* = 0.000). Regarding risk factors, it was discovered that *H. pylori* infection was relatively prevalent among smokers (42/58%), was statistically significant (*P. value* = 0.001) and this finding was in agreement with the majority of previous studies [18, 19]. Also, the study found a statistically significant link between *H. pylori* infection and coffee users 40(56%), which supports theory that the *H. pylori* infection may be caused by a fall in stomach pH [20-22].

CONCLUSION

The results of the current investigation showed a connection between *H. pylori* infection and typhoid fever. Age, tribe, and other risk variables all contributed to a rise in *H. Pylori* infection.

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