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Original Research Article

Patient Characteristics and Determinants of Helicobacter Pylori Infection among African Population

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Abstract: *Background*: Helicobacter pylori is the most common cause of chronic or atrophic gastritis, peptic ulcer, gastric lymphoma, and gastric cancer in children and adolescents. People with the blood group O have an estimated 16.3% higher risk of developing H. pylori infection and thus at risk of developing gastric carcinoma among other complications. Knowledge of determinants of H. pylori can help design interventions to prevent helicobacter pylori infection. *Objectives*: To find out the determinants of helicobacter pylori infection among patients with blood group O among African population. *Methods*: The study was cross sectional prospective design that targeted 50 patients who tested positive at Siaya county referral hospital between June 20 and October 5 2023. Each patient who consented to participate in the study blood samples were taken for grouping. Demographic characteristics were collected through interviews sessions. *Results:* Majority 38 (76%) of the patients who tested positive were females. Females and males are not infected by helicobacter pylori in equal chances (p=0.000). Majority of patients 23 (46%) were aged between 15-29 years, followed by 45-59 years (14, 28%), 30-44 years (9, 18%), 60-64 years (2, 4%) and more than 75 (2, 4%). Age categories do not occur with equal chance (p=0.000) thus persons aged 15-29 are likely to be infected by helicobacter pylori infection. Majority of patients (48, 96%) were Christians. There was significant statistical relationship between helicobacter pylori infection and religion (p=0.000). There was no statistically significant relationship between employment status and infection with h pylori infection (p=0.203). Majority (22, 44%) of the patients had secondary education level. Education level is significantly associated with h pylori infection (p=0.04). Majority of patients (25, 50%) had a body mass index of 25-30. BMI does not occur with equal chances and as such patients with BMI 25-30 are likely to have h pylori infection than any other age group (p=0.043). Majority (20, 40%) of patients had blood group O, followed by blood group A (14, 28%) and Blood group B and AB at 8 (16%) and 8 (16%) respectively. There was no statistically significant variation in blood groups in patients with helicobacter pylori (F 0.313, P=0.578). However, majority of patients in the study were found to have blood group O. *Conclusion*: Based on the results of the current study, it can be deduced that individuals with blood type O who are between the ages of 15 and 29 are likely to have helicobacter pylori infection. Helicobacter pylori infection is more common in females than in males. The recent study discovered that a person's education level and religion are significant factors that may affect helicobacter pylori infection. The chance of contracting helicobacter infection is correlated with education level. Blood sugar levels and BMI do not correlate with Helicobacter pylori infection.

Keywords: Blood group O; Helicobacter pylori; Determinants.

BACKGROUND

Helicobacter pylori (H. pylori) is a spiral-shaped gram-negative bacterium that affects up to 50% of the world's population, with a higher incidence in poorer nations (Parikh & Ahlawat., 2022). Among adult patients with dyspepsia symptoms, a study conducted in Cameroon on the prevalence of Helicobacter pylori infection found that poor income, a family history of stomach cancer, clinical symptoms of nausea and vomiting, and flatulence and bloating were risk factors for H. pylori infection in this population (Kouitcheu Mabeku *et al.*, 2018). According to the findings of a meta-analysis of observational studies, people with the blood group O have an estimated 16.3% higher risk of developing H. pylori infection. If this observed link is causal, a deeper comprehension of the underlying mechanisms may point to viable H. pylori infection prevention methods (Chakrani *et al.*, 2018a)

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Helicobacter pylori is a serious infection of the gut which is important in causing recurrent peptic ulcer disease and also been associated with other diseases such inflammatory bowel disease (IBD) (Abd El-Wahab *et al.*, 2022; Papamichael *et al.*, 2014). Peptic ulcer disease is associated with complications which can be life threatening and expensive to treat as well as leave serious sequalae on the patient (Papamichael *et al.*, 2014). Complications of peptic ulcer disease include gastrointestinal bleeding, stricture formation, gastric outlet obstruction, perforation of the gut and can also transform into neoplasia. Gastrointestinal bleeding can lead to anemia and shock if the bleeding is massive (FitzGerald & Smith, 2021). Anemia can cause multiple organ hypoxia due to reduced perfusion and oxygenation. Strictures results from healed ulcers and they contribute to narrowing of the gut which then leads to obstruction (Chen *et al.*, 2016; Liu *et al.*, 2016; Sokic-Milutinovic *et al.,* 2015). Patients who get obstruction have to be managed surgically and this can lead to further complications such as dumping syndrome which is characterized by impaired absorption of nutrients. Management of a patient with stricture is expensive and therefore few people can afford (Kavitt *et al.*, 2019; Malfertheiner *et al.*, 2023). Peptic ulcer disease leads to perforation in which the ulcers breach the gut layer and this can lead medical emergencies such peritonitis which can lead to death if not managed early enough (Malfertheiner *et al.*, 2023). Some of the ulcers such as the gastric ulcers are associated with gastric malignancy which is associated with bad outcomes and death as well as anaemia and malnutrition. The knowledge of the risk factors to helicobacter pylori is important.

METHODS

Study design

The study was cross sectional prospective design that targeted 50 patients who tested positive at Siaya county referral hospital between June 20 and October 5 2023.

Data collection

The study was conducted between June 20 and October 5, 2023. The data was collected using structured questionnaire. Each patient who consented to participate in the study blood samples were taken for grouping. Demographic characteristics were collected through interviews sessions.

Data Analysis

Inferential statistics were done with SPSS version 26 for Windows. Test of normality of data was done using Shapiro Wilk test, one sample chi-square test was used to check association between BMI, Education level and sex and helicobacter pylori infection. One sample binomial test was used to check for relationship between employment status and helicobacter pylori. ANOVA was used to assess variation in blood groups among patients with helicobacter pylori infection. A p value less than 0.05 was considered statistically significant.

Ethical consideration

This study was licensed by national commission for science, innovation and technology vide license number NACOSTI/P/23/28108. Uzima University School of Clinical Medicine authorised the study. This study was approved by ethics committee at Baraton University ethics committee vide reference number UEAB/REC/18/07/2023. Consent to collect access data was obtained from Chief officer of health Siaya county and endorsed by the medical superintendent Siaya county referral hospital Kenya. All records were anonymized before print out and therefore no patient identifiers were collected during and after the study.

RESULTS

Sex		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	12	24.0	24.0	24.0
	Female	38	76.0	76.0	100.0
	Total	50	100.0	100.0	

The study established that majority 38 (76%) of the patients who tested positive were females and 12 (24%) were males. The study sought to establish the hypothesis that helicobacter pylori infection occurs in males and females in equal chances. One sample binomial test was therefore run and it was concluded that females and males are not infected by helicobacter pylori in equal chances (p=0.000). This can be interpreted to mean that females are more likely to be infected by helicobacter pylori infection than males.
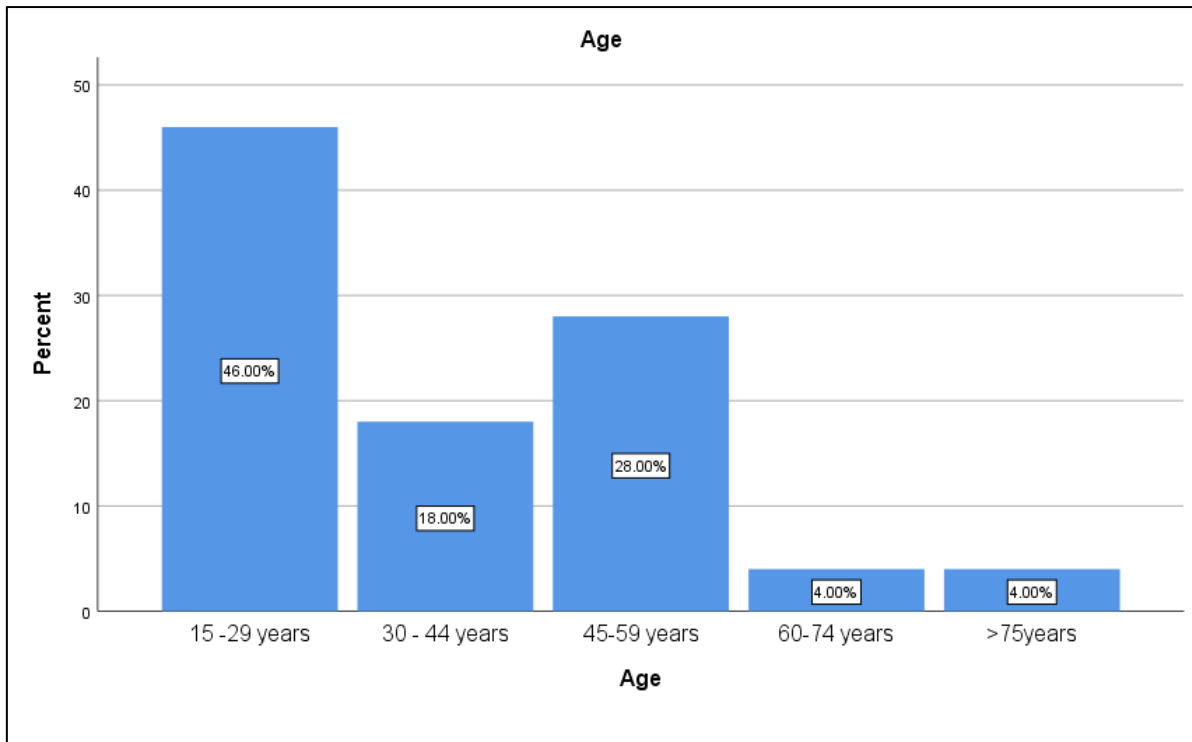
The study found that majority of patients 23 (46%) were aged between 15-29 years, followed by 45-59 years (14, 28%), 30-44 years (9, 18%), 60-64 years (2, 4%) and more than 75 (2, 4%). A null hypothesis that age categories occur with equal chances was tested using one sample chi-square. It was found that age categories do not occur with equal chance (p=0.000). This can be interpreted to mean those persons aged 15-29 are likely to be infected by helicobacter pylori infection.

| Religion		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Christian	48	96.0	96.0	96.0
	Islam	2	4.0	4.0	100.0
	Total	50	100.0	100.0	

The study found that majority of patients (48, 96%) were Christians while the remainder (2, 4%) were Muslims. One sample binomial test was used to test hypothesis that there is no relationship between religion and helicobacter pylori infection. The study found a significant statistical relationship between helicobacter pylori infection and religion (p=0.000). This can be interpreted to mean that Christians are likely to test positive of helicobacter pylori.

Occupation		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed	20	40.0	40.0	40.0
	Not employed	30	60.0	60.0	100.0
	Total	50	100.0	100.0	

According to the current study, majority (20, 60%) of the patients who turned positive of h pylori were not employed while minority (20, 40%) were employed. One sample binomial test was run to test the hypothesis that employment is not related to infection with h pylori. The study determined that there is no relationship between employment status and infection with h pylori infection (p=0.203).
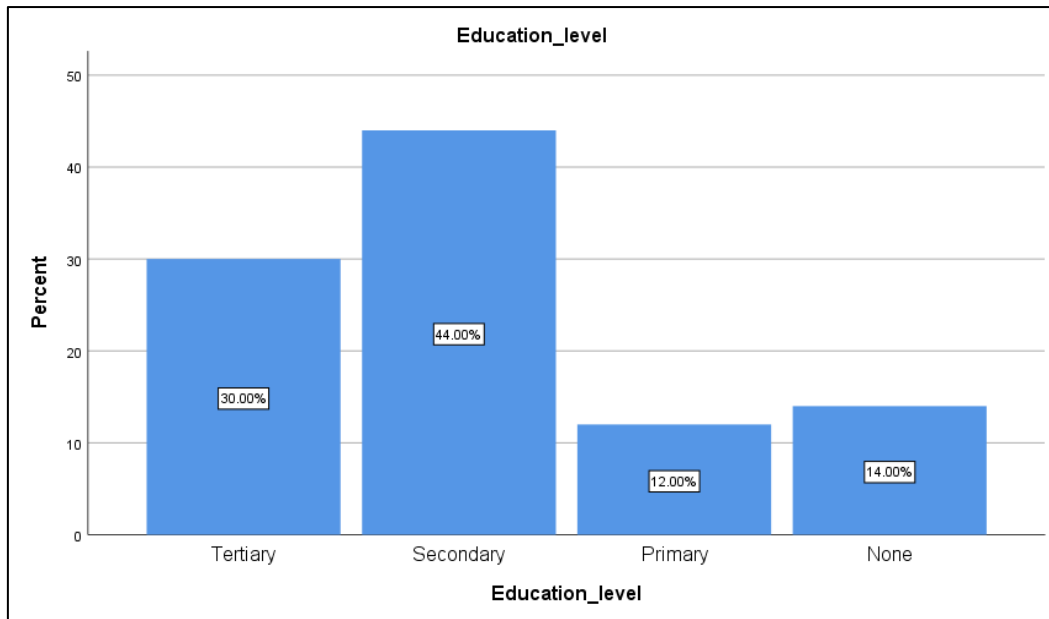
The current study found that majority (22, 44%) of the patients had secondary education level, followed by tertiary (15, 30%), primary level (6, 12%) and none (7, 14%). One sample chi-square test was used to test hypothesis that education level is associated with h pylori infection. The current study found that education level is significantly associated with h pylori infection (p=0.04). These results may suggest that education level influences hygienic practices in relation to helicobacter pylori transmission.

BMI		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	13	26.0	26.0	26.0
	25-30	25	50.0	50.0	76.0
	>30	12	24.0	24.0	100.0
	Total	50	100.0	100.0	

The current study found that majority of patients (25, 50%) had a body mass index of 25-30, 13 (26%) had BMI 18-24 and 12 (24%) had a BMI of more than 30. One sample chi-square test was run to test hypothesis that BMI in patients occurred with equal chances. The study determined that BMI does not occur with equal chances and as such patients with BMI 25-30 are likely to have h pylori infection than any other age group (p=0.043).
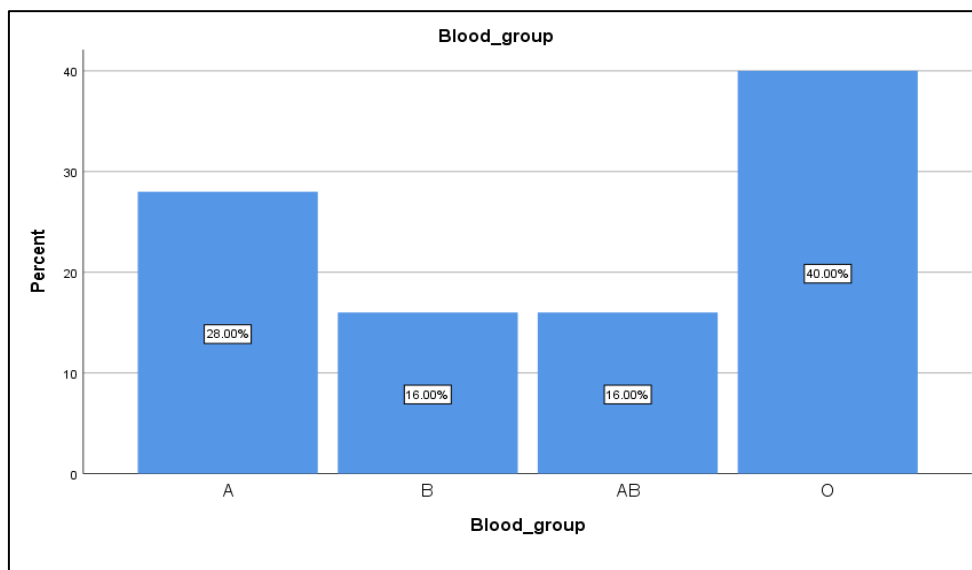
According to the current study, majority (20, 40%) of patients had blood group O, followed by blood group A (14, 28%) and Blood group B and AB at 8 (16%) and 8 (16%) respectively.

ANOVA					
Blood group	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.512	1	.512	.313	.578
Within Groups	78.368	48	1.633		
Total	78.880	49			

Hypothesis that blood groups did not differ significantly among patients was tested using one way ANOVA. The study found that there was no statistically significant variation in blood groups in patients with helicobacter pylori (F 0.313, P=0.578). However, majority of patients in the study were found to have blood group O. This finding may suggest that Blood group O persons may have an increased risk for helicobacter pylori infection.

DISCUSSION

The current study found that females are affected by h pylori infection more than men (p<0.05) and that age categories do not occur with equal chance (p=0.000). This can be interpreted to mean females persons aged 15-29 are likely to be infected by helicobacter pylori infection. Similar findings have been documented by (Zanzal Ra'ad Al-Dorri *et al.*, 2022) who found that the seroprevalence of H. pylori was 62% in pregnant women, especially at the age group of 20-24 years with 32.5%.

The study determined that there is no relationship between employment status and infection with h pylori infection (p=0.203). Similar findings were documented by (Monno *et al.*, 2019) who found that there is no relationship between employment status and h pylori infection. The current study findings agree with (Almorish *et al.*, 2023) who found that the prevalence of H. pylori infection was (80.6%), with a higher rate of infection in females than males. It should be however noted that Monno et el. carried out retrospective study unlike the current study which was prospective and findings therefore can vary.

The current study found that majority of patients with helicobacter pylori infections are blood group O. The current study findings agree with (Almorish *et al.*, 2023) who found that the prevalence of H. pylori infection was linked to blood group O. Similar findings have been found by (Zanzal Ra'ad Al-Dorri *et al.*, 2022) who found that majority of patients with Helicobacter pylori infection had blood group O+ (33.3%). It should however be kept in mind that Zanzal *et al.*, studied only pregnant women and this could explain the difference in prevalence with the current study. Similar findings have been found by (Chakrani *et al.*, 2018b) that Individuals with O blood group were more likely to be infected with H. pylori.

The current results may suggest that patients with blood group O have some unique characteristics that favor helicobacter pylori infection. Furthe study is therefore needed to understand the relationship among African population.

CONCLUSION

According to the results of the present study, those with blood type O who are between the ages of 15 and 29 are more likely to have helicobacter pylori infection. Compared to men, females are more likely to have helicobacter pylori infection. The current study discovered that a person's religion and education level were significant variables that were likely to affect helicobacter pylori infection, with poor education being associated with an increased risk of getting helicobacter infection. Marriage status, blood sugar level, and BMI are not linked to infection.

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