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FACTORS ASSOCIATED WITH H. PYLORI INFECTION AMONG PATIENTS ATTENDING OUTPATIENT DEPARTMENT AT OUR LADY OF CONSOLATA, KISUBI HOSPITAL. A CROSS-SECTIONAL STUDY.

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Abstract

Background

Helicobacter pylori (H. pylori) is a Gram-negative spiral bacterium that has long been recognized for its ability to chronically colonize the gastric mucosa and intestine, causing gastritis duodenal ulcers, and gastric carcinoma. This study aimed to assess factors associated with *H. pylori* infection among patients attending the outpatient department at Our Lady of Consolata, Kisubi Hospital**.**

Methodology

A descriptive cross-sectional study was employed, and a total of 115 study participants were enrolled using a simple random sampling technique. A semi-structured questionnaire was used to collect information on demographic data, family structure, socio-economic status, level of education, type of drinking water, and hygienic habits of the study participants, stool samples collected from the study participants were tested for the presence of *H. pylori* using *H. pylori antigen* test strips.

Results

68(59.1%) of the respondents were married, the most frequent age was that of below 20 years 27.8%, not washing hands 43(55.1%) with OR=2.6(1.12-5.81), p value= 0.0247 was associated with *H. pylori* infection. *H. pylori* was exhibited more in married participants at a rate of 51.3%, OR=0.3(0.14-0.81), p=0.0149) and in single people at a rate of 48.7%, OR=2.9(1.24-7.07). Taking unboiled water by the participants increased the chances of them being positive for *H. pylori*, as this was seen in participants who took unboiled water, these exhibited 64.1%, OR=5.5(2.29-13.42), p=0.0001 and Participants that lived more than 4 people in a household exhibited a high rate of 59.0% OR=0.6(0.26-1.40).

Conclusion

Improper hand washing and drinking of un-boiled water were the most predisposing factors associated with *H. pylori* infection.

Recommendation

Village health team with local leaders should emphasize hand washing after visiting the latrine and before eating found this will reduce the transmission of *H. pylori*.

Keywords: *Factors associated with H. pylori infection, Kisubi hospital, patients at outpatient department.*
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Background

Helicobacter pylori (H. pylori) is a Gram-negative spiral bacterium (Rupp et al., 2022) that has long been recognized for its ability to chronically colonize the gastric mucosa and intestine, causing gastritis and duodenal ulcers. and gastric carcinoma (Pop et al., 2022). In 1982, researchers Barry Marshall and Robin Warren isolated and identified *H. pylori* from the human stomach and also drew attention to the association of *H. pylori with* gastritis, and since then there has been much evidence that *H. pylori causes* peptic ulcers (Alsulaimany et al., 2020) lymphoma of the lymphoid tissue associated with the gastric mucosa, and gastric cancer. Recently, its association with other diseases such as abnormal autoimmune systems, cardiovascular diseases, and metabolic syndrome has attracted the attention of researchers and doctors (Wang et al., 2019)

In general, most cases of peptic ulcers are caused by *H. pylori*. Since *H. Pylori* is contagious within families, this may explain the high prevalence of *H. pylori among* these participants (Khoder et al., 2019). Peptic ulcers are mucosal lesions of the gastrointestinal tract that extend through the male mucosa and persist as a function

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of gastric acid or peptic activity (Malik et al., 2024). Alternatively, peptic ulcers are pain in the lining of the stomach or duodenum, where the small intestine begins, peptic ulcers are more common and one of the main causes of their appearance is *H. pylori* invasion of the stomach (*Stomach and Duodenal Ulcers (Peptic Ulcers)*, 2019). A systematic review and meta-analysis of global prevalence estimates of H. *pylori infection* showed that in Africa *H. pylori infection* prevalence was 70.1%, while Oceania had the lowest prevalence of 24.4%. The prevalence of *H. pylori* infection varied by country from 18.9% in Switzerland to 87.7% in Nigeria (Hooi et al., 2017a). Still; It has been found that the prevalence of *H. pylori* varies between 85-95% in developing countries and 30-50% in developed countries (Khoder et al., 2019).

H. pylori is likely to be transmitted fecal-oral, oral, and within the family, so *H. pylori* infection is closely related to food and personal hygiene. Other known risk factors associated with *H. pylori infection* include age, socioeconomic status, number of siblings, crowded households, ethnicity, migration from a high-prevalence area, infection status of family members, and sanitation (Khoder et al., 2019). This makes peptic ulcer disease a significant cause of morbidity and healthcare costs. (Malik et al., 2024). This study aimed to assess factors associated with *H. pylori* infection among patients attending the outpatient department at Our Lady of Consolata, Kisubi Hospital**.**

Methodology

Study design

The study was cross-sectional where quantitative data was collected. A cross-sectional study is a type of observational study that analyzes data from a population or representative subset at a specific point in time (Simkus, 2023)

Study area

The study was conducted at Our Lady of Consolata, Kisubi Hospital in Wakiso district. This district is approximately 28 kilometers by road southwest of Kampala, the capital of Uganda.

Study population

The study was centered on 115 patients who attended the outpatient clinic at Kisubi Hospital during the study period.

Inclusion criteria

All patients who attended the outpatient clinic at Kisubi Hospital during the period of study and consented to participate willingly were included in the research.

Exclusion criteria

All patients who did not consent to participate were excluded from the research.

Patients who needed emergency were excluded from the research

Sample size determination

The sample size (N) was determined using a formula according to (Charan & Biswas, 2013) and prevalence (Hooi et al., 2017a)

N =

Where;

N was the sample size required,

P was the expected prevalence

D was the allowed error = 0.1

Z was the confidence interval (95%) = 1.96

Q=1-P

N= = 115

Therefore 115 patients were recruited in the study.

Sampling technique

A simple random sampling technique was used to obtain the sample size as discussed under the sampling procedure. This was so to reduce the bias while selecting the study participants who represented the entire population.

Sampling procedure

A simple random sampling technique where a subset of a statistical population in which each member of the subset has an equal probability of being chosen to participate was used to obtain study subjects who met the inclusion criteria. The technique was used to reduce the bias of representing the entire population.

A list of all patients attending our Lady of Consolata Kisubi hospital every day of data collection was made with code numbers. A computer was used to generate random numbers equivalent to the sample size. Then only the individuals with serial numbers corresponding to those generated by the computer qualified to be recruited for this study. The purpose of the study was explained to the selected study subjects. Participants to be surveyed were asked to consent to be recruited for this study.

Laboratory methods used for examination

The rapid, one-step *H. pylori* card test (H+R *H. pylori* CARD, Madrid, Spain) was used to investigate the presence of *H. pylori antigens* in the stool samples. This test is a qualitative immunochromatographic assay for the determination of *H. pylori* in stool samples. The membrane is precoated with monoclonal antibodies, on the test band region, against *H. pylori* antigens. During testing, the sample is allowed to react with the colored conjugate (anti-*H. pylori* monoclonal antibodies-red polystyrene microspheres) pre-dried on the test strip. The mixture then moves up the membrane by capillary action. As the sample flows through the test membrane, the colored particles migrate. For a positive result, the specific antibodies present on the

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membrane will capture the colored conjugate. The mixture continues to move across the membrane to the immobilized antibody placed in the control band region, where a red band always appears. The presence of this red band serves as; an internal control for the reagents and verification that sufficient volume was added and proper flow was obtained. The stool samples were evaluated by the card test according to the manufacturer's protocol. A single red band appearing across the central window in the site marked with the control line was considered negative. A red band appearing in the site marked with the result line and in the site marked with the control line was considered positive. A total absence of the control band, regardless of the appearance of the result site was considered invalid. (Calik et al., 2016)

Data collection method

Oral interviews using a pre-tested semi-structured questionnaire were used as a method of data collection to get data from study participants to enable also the illiterate to understand the questions and give the appropriate response.

Data collection tool

A semi-structured questionnaire was used to collect information on demographic data, family structure, socio-economic status, level of education, type of drinking water, and hygienic habits of the study participants, in order to control for potential bias.

H. pylori antigen test strips were used for testing for the presence of *H. pylori* in stool samples collected from the study participants.

Data collection procedure

The purpose of the study was explained to each study participant and consent was sought from each study participant on each day of data collection. A face-to-face oral interview with each study participant was conducted to collect data on demographic data, family structure, socio-economic status, level of education, type of drinking water, and hygienic habits of the study participants. Then a sterile stool container labeled with the participant's identification number was provided to each participant and asked to collect stool samples using the scoop within the container and bring it to the laboratory for testing. Each stool sample was tested for the presence of *H. pylori* antigen using *H. pylori* antigen test strips. It is an immunoassay-based qualitative test for the detection of H. pylori in human fecal specimens. A small portion of the stool sample was diluted in the test buffer and mixed very well then 3 vertical drops were added to the sample well on the test device and waited for 15 minutes to read the results. The presence of rose-pink color bands in both the control and test regions was indicative of the presence of *H. pylori* antigens in stool (Positive result). The presence of a rose-pink color band at the control region only was indicative of absence of *H. pylori* antigen in stool (Negative results). The results were recorded and used for determining the prevalence of *H. pylori* among patients attending outpatient clinics at our Lady of Consolata Kisubi hospital.

Quality control

To ensure the validity of data collection, the data collection tool was given to the research supervisor to evaluate the relevance of the tool to earlier stated research-specific objectives.

To establish reliability, a research assistant was trained on how to collect and test stool samples for *H. pylori* using *H. pylori test* kits. Also, standard operating procedures were followed during the collection and processing of stool samples. All test kits that were being used were checked for the expiry date before being used to avoid using expired kits that may produce false results.

Data analysis and presentation

Data collected was checked and manually organized into data entry form, sorted and manually computed using simple hand calculators, and then the whole information was fed into a computer Microsoft Excel program for analysis and presentation into statistical tables, pie charts grouped bar graphs, and then discussed, printed.

Ethical considerations

The principal investigator presented an introductory letter from the faculty of health sciences to the in charge of our Lady of Consolata Kisubi Hospital to conduct this study among out-patients attending his facility. The in-charge then granted permission for this study to be conducted.

Informed consent was obtained from the patients before they were recruited. The names of the respondents did not appear anywhere in the result tally sheet instead study numbers were used on questionnaires to ensure confidentiality of the study participants.

Results

Socio-Demographic Characteristics of the Respondents

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Table 1: showing the Age of respondents.

Age	Frequency	Percent (%)
Below 20	32	27.8
20-30	29	25.2
31-40	27	23.5
41-50	13	11.3
Above 50	14	12.2
Total	**115**	**100**

Table 1: shows that respondents were in the age range from less than 20 years, 20 to 30 years, 31–to 40 years, 41 to 50 and 50 years and above. Summarize the results. The findings indicated that respondents range in age. It was discovered that the most frequent age was below 20 years with 27.8%, while the less frequent age was between 41 and 50 years with 11.3%

Gender

Table 2: Gender of the respondents

Gender	Frequency	Percent
Male	45	39.1
Female	70	60.9
Total	**115**	**100.0**

Table 2: indicated that among reached out respondents, 45 (39.1%) were male while 70(60.9%) were female. This indicated that females dominated the hospital.

Education Level

Table 3: showing the level of education.

Level	Frequency	Percent
Primary	29	25.3
Secondary	15	13.0
Tertiary	10	8.7
No formal education	61	53.0
Total	**115**	**100.0**

Table 3: indicated that respondents had varying levels of education, no formal education had the highest frequency of 53.0% while the lowest level of education was depicted in the tertiary level with 8.7%.

Marital Status

Table 4: Showing marital status

Status	Frequency	Percent
Single	47	40.9
Married	68	59.1
Total	115	100

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Table 4: indicates that 47(40.9%) of respondents were single, 68(59.1%) of the respondents were married and the findings of the study indicated that the majority of the respondents were married.

Predisposing factors associated with H. pylori infection among patients attending outpatient department at Our Lady of Consolata, Kisubi hospital.

Table 5: Showing predisposing factors associated with H. pylori infection.

Predisposing factor	No examined	No Examined	Percent (%)	Confirmed lab results		Positivity rate (%)	OR (95% CI)	p-valve
				Neg	Pos			
Gender	Female	70	62.8	21	49	70	1.3(0.58- 2.85)	0.5341
	Male	45	37.2	16	29	64	0.8(0.35-1.72)	
Level of education	Primary	29	25.5	9	20	69	1.1(0.43-2.65)	0.8793
	Secondary	15	18.0	1	14	93	7.9(0.99-62.38)	0.0506
	Tertiary	10	7.7	4	6	60	0.7(0.18-2.60)	0.5810
	No formal education	61	48.7	23	38	62	0.6(0.26-1.28)	0.1791
Marital status	Married	68	51.3	28	40	59	0.3(0.14-0.81)	0.0149
	Single	47	48.7	9	38	80	2.9(1.24-7.07)	
Occupation	Crop cultivation	18	17.9	4	14	78	1.8(0.55-5.9)	0.3300
	Business person	37	32.1	12	25	67	0.9(0.42-2.26)	0.9674
	Civil servants	20	12.8	10	10	50	0.3(0.13-0.85)	0.0225
	Others	40	37.2	11	29	73	1.3(0.60-3.24)	0.4342
Houses holds	<4	43	41.0	11	32	74	1.6(0.71-3.79)	0.2442
	>4 (overcrowded)	72	59.0	26	46	64	0.6(0.26-1.40)	
Daily income status	Earns < 10,000/ in a day	65	51.3	25	40	62	0.5(0.2-1.14)	0.1024
	Earns >10,000/ in a day	50	48.7	12	38	76	1.9(0.87-4.48)	
Type of drinking water	Boiled	56	35.9	28	28	50	0.1(0.07-0.43)	0.0001
	Un boiled	59	64.1	9	50	85	5.5(2.29 – 13.42)	
Hand washing after visiting the toilet	Yes	60	44.9	25	35	58	0.3(0.17-0.88)	0.0247
	No	55	55.1	12	43	78	2.6(1.12-5.81)	

Table 5: shows that, not washing hands 43(55.1%) with OR=2.6(1.12-5.81), p value= 0.0247 was associated with *H. pylori* infection.

H. pylori was exhibited more in married participants at a rate of 51.3%, OR=0.3(0.14-0.81), p=0.0149) and in single people at a rate of 48.7%, OR=2.9(1.24-7.07)

Regarding the occupation, participants with 'others' this included having no jobs, cleaners, hawkers, etc. had a high frequency of 37.2%, OR=1.3(0.60-3.24), while civil servants had the lowest at 12.8%, OR=0.3(0.13-0.85), p=0.0225.

Participants who lived more than 4 people in a household exhibited a higher rate of 59.0% OR=0.6(0.26-1.40) than those who lived less than 4 in a household.

Participants who earned less than 10000 shs in a day had the highest cases of *H. pylori* at 51.3%, OR=0.5(0.2=1.14), and those that earned more than 10000shs in a day had the lowest cases of 48.7%, OR=1.9(0.87-4.48)

Taking unboiled water by the participants increased the chances of them being positive for *H. pylori*, as this was seen in participants who took unboiled water, these exhibited 64.1%, OR=5.5(2.29-13.42), p=0.0001, whereas taking boiled water lowered the chances as this was exhibited by those that took boiled water and only 35.9% cases were positive.

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Discussion of findings

Predisposing factors associated with H. pylori infection

The objective of this study was to determine the predisposing factors associated with *H. pylori* infection among patients who attended our patients' clinic at our Lady of Consolata Kisubi hospital in Wakiso district from 22nd Feb 2024 to 14th April 2024.

Data analysis and interpretation showed that not washing hands after visiting the latrine(55.1%) OR=2.6(1.12-5.81), p value= 0.0247 this was statistically significant because one of the transmission routes of *H.pylori* is fecal to oral when one does not wash the hands after visiting the latrine, the risk rate increases, this was in line with a study on, Prevalence of *H. pylori* infection which was slightly higher, 39.8% (41/103) in participants who did not wash their hands than in those who did not wash their hands after using the toilet. (Shiferaw & Abera, 2019). According to the study, 64.1% OR=5.5(2.29-13.42), p=0.0001 hence statistically significant, one-way *H. pylori* is transmitted is through the mouth, unboiled water has a greater chance of containing the bacteria and thus multiplying risk in participants who consumed unboiled water correlates with Wang's study. Regarding the source of drinking water, subjects who consumed tap water had a higher risk of *H. pylori* infection than those who used tap or bottled water (Wang et al., 2019).

H.pylori was exhibited more in married participants at a rate of 51.3%, OR=0.3(0.14-0.81), p=0.0149) hence statistically significant this was explained by the fact that the married people spend time together often and this relates to the person to person *H.pylori* transmission specifically oral to oral, this increases the risk of them having the disease, it was attributed to the poor hygiene exhibited in married participants, this was in line with a study done by (Stefano et al., 2018) and (Zhou et al., 2023) who observed that the risk for *H. pylori* increases when living with a spouse infected with *H. pylori.*

Participants with a secondary level of education had *H. pylori* 18% (OR=7.9(0.99-62.38, P=0.0506) hence the significance, this was attributed to the drinking of unboiled water which increased their risk rate and most of them were married participants. This was in line with a study done by Shiferaw The education level of participants was significantly associated with *H. pylori*infection compared to higher education (COR = 6.555, CI95% = 1.777–24.1777, *p* = 0.005 and COR = 3.277, CI95% = 1.560–6.885, *p* = 0.002) respectively. (Shiferaw & Abera, 2019). According to the study, the majority (48.7%) of the respondents had never received any formal education whereas the least (25.6%) had attained primary education with *H.pylori* this was not in line with any of the previous researchers as they gauged no correlation of *H.pylori* with not receiving any formal education.(Baingana et al., 2014).

Conclusion

Improper hand washing and drinking of unboiled water were the most predisposing factors associated with *H. pylori* infection.

Study limitations

The major limitation of this study was that it was conducted in a general hospital setting and this may not be a true representation of the prevalence of *H. pylori* infection in the entire community therefore the study findings are only limited to health centers.

Recommendation

Village health team with local leaders should emphasize hand washing after visiting the latrine and before eating found this will reduce the transmission of *H. pylori.*

Health workers under the MOH should educate the people on the factors that will predispose them to *H. pylori* infection to create awareness about the infection.

Wash hands thoroughly with soap and eat food that is properly prepared.

Drinking water from a safe and clean source.

Acknowledgment

I would like to thank the laboratory department of Kisubi Hospital for the great support rendered to me during the process of data collection may the Almighty God bless them abundantly.

I also appreciate my supervisor Mr. Lujjimbirwa Fortunate for his guidance throughout the entire research process may God bless you.

Lastly, I extend my sincere thanks to all my tutors and classmates who have always been with me throughout this journey and working hard for me to achieve my goal I pray that God rewards you for your efforts.

List of Abbreviations and Acronyms

MALT	Mucosa-associated lymphoid tissue
MOH	Ministry of Health
OPD	Outpatient department
PUD	Peptic ulcer disease
SES	Socioeconomic status
SOPS	Standard Operating Procedures
WHO	World Health Organization
C-UBT	C-urea breath test

Source of funding

The study was not funded

Conflict of interest

There is no conflict of interest.

Authors biography

Catherine Tusingwire is a student of Bachelor of Biomedical Laboratory Technology at the University of Kisubi.
Fortunate Lujjimbirwa is a research supervisor at the University of Kisubi.

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