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The Association between the Use of Non-Steroidal Anti-Inflammatory Drugs And Helicobacter Pylori Infection Among Patients Attending Private Clinics In The Borama District, Somaliland

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Abstract
Background & Aims *: Helicobacter pylori infection is a global public health problem, affecting over 50% of the population worldwide. Helicobacter pylori infection is recognized as the most common cause of chronic gastritis and is strongly linked to peptic ulcer disease and gastric cancer. Factors associated with H. pylori infections are nonsteroidal anti-inflammatory drugs, socioeconomic status, and household hygiene practices. Therefore, this study attempts to understand the association between the uses of non-steroidal anti-inflammatory drugs and Helicobacter pylori infection among patients attending private clinics in the Borama district, Somaliland.* ***Methods****: Correlation cross-sectional survey research design was conducted to assess the association between the uses of non-steroidal anti-inflammatory drugs and Helicobacter pylori infection among patients attending private clinics in the Borama district, Somaliland, and the period of the study was from October 2019 to August 2020. Data was extracted from 152 patients' records, which included the gender, residence , marital status , age , level of education, and use of non-steroidal anti-inflammatory drugs. Descriptive statistics and chi-square tests were used to describe and report in figures and tables..* ***Results:*** *The study indicates that the status of use of non-steroidal anti-inflammatory drugs among patients with Helicobacter pylori infection attending Borama private clinics was generally high. The study found that most (47.4%) of respondents indicated that they had always used non-steroidal anti-inflammatory drugs, 30.3% of the respondents sometimes used non-steroidal anti-inflammatory drugs, while 22.4% of the respondents indicated that they had not used non-steroidal anti-inflammatory drugs.* ***Conclusions:*** *This study indicates that the status of use of non-steroidal anti-inflammatory drugs among patients with helicobacter pylori infection attending Borama private clinics was generally high*

Key words: *gender, residence , marital status , age , level of education, and association between the use of non-steroidal anti-inflammatory drugs and helicobacter pylori infection*

HIGHLIGHTS

• A new study has found that Boorama , Somaliland , there is association between the use of non-steroidal anti-inflammatory drugs and helicobacter pylori infection .
• Borama town helicobacter pylori infection was generally high
• Researchers urge the government to take steps to prevent helicobacter pylori infection .

Introduction

Helicobacter pylori (H. pylori) is a gram-negative spiral-shaped bacterium that infects gastric-type epithelium, and it is probably the most common bacterial agent in humans after Streptococcus mutans, which is implicated in dental caries. (1) The prevalence of H. pylori increases with age (2). Helicobacter pylori infection is now recognized as a worldwide problem, and it is the most common cause of chronic gastritis and is strongly linked to peptic ulcer disease and gastric cancer. Helicobacter pylori infection is a global public health problem, affecting over 50% of the population worldwide (3). Helicobacter pylori infection is now recognized as a worldwide problem, and it is the most common cause of chronic gastritis and is strongly linked to peptic ulcer disease and gastric cancer. Prevalence of H. pylori infection is high in less developed Asian countries like India, Bangladesh, Pakistan, and Thailand, and is acquired at an earlier age than in the more developed Asian countries like Japan and China (4). NSAID users had a 20–30% prevalence of peptic ulcers, with gastric ulcers occurring almost six times more frequently than duodenal ulcers. (5) The prevalence of peptic ulcers due to H. pylori infection was 60%, with a higher incidence of duodenal ulcers (66.9%) compared to gastric ulcers (48.5%). (6) . In sub-Saharan countries, specifically Ethiopia, the prevalence of H. pylori infections is 52.2% and recognized as a major cause of gastrointestinal diseases (7). The prevalence of H. pylori in Somaliland is 60% (8). In Borama town, H. pylori infection is the health problem mostly seen in both public and private hospitals (9). Although H. pylori infection is mostly found in Borama town, the exact factors associated with this increase are not clearly known and remain undocumented (10).
Factors associated with H. pylori infections include nonsteroidal anti-inflammatory drugs , socioeconomic status, and household hygiene practices. Nonsteroidal anti-inflammatory drugs (NSAIDs) have various definitions: Nonsteroidal anti-inflammatory drugs (NSAIDs) are drugs that alleviate pain by counteracting the cyclooxygenase enzyme, such as ibuprofen, aspirin, and diclofenac (11). According to WHO (2019), non-steroidal anti-inflammatory drugs (NSAIDs) are simple analgesic medications, which, along with paracetamol, comprise step 1 of the World Health Organization pain ladder. The nonsteroidal anti-inflammatory drugs (NSAIDs) are a drug class that groups together drugs that provide analgesic (pain-killing) and antipyretic (fever-reducing) effects and, in higher doses, anti-inflammatory effects (12). Nonsteroidal anti-inflammatory drugs (NSAIDs) are a drug class approved for the treatment of muscle pain, dysmenorrhea, arthritic conditions, pyrexia, and gout (13). NSAID use is higher in patients with advanced age, who also represent the group with a higher risk of H. pylori infection (14, 15). The study operationalized nonsteroidal anti-inflammatory drugs as ibuprofen, aspirin, and diclofenac. Helicobacter pylori infection is highly prevalent in Borama. The records from Borama private clinics for the last three years are steadily increasing. In 2016, there were 400 patients; in 2017, 500 patients; and in 2018, 550 patients (16). This reflects a general increase of 27% in 3 years, or an increase of 9% per year in Helicobacter pylori infection, which has resulted in increased cases of Helicobacter pylori infection among patients attending private clinics. Available studies and interventions did not address this; therefore, the aim of this study is to investigate whether gender, residence , marital status , age **,** level of education, and use of non-steroidal anti-inflammatory drugs are associated with this increase in the prevalence of pylori infections.

MATERIALS AND METHODS

Materials and methods

Study design, period, and setting

Correlation cross-sectional survey research design was conducted to assess the association between the uses of non-steroidal anti-inflammatory drugs and Helicobacter pylori infection among patients attending private clinics in the Borama district, Somaliland, and the period of the study was October 2019 to August 2020.

Data extraction

A total of 152 patients attending four private clinics, namely Geele Poly Clinic, Borama Medical Center, Daryeel Clinic, and Gahayr Clinic, participated in the study, and records with complete information were selected for data extraction. The information extracted from the records included gender, residence , marital status , age **,** level of education, and use of non-steroidal anti-inflammatory drugs.

Data analysis

The data entry was done using Microsoft Office Excel, and then it was imported to SPSS version 20 for further analysis. Descriptive statistics were used to designate the demographic characteristics of the participants and use of non-steroidal anti-inflammatory drugs. Data was analyzed using both descriptive and chi-square tests and reported in figures and tables.

Results

The result of the study investigated the association between gender, residence , marital status , age **,** level of education, association, and use of non-steroidal anti-inflammatory drugs and Helicobacter pylori infection among patients attending private clinics in the Borama district, Somaliland. The data was collected from 152 patients attending four private clinics, namely Geele polyclinic, Borama medical center , Daryeel clinic, and Gahayr clinic.

Gender of the Respondents

The respondents were asked to indicate their gender. They responded as summarizedin figure1

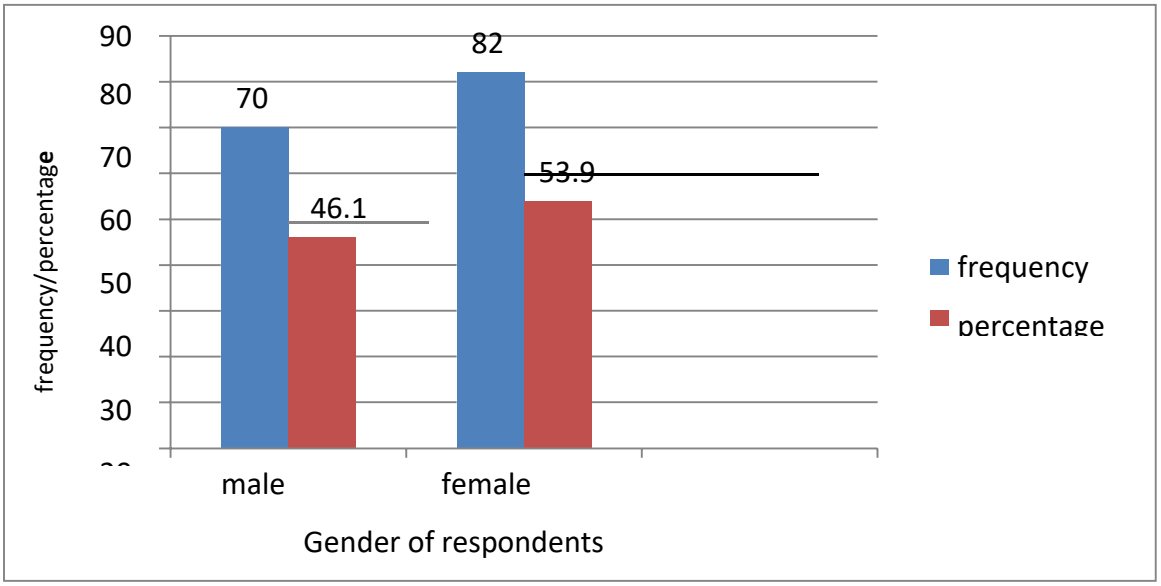

***Figure 1*. Gender of respondents.**

Figure 1 shows the distribution of respondents by gender. It indicates that 53.9% of the respondents were females, while 46.1% of the respondents were males. This shows that Helicobacter pylori infection is significantly more common in females than in males in the study population.

Distribution of Respondents by Residence

The respondents were also asked to indicate their areas of residence. This was intended as a measure of how patients were distributed in the sample in relation to the responses as summarized in Figure 2.

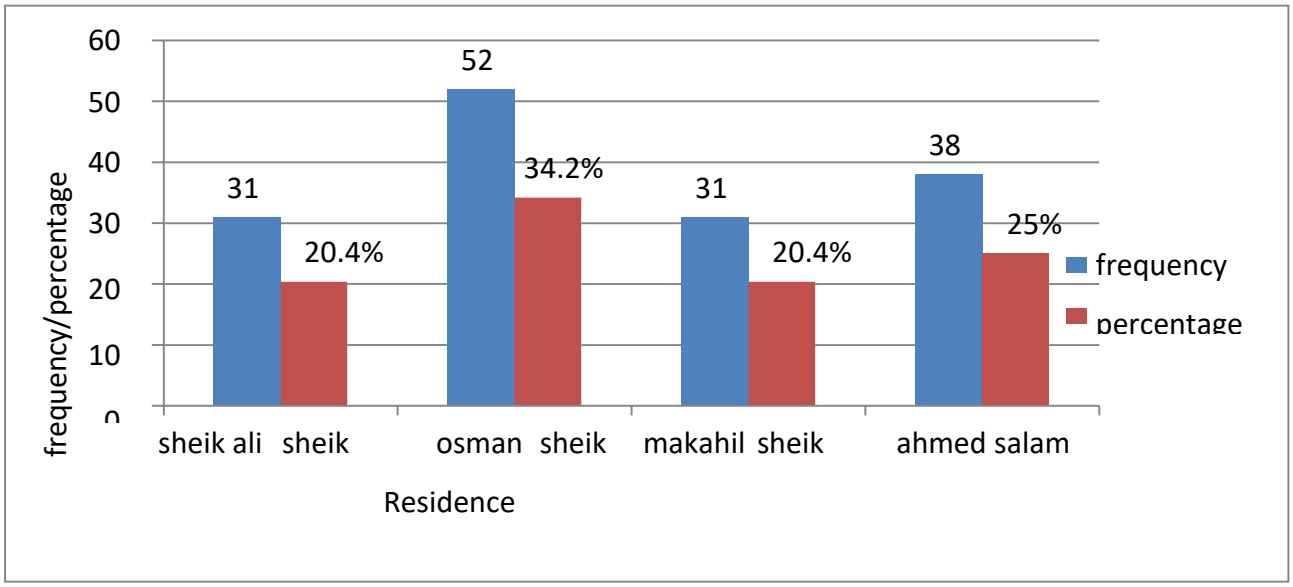

Figure 2 **Distribution of respondents by area of residence**

Figure 2 shows the distribution of respondents by location. It shows that most (34.2%) of Helicobacter pylori-infected patients were located in Sheikh Osman, while 25% resided in the Sh. Ahmed Salam area and 20.4% came from Sh. Ali and Sh. Makahil, respectively. These show that data was collected from all regions of the district, and this makes the data representative.

Distribution of Respondent by Marital Status

The respondents were asked to indicate their marital status. This was necessary to determine if the patients have necessary family support and which type of status can Helicobacter pylori infection affect most. The responses are indicated in figure 3.

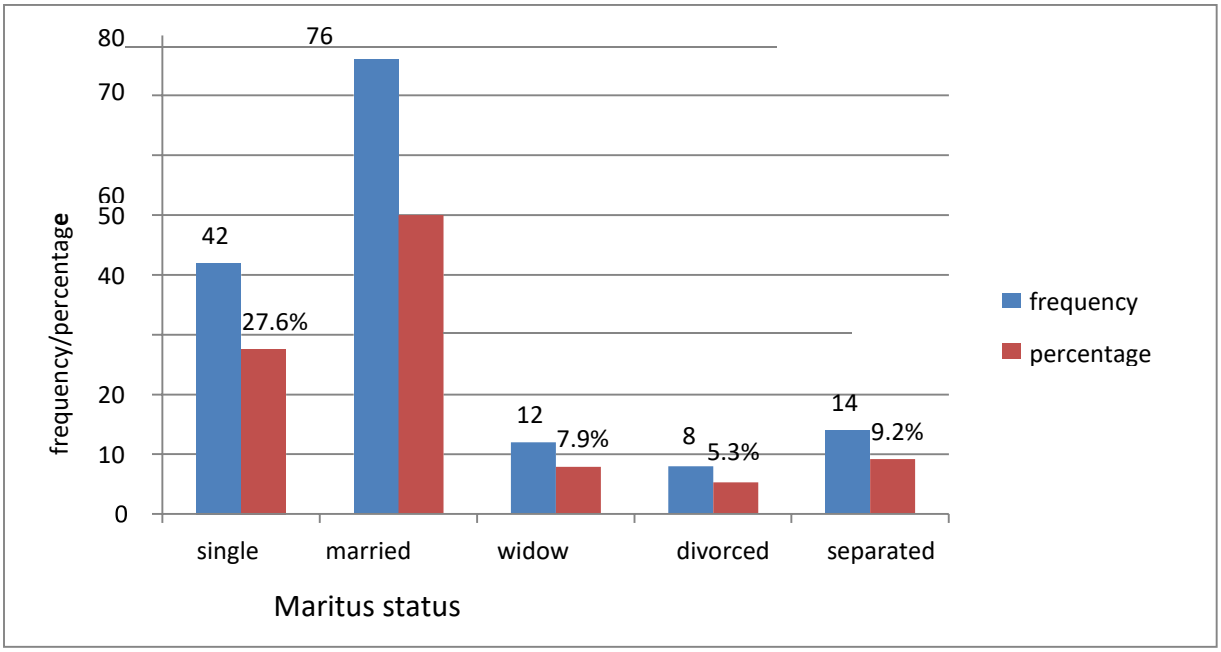

Figure 3. **Marital Status of the respondents**

Figure 3 shows the distribution of respondents by marital status. It shows that the majority (50%) of the respondents were married, and 27.6%, 9.2%, 7.9%, and 5.3% were single, separated, widowed, and divorced, respectively.

Distribution of Respondents by Age

The respondents were asked to indicate their ages. The issue of age was necessary to gauge the capacity of respondents to provide valid information for this research and to determine if Helicobacter pylori infection is popular among a particular age set. The responses are summarized in figure 4.

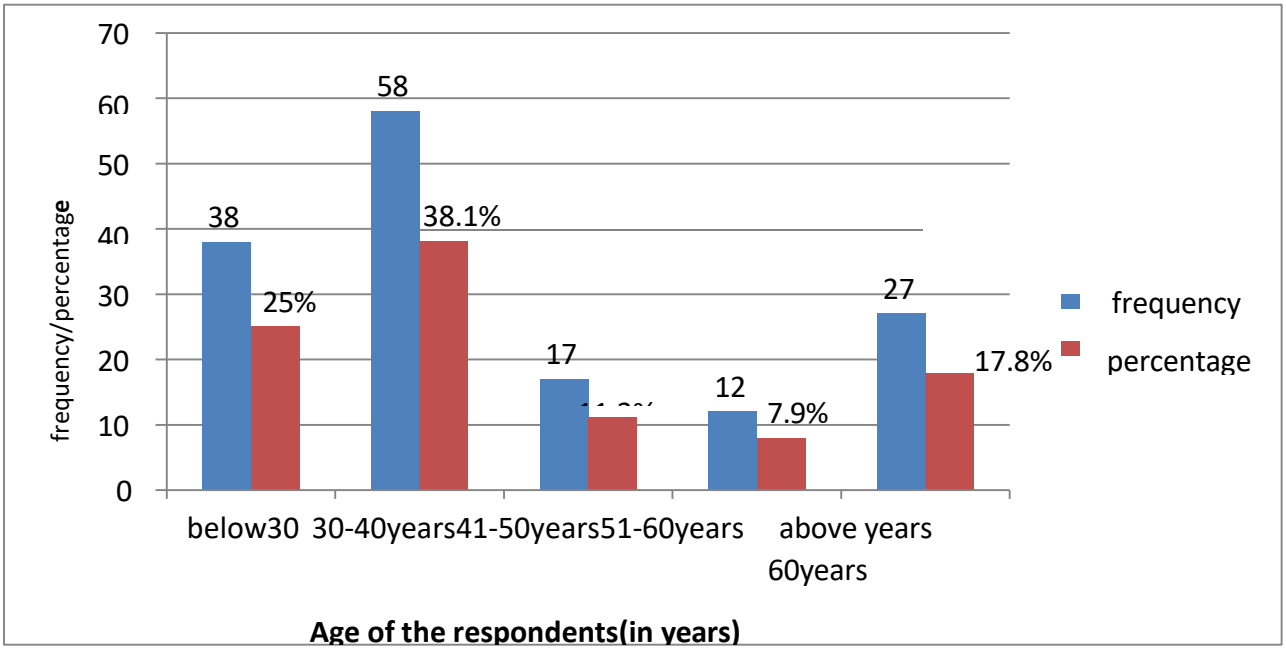

Figure 4. **Age of respondents.**

Figure 4 shows the distribution of respondents by age. It was shown that 38.1% of the respondents were aged 30-40 years, and 25% were aged below 30 years. 17.8% were aged above 60 years, and 11.2% were aged 41-50 years. While only 7.9% of the respondents were aged1-60 years. This indicates that most of the respondents were aged between 30 and 40 years

Distribution of Respondents by Level of Education

The respondents were also asked to provide information on their level of education. This was necessary because level of education is known to influence general behavior, including issues that relate to health.

The responses obtained were summarized in figure 5

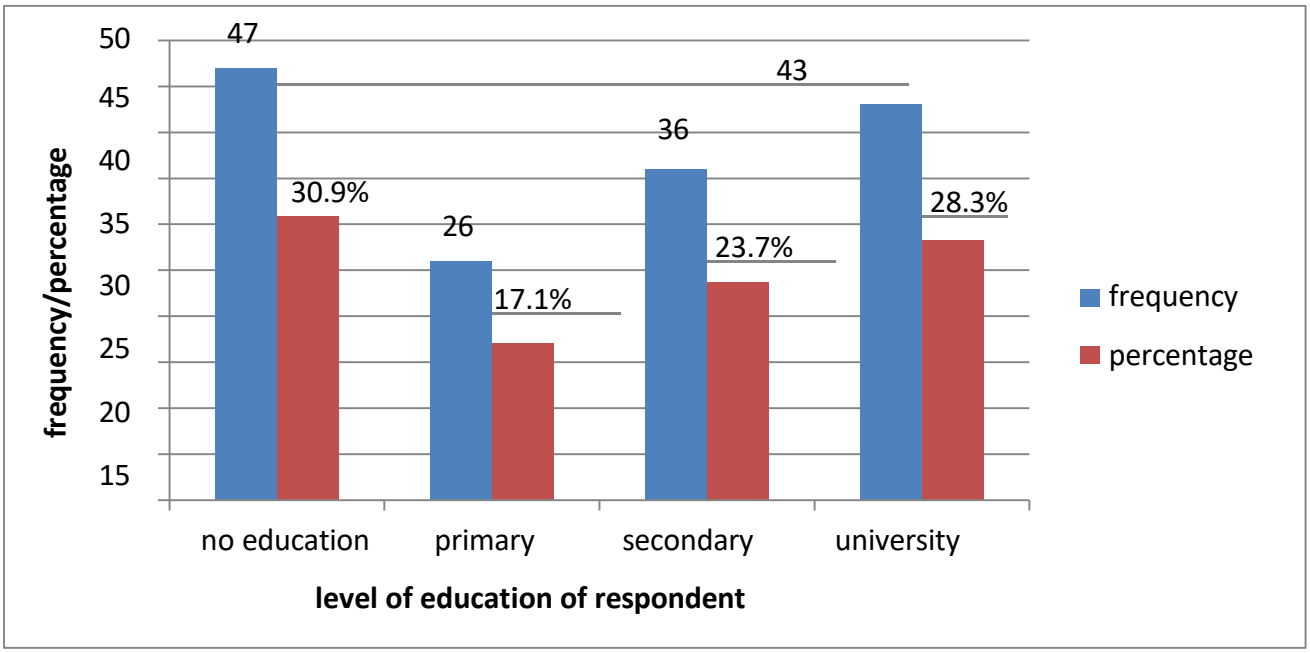

***Figure 5*. Level of education of the respondents.**

Figure 5 shows the distribution of respondents by their level of education. Results on the education level of the respondents showed that 30.9% of the patients had not attained any formal education, 28.3% had attained university level, and 23.7% had gotten secondary education. Only a minority of the study population (3.4%) had attended primary education.

Use non-steroidal Anti- Inflammatory Drugs and Helicobacter Pylori Infection

This study was to determine the association between the uses of non-steroidal anti-inflammatory drugs and the occurrence of Helicobacter pylori infection among patients attending Borama Private Clinics in Borama District, Somaliland. The uses of non-steroidal anti-inflammatory drugs were conceptualized as ibuprofen, aspirin, and diclofenac. Respondents were asked to react to several statements on these variables intended to determine the status of the uses of ibuprofen, aspirin, and diclofenac. The responses were scored as described in Table 1. The results summarized in Table 1 were obtained**.**

Table 1

Use non-steroidal anti-inflammatory drugs with Helicobacter pylori infection

ɔbacter pyloriinfection

		Clinical symptoms	LabTest	Total
not used	Count	22	12	34
	% with NSAIDs	64.7%	35.3%	100.0 %
	% with HBPI	34.4%	13.6%	22.4 %
	% of Total	14.5%	7.9%	22.4 %
Use NSAIDs sometimes used	Count	16	30	46
	% with NSAIDs	34.8%	65.2%	100.0 %
	% with HBPI	25.0%	34.1%	30.3

				%
	% of Total	10.5%	19.7%	30.3 %
always used	Count	26	46	72
	% with NSAIDs	36.1%	63.9%	100.0 %
	% withHBPI	40.6%	52.3%	47.4 %
	% of Total	17.1%	30.3%	47.4 %
Total	Count	64	88	152
	% with NSAIDs	42.1%	57.9%	100.0 %
	% with HBPI	100.0%	100.0%	100.0 %
	% of Total	42.1%	57.9%	100.0 %

Note. The NSAIDs = Non-steroidal anti-inflammatory drugs and HBPI = HelicobacterPylori Infection.

Table 1 shows the status of uses of non-steroidal anti-inflammatory drugs among Helicobacter pylori infection patients attending private clinics in Borama District, Somaliland. It shows that most (47.4%) of the respondents indicated that they always used non-steroidal anti-inflammatory drugs, while 22.4% of respondents indicated that they have not used non-steroidal anti-inflammatory drugs. Data on the last row show the diagnosis of Helicobacter pylori infection among patients in Borama District. It shows that most (57.9%) of patients are diagnosed with laboratory tests, while 42.1% are diagnosed with clinical symptoms. Thus, the status of usage of non-steroidal anti-inflammatory drugs among Helicobacter pylori infection patients attending private clinics in Borama District, Somaliland, was generally high. On cross comparison along the diagnosis of laboratory test, most (30.3%) of patients with always used NSAIDs status had a diagnosis with a laboratory test, while only 7.9% of patients with not used NSAIDs status had diagnosis laboratory test. Along the clinical symptoms column, most (17.1%) of patients with always used NSAIDs" status had a diagnosis with clinical symptoms, while only 10.5% of patients with sometimes used NSAIDs status had a diagnosis with clinical symptoms . This could indicate the association of always using non-steroidal anti-inflammatory drugs on the occurrence of Helicobacter pylori infection among Helicobacter pylori infection patients who attend private clinics in Borama District, Somaliland. The data in Table 3 was subjected to a chi-square test of goodness of fit to establish if there were significant differences between the proportions reported and to test the null hypothesis that the use of non-steroidal anti-inflammatory drugs is not associated with the occurrence of Helicobacter pylori infection among Helicobacter pylori infection patients attending private clinics in Borama District, Somaliland**.**

Ho1: The use of non-steroidal anti-inflammatory drugs is not associated with the occurrence of Helicobacter pylori infection among Helicobacter pylori infection patients attending Borama Private Clinics in Borama District, Somaliland**.**
The results of the chi-squire analysis are summarized in Table 2

Table 2
Summary X^2 Test for Uses Non-steroidal anti- inflammatory Drugs

Variables	N	*df*	X^2	*P*	C
Uses NSAIDs	152	2	9.197	.010	0.239

Note. X^2 (2, .05) = 5.99.

Table 2 shows the results of the chi-square test of the status of the use of non-steroidal anti-inflammatory drugs among Helicobacter pylori infection patients attending private clinics in Borama District, Somaliland. It shows that X^2 (2, N = 152) = 9.197, p = .010. Further, $X20 = 9.197 > X2c = 5.99$, which led to rejection of the null hypothesis. This means that there were more respondents who rated always uses non-steroidal anti-inflammatory drugs than those who rated not used non-steroidal anti-inflammatory drugs. The hypothesis that the use of non-steroidal anti-inflammatory drugs is not associated with the occurrence of Helicobacter pylori infection was therefore rejected. The finding suggested by the data in Table 4 was therefore upheld. The study therefore established that the Helicobacter pylori infection patients who attended private clinics were generally always using nonsteroidal anti-inflammatory drugs when they were first diagnosed with Helicobacter pylori infection.

The contingency coefficient (C = .239) indicates an association of .239, which means that 23.9% of the variance in the occurrence of Helicobacter pylori infection is dependent use of non-steroidal anti-inflammatory drugs.

Therefore, up to 23.9% of the changes from always using non-steroidal anti-inflammatory drugs to not using non-steroidal anti-inflammatory drugs can be preventing the occurrence of Helicobacter pylori infection in the Borama district of Somaliland.

Discussion

This study was to determine the association between the uses of non-steroidal anti-inflammatory drugs and the occurrence of Helicobacter pylori infection among patients attending private clinics in Borama district, Somaliland. It was found that most (47.4%) of respondents indicated that they had always used non-steroidal anti-inflammatory drugs, while 22.4% of the respondents indicated that they had not used non-steroidal anti-inflammatory drugs. This indicates that the status of use of non-steroidal anti-inflammatory drugs among patients with Helicobacter pylori infection attending Borama private clinics was generally high. This position was upheld by a chi-square test that X^2 (2, N = 152) = 9.197, p = .010, C = .239. The study therefore established that patients that use non-steroidal anti-inflammatory drugs are more likely to develop Helicobacter pylori infection than those who did not use them. A study done by Deepa, Anjana, and Mohan (16) in India on the role of ibuprofen in the epidemic of Helicobacter pylori infection: lessons learned from India found that ibuprofen, such as high doses and frequent use, is associated with the incidence of Helicobacter pylori infection**.** This finding agrees with the finding by Wolfe et al. (17) in Mexico that the use of non-steroidal anti-inflammatory drugs (NSAIDs) and Helicobacter pylori are *the* most important risk factors in the pathogenesis of peptic ulcer. This finding was similar to and almost near the finding of this study. Another study done by Midhet et al. (18) in Saudi Arabia on non-steroidal anti-inflammatory drugs related to risk factors of Helicobacter pylori infection in Saudi Arabia found that aspirin and diclofenac are the most important factors responsible for the increasing incidence of Helicobacter pylori infections worldwide. These findings were similar to and almost near the findings of this study. Furthermore, another study conducted by Kuipersetal. (19) in South Korea found that aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) comprise the causes of a large proportion of peptic ulcers. Another study done by Deepa Anjana and Mohan (20), in India, on the role of ibuprofen in the epidemic of Helicobacter pylori infection: lessons learned from India, found that ibuprofen, such as high doses and frequent use, is associated with the incidence of Helicobacter pylori infection.

Conclusions

These studies found the gender: it indicates that 53.9% of the respondents were females, while 46.1% of the respondents were males. This shows that Helicobacter pylori infection is significantly more common in females than in males in the study population. Residence : It shows that most (34.2%) of Helicobacter pylori-infected patients were located in Sheikh Osman, while 25% resided in the Sh. Ahmed Salam area and 20.4% came from Sh. Ali and Sh. Makahil, respectively. Marital status: these show that data was collected from all regions of the district, and this makes the data representative. It shows that the majority (50%) of the respondents were

married, and 27.6%, 9.2%, 7.9%, and 5.3% were single, separated, widowed, and divorced, respectively. Age by respondents. It was shown that 38.1% of the respondents were aged 30-40 years, and 25% were aged below 30 years. 17.8% were aged above 60 years, and 11.2% were aged 41-50 years. While only 7.9% of the respondents were aged1-60 years. This indicates that most of the respondents were aged between 30 and 40 years. Level of education. Results on the education level of the respondents showed that 30.9% of the patients had not attained any formal education, 28.3% had attained university level, and 23.7% had gotten secondary education. Only a minority of the study population (3.4%) had attended primary education. Uses of non-steroidal anti-inflammatory drugs found that most (47.4%) of respondents indicated that they had always used non-steroidal anti-inflammatory drugs, 30.3% of the respondents sometimes used non-steroidal anti-inflammatory drugs, while 22.4% of the respondents indicated that they had not used non-steroidal anti-inflammatory drugs.

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Not applicable

Availability of data and materials

All the data are available with the corresponding author.

Declarations

Ethics approval and consent to participate

The researcher notified each participant of the intentions of the study. The researcher obtained informed consent from each respondent. The researcher also took permission from all gatekeepers before conducting this study. The researcher ensured data collected is not made to conform to predetermined opinion. Further, the researcher ensured any information provided was confidential and should not be shared with others without the permission of the client.

Competing interests

The authors declare no competing interests.

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