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PREVALENCE OF HELICOBACTER PYLORI INFECTION AMONG YOUTH AGED 15 -30 YEARS SEEKING HEALTH CARE. A PROSPECTIVE CROSS-SECTIONAL STUDY. AT C-CARE INTERNATIONAL HOSPITAL KAMPALA.

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ABSTRACT

Background

The study was conducted to determine the prevalence of H. pylori infections among youth aged 15-30 years seeking health care services at C- CARE IHK. The specific objectives were to determine the prevalence, and infection patterns among various age groups and genders and also find out the risk factors influencing the prevalence of H. pylori infections among youth aged 15-30 years attending C- CARE IHK.

Methodology

A prospective cross-sectional study design using both quantitative and qualitative methods was conducted. A questionnaire was used to collect qualitative data from patients' age, gender, and other relevant data that gathered data to meet and answer the objectives of the study. Prevalence was determined by collecting and testing stool samples using stool H. pylori antigen kits and then results were entered into a result sheet. A convenient way of sampling was used to select eligible participants and a sample size of 88 was obtained.

Results

Out of the 88 samples analyzed, 47% were positive for H. pylori infection while 53% were negative. The most affected were males at 53.7%, the age group was (25-30) years at 63.4% and the least affected age group was (15-19) years at 12.2%. people living in town (75.6%), people of no level of education (51.2%), alcoholism, and smoking (73.2%,34.1%) were the factors associated with the prevalence of H. pylori infection.

Conclusion

The prevalence of H. pylori was relatively high, towns and unhygienic conditions predisposed the majority of the patients while the age of 25-30 was affected mostly.

Recommendations

The Ministry of Health should advocate for the testing of youth for H. pylori infection to put more emphasis on sensitizing youth about how it's acquired, spread, and prevented and the complications of H. pylori.

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BACKGROUND

Helicobacter pylori is a gram-negative, micro-aerophilic spiral-shaped, flagellated, bacillus that colonizes the mucus layer of the gastric epithelium (Marshall *et al.,* 1985). It colonizes the human stomach and leads to chronic gastritis, peptic ulcers, gastric adenocarcinoma, and mucosa-associated lymphoid tissue lymphoma, Infections are more common in developing countries than in developed countries (Zamani *et al*., 2018), infected individuals present with abdominal pain, gastric reflux, intestinal bleeding, occasional fevers, loss of body weight and vomiting. Epidemiological studies show that person-to-person, fecal-oral, and oral-oral are the common routes of transmission (Aitila *et al*., 2019). In 2017, the World Health Organization (WHO) published a list of 16 bacteria that pose the greatest risk to human health where H. pylori was thus categorized as a high-priority pathogen for research and development of new and effective treatments(Melese et al., 2019a)

Globally, according to (Bureš et al., 2012) Helicobacter pylori (H. pylori) infection is still the most common human infection.. It is estimated that 50%-80% of the population is infected in a recent meta-analysis evaluating the global

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prevalence of H. pylori infection (Zamani *et al*., 2018), it was found Latin America and the Caribbean to have the highest prevalence of H. pylori worldwide with a prevalence of 59.3% while among European populations the prevalence of H. pylori is estimated to be in the region of 20% to 40% with a 25.4% prevalence of the infection in persons aged ≥3 years in USA, in Japan, the prevalence was stated to be near 90% among individuals born before 1950s, but with a subsequent decreasing trend, reaching less than 2% among subjects born after 2000s.

The factors influencing the prevalence of H. pylori globally vary from country to country with a higher rate in developing countries than in developed countries. Factors such as age, ethnicity, geographical location, socioeconomic factors, and methods of diagnosis influence H. Pylori infections worldwide (Melese *et al*., 2019). Sub-Saharan Africa is the second most contributor of H. Pylori infection with a prevalence of 70.1%, with Nigeria contributing the highest prevalence of H. pylori infection with a rate of 89.7% in the region, various studies also show H. pylori prevalence rates between 73.0% and 94.5% among patients with dyspepsia (Olokoba *et al*., 2013). In Ethiopia, the prevalence of H.pylori infection ranges from 7.7% to 91% and is recognized as a major cause of gastrointestinal diseases. (Melese *et al.*, 2019) and the studies document that, occupational status, household family size, drinking unboiled water, hand washing with soap after toilet visits, water treatment, waste disposal, and the presence of domestic animals were factors influencing H. pylori infections among adults in different areas with 85.6% of the population being infected with H.pylori (Belay *et al.*, 2020). In Africa however, the high prevalence of H. pylori is presumed to be influenced by socio-demographic and geographical factors.

In East Africa particularly Tanzania Jaka *et al*., (2016), conducted a study on 202 participants in Tanzania on H. pylori infections, 79% of them tested positive for H. pylori infection. The study showed that 119 participants lived in rural areas while 83 lived in urban areas. It also suggested that low levels of education, untreated drinking water, poor living conditions, and geographical locations as factors influencing H. pylori infections among the people of Tanzania with a prevalence of 70%.

In Uganda, a study carried out at Kawempe health center by Baingana *et al.,* (2014) showed that low levels of income, geographical setting, and ethnicity are factors influencing H. pylori infections among the youths. Out of 447 participants, 202 tested positive for the H. pylori infection with a prevalence of 74% among dyspeptic patients. Few studies have been conducted on H. pylori prevalence and its associated factors. However, no studies have been reported on the prevalence of H. pylori infections among youth aged 15-30 years seeking health care services at C-Care International Hospital Kampala in Kampala district. The study aims to assess the prevalence of H.pylori infections among youth aged 15-30 years seeking healthcare at C-Care IHK, Kampala.

METHODOLOGY

Study design

A cross-sectional study design was used during data collection. This is because it is cheap and can be conducted within a short period. It is the most suitable study design whereby the researcher was able to measure both the dependent and independent variables at the same time with no follow-up of the respondents in the study

Study area

The study area was C-Care IHK HOSPITAL plot 4686, Kisumu-Namuwongo in Kampala district in the central region of Uganda ($0^0$18'19" N, $32^0$36'38" E). It receives a total population of 100 youths daily. The study was conducted from July 2023 to September 2023

Study population

The study population included patients attending the outpatient department (OPD) at C-CARE International Hospital Kampala

Sample size determination

The sample size was calculated using: the modified Kish and Lesile formula (1965)

$$n = \frac{Z^2PQ}{d^2}$$

Where:

total number or desired population

Z= 1.96 which is the standard normal deviation under the normal distribution at 95% confidence limits

P= prevalence of H.pylori among174 youth in Uganda is 37.2% or 0.372 as reported by (Tsongo et al., (2015)

d= 0.05 representing the precision error around the estimated prevalence of H.pylori at a 95% confidence interval.

Q= (1-P), 1-0.374=0.626

Therefore; $n = \frac{1.96^2 \text{ x} 0.3743(1-0.374)}{0.05^2}$

N=360

However, hospital records indicated that on average, approximately 100 youth of 15- 30 years visit the hospital per day, therefore the sample size was adjusted using Kish and Leslie's (1965) formula below:

$$N = \frac{n}{1 + \frac{n}{\text{Sampling frame}}}$$

Where n=360, sampling frame=100

$$N = \frac{360}{1 + \frac{360}{100}}$$

$$N = 360$$

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4.1
N= 88
Therefore, a total of 88 participants were selected and included in the study.

Sampling technique
The study employed a convenience sampling method specifically because all participants were sampled as they walked in at their convenience. The method is also cheap and simple to administer within a short period.

Sampling procedure
Patients were introduced to the study by the researcher and consent was sought before being enrolled in the study. Respondents were sampled as they walked in the laboratory based on first come first serve and they were given consent forms where those that consented were tested by stool antigen test to check for H.pylori

Data collection method
An interview technique using questionnaires which is a quantitative data collection method was administered to the respondents to determine the social demographic factors, the risk factors, and the prevalence of H. pylori infections among youth aged 15-30 years. Laboratory tests of stool H.pylori antigen were used to determine the prevalence of H.pylori.

Data collection tools
Close-ended questionnaires were used to determine risk factors and infection patterns of H.pylori among various age groups and genders. Stool H. pylori antigen test kits were used to determine the prevalence of H. pylori infections.

Data collection procedure
A standard close-ended questionnaire was given to each of the respondents to fill out after consenting. Stool containers were given to participants to collect stool and stool was mixed with buffer in the buffer, waited for 5 minutes then put 3 drops on the antigen test strip and read results after 15 minutes.

Laboratory stool examination
This was done using the stool antigen test strips

Requirements
Freshly collected stool samples in the stool container, stool container, H.pylori test package, applicator sticks, and disposable dropper.

Principle
The H.pylori antigen test is a qualitative, lateral flow immunoassay for the detection of H.pylori antigen in human stool specimens. In the membrane, it is coated with anti–pylori antibodies on the test region of the test kit. The specimen reacts with the particles coated with anti—H.pylori antibodies. The mixture migrates upwards on the membrane by capillary action and reacts with H.yplori antibodies producing a colored line. the presence of a colored line in the test region indicates a positive test, while absence will indicate a negative result. To serve as a procedure control, a colored line will appear at the control region indicating that the proper volume of the specimen was added and membrane wicking occurred.

Procedure
- A small portion of the stool sample is emulsified in diluent and left to stand for 5 minutes
- A test kit is labeled with a patient number.
- 2-3 drops of mixture are added to the test kit
- Then allowed to stand for 15 minutes
- Report your findings

Interpretation of results
- Two lines both inpatient region and control region-positive
- One line in the control region- negative
- A line in the patient region and no line in control is invalid
- No line in both the patient and control region is invalid

Study variables
The dependent variable was the prevalence of H. pylori infections among youth aged 15-30 years and the independent variable was the risk factors influencing H. pylori infection and infection pattern of H. pylori among various age groups and gender.

Quality control
Research assistants were trained by the researcher before data collection to ensure correct results were obtained. The research tools were pre-tested before using them and changes were made where necessary.

Data analysis and presentation
Data was analyzed using Microsoft Excel and a scientific calculator for manual calculations and presented in tables, graphs, and pie charts.

Ethical considerations
Approval of my research proposal and permission to carry on my research project was sought from the research and ethics committee of C-CARE IHK before the conduction of the study.

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All participants signed an informed consent form and all the research data/ information obtained was handled with maximum confidentiality.

RESULTS

Social demographic characteristics of the participants

Table 1: Summary of social demographic characteristics of participants

Variable	Category	Frequency (n=88)	Percentage (%)
Gender	Male	39	44.3
	Females	49	55.7
Age	15-19	12	13.6
	20-24	23	26.1
	25-30	53	60.2
Educational level	None	41	46.6
	Primary	07	7.95
	Secondary	26	29.5
	Tertiary	14	15.9
Marital status	Single	54	61.4
	Married	30	34.1
	Divorced	04	4.5
Place of residence	Town	65	73.9
	Village	23	26.1

As depicted in Table 1 above, out of 88 participants in the study, (39) 44.3%were males and(49) 55.7%where females, most participants were of age 25-30 (60.2%), most respondents were single 61.4% and most residing in towns(73.9%), participants that were of no educational level were most dominant in the study (46.6%)

Prevalence of H.pylori infection among youth aged 15-30 years

Table 2: Percentage prevalence of H.pylori infection

Variable	Category	Frequency (n=88)	Percentage (%)
Tests(status)	Positive	41	46.6
	Negative	47	53
	Total	**88**	**100**

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Figure 1 the prevalence of H.pylori infection

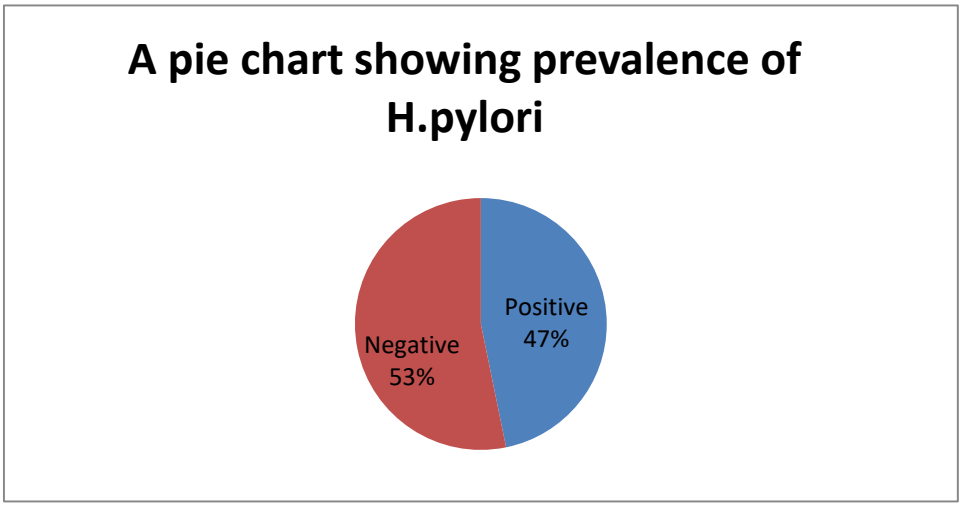

Table 2 and Figure 1 above show that out of 88 samples tested for h.pylori from participants,41 were positive of H .pylori (47%) and 47 tested negative (53%)

Risk factors of H.pylori infection among youth aged 15-30 years

Table 3 shows the relationship between risk factors and prevalence of H.pylori infection.

Risk factors	Category	Total	Percentage (%)	Number of positive cases	Percentage (%)
Place of residence	Town	65	73.9	31	75.6
	Village	23	26.1	10	24.4
	Total	**88**	**100**	**41**	**100**
Employment status	Paid employment	27	30.6	12	29.3
	Un employed	51	58.0	23	56.1
	Self-employment	10	11.4	06	14.6
	Total	**88**	**100**	**41**	**100**
Smoking	No	66	75.0	27	65.9
	Yes	22	25.0	14	34.1
	Total	**88**	**100**	**41**	**100**
Taking alcohol	No	24	27.3	11	26.8
	Yes	64	72.7	30	73.2
	Total	**88**	**100**	**41**	**100**
Source of drinking water	Packaged	34	38.6	13	31.7
	boiled water	20	22.7	8	19.5
	Un boiled water	34	38.6	20	48.7
	Total	**88**	**100**	**41**	**100**
Sources of water for domestic use	Piped water	46	52.3	18	43.9
	Borehole	30	34.1	14	34.1
	Open water source	12	13.6	9	22
	Total	**88**	**100**	**41**	**100**
Religion	Muslim	8	9.1	5	12.2
	Catholic	45	51.1	20	48.8

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	Protestants	35	39.8	16	39.0
	PAD42	00	00	0	00
	Total	**88**	**100**	**41**	**100**
Educational level	None	41	46.6	21	51.2
	Primary	07	8.0	03	7.3
	Secondary	26	29.5	12	29.3
	The	14	15.9	5	12.2
	Total	**the 88**	**100**	**41the**	**100**

The table shows the highest and lowest risk factors influencing the prevalence of H.pylori infection among youth aged 15-30 with the town as a place of residence with the highest prevalence at 75.6 %, and the village at unemployed employed with a higher prevalence at 56.1% and least on self-employed 14.6%, participants who were taking unboiled water had a higher prevalence of 48.7% and those taking boiled with least of 19.5%, participants with no educational levels higher with 51.2 and catholic religion with the highest prevalence of 20%

Infection patterns among various age groups and gender

Table 4 shows infection patterns among the different age groups and gender

Variable	Category	Number of positive cases	Percentage (%)
Age	15-19	5	12.2
	20-24	10	24.4
	25-30	26	63.4
	Total	**shows**	**100**
Gender	Male	22	53.7
	Female	19	46.3
	Total	**41**	**100**

Figure 2 shows infection patterns among different age groups

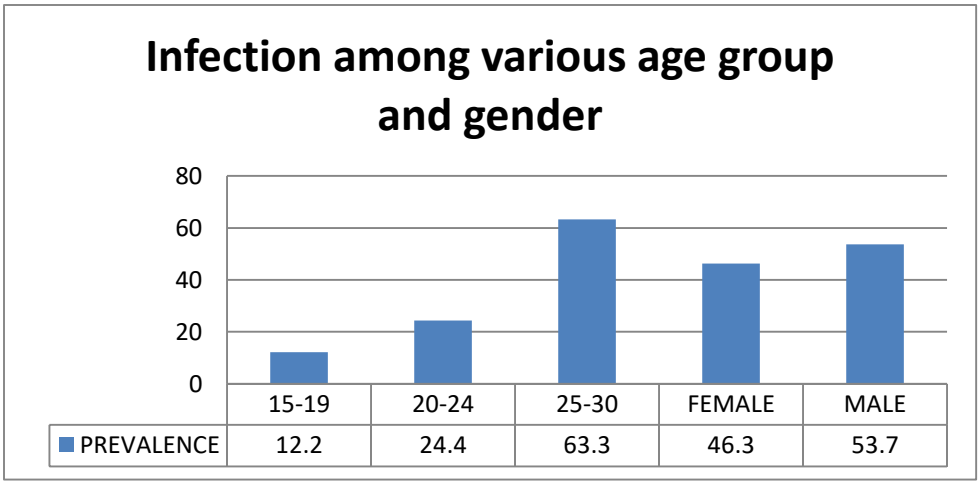

Table 4 and Figure 2 show the relationship between prevalence and infection patterns among various age groups and gender

Of the 41 participants who tested positive, males had the highest prevalence of 53.7% and females with 46.3%. The various infection patterns indicated that the age group of 25-30 had the highest prevalence of 63.3% followed by 20-24 with24.4% and the least with 12.2% among 15-19

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Discussion

Prevalence of H.pylori infections among youth aged 15-30 years

The study findings showed that the prevalence of H. pylori infections among youths aged 15 to 30 years was 46.6%. The study results were slightly agreeing with the study carried out by (Wang et al., 2019) in Jidong community, China, which showed a prevalence of 52.2%. The agreement of the two study findings could be due to the poor lifestyle people in the study areas live in. The study at hand was conducted within an urban center. However, the study results are contrary to those of a study carried out by Jaka *et al*., (2016) in Tanzania with a prevalence of 39.1% which is a slightly lower rate. This discrepancy is probably due to the difference in the time lag in which the two studies were carried out.

A retrospective study carried out with outpatient records of Wum district hospital in Cameroon by Aminde *et al*., (2019), showed that out of 451 participants involved, 51.5% were H. pylori seropositive with a higher prevalence rate in females 32.2 % than males 18.8%. Their findings were associated with occupational status whereby the unemployed were at a higher risk of infection than the employed similarly the current study showed that out of 88 participants involved, 46.6%

On the contrary with higher prevalence rate in males 53.7% than in females 46.3 % this is attributed to the different techniques used when testing for H.pylori infection due to that women take more antibiotics that suppress the bacteria

Infection patterns among various age group and gender

There was a high prevalence of helicobacter pylori in ages between 24-30 of 26(63.4%) This is based on the fact that this age group is the most active in life, Stressful factors, and therefore more exposed. These findings are in agreement with the study by Namyalo *et al* 2019 with a higher prevalence among ages between 19-35 years and also a study conducted by s.kakooza in butemba HCI in kyankwanzi that shows a higher prevalence in the age group of 18-30 years this agreement is attributed to the testing methods used and study area.

Higher prevalence in males (53%) than in females (46%) this is in agreement with a study conducted by Smith et al 2018 in Nigeria that also shows a higher prevalence in males of 38.4% than females of 36.7% and also in agreement with the study by Namyalo *et al* 2019 with a slightly higher prevalence in males of 36.0% than females 35.4%

However, the study is in contrast with a study by Khoder *et al 2019* that shows a higher prevalence among females 53% and males 35% and also a study by Estragham *et al 2014* in eastern meditation countries with a higher prevalence in females than males 30.6% .these differences are greatly attributed to the geographical location, different testing methods used in the study and also the time rag between the two studies

Risk factors

The objective of the study was to determine the risk factors of H. pylori infections among youths aged 15 to 30 years. Data analysis and interpretation revealed the following major findings under this objective.

The study showed the outstanding risk factors influencing h pylori infection were town residence, smoking, alcoholism, unemployment, and taking unboiled water with the prevalence of 75.6%, 34,1%, 73.2%,56.1%and48.7% respectively.

The town as the place of residence was the most outstanding risk factor since most positive cases were from the town. This was so because of the crowdness people live in town getting more exposed to the infection with a prevalence of 73.9%. This study contradicts the study which was conducted in Eastern Sudan on seroprevalence of H. pylori infection among adults by Abdallah *et al*., (2014), 65.8% of them tested positive for H. pylori, and Rural residency was the only significant socio-demographic factor influencing H. pylori infection in Sudan.

The study also showed that alcoholism, unemployment, unboiled water as a source of drinking water, piped water as a source of water for domestic use, and low level of education with the prevalence of 73.2%, 56.1%, 48.7%, 43.9%, and 51.2% respectively. These study findings are similar to a cross-sectional study carried out on socio-economic, personal habits, and prevalence of H. pylori infections among inhabitants of Lanyu islands by Chen *et al*., (2014), the overall prevalence of H. pylori was 72.1%. The high infection rates were significantly associated with alcoholism, smoking, and overcrowding. Individuals who practiced smoking and alcoholism had high rates of infection of 78.6% and 76.1%respectively

A study conducted by Shiferaw & Abera, (2019) that indicates low educational levels were more likely to be infected with *H. pylori* infection than higher level education which were similar to the risk factors of the current study because of their sources of basic needs like water and others that could predispose them to H.pylori infection easily.

A cross-sectional study carried out on H. pylori prevalence and its associated factors in Ethiopia showed individuals who consumed water from open and unprotected sources were at a higher risk of infection than those who consumed piped and borehole water which was safe ((Melese et al., 2019b). This study contradicts the current study where individuals who consumed unboiled water as a source of drinking water and piped water as a source of water for domestic use were at a higher risk of infection than those who consumed packed water, boiled water as a source of drinking water, open source and borehole water as sources

of water for domestic use because water was not effectively treated leaving it contaminated.

Conclusions

The study was carried out to determine the prevalence of H pylori infection, infection patterns among various age groups and genders, and risk factors for H. pylori among youth aged 15-30 years seeking healthcare services at C-Care IHK. The study established that the prevalence is 46.6% and the major risk factors included; smoking, alcoholism, drinking un-boiled water, unemployment, level of education, and town residence.

Given these results, the prevalence of H. pylori was relatively high, towns and unhygienic conditions predisposed the majority of the patients while the age of 25-30 was affected mostly.

Recommendations

The following recommendations are suggested:

A proper approach to improve lifestyles, sanitary facilities, and educational services needs to be put in place by the District to reduce the incidence of H. pylori infection

Proper diagnosis and treatment of symptomatic patients should be done at C-Care IHK and all health facilities in Uganda

Establishment of health awareness programs in the community by the district to enhance personal hygiene and behaviors in Kampala district.

Acknowledgment

This work has been accomplished with the assistance of many people who deserve special mention for their support. I thank Allah for enabling me to finally complete this study. Through Him all things were possible. The strength and joy that I received to carry out this work came from the Almighty God. He made it possible for me to come this far. To Him, I give all the glory.

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I owe my cordial thanks to the staff of C-CARE IHK for making their facilities available for this study, thank you for your cooperation and the good working environment you created for me.

My sincere appreciation goes to my tutors who have supported me in diverse ways toward the success of my course study.

Once again, I would like to thank the Almighty God for His guidance through this research work and for making it a success.

List of Abbreviations

%: percentage
C-CAREIHK: C-Care International Hospital Kampala
CDC: Centre for Disease Control
DNA: Deoxyribose Nucleic acid
ELISA: Enzyme-linked immunoassay
H.Pylori: Helicobacter pylori
MOH: Ministry of Health
OPD: Outpatient department
PUD: Peptic Ulcer Disease
SOPS: Standard Operating Procedures
UAE: United Arab Emirates
UAHEB: Uganda Allied Health Examination Board
USA: United States of America
WHO: World Health Organization

Source of funding

No source of funding.

Conflict of interest

No conflict of interest.

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