Page 135 to 143

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Knowledge, Practice and Prevalence of *Helicobacter Pylori* Infection in the North West Region of Cameroon

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Abstract

Helicobacter pylori remains a public health problem and a major cause of peptic ulcer disease and gastric. It has a prevalence rate of about 70% in developing countries. This study was carried out in order to assess the knowledge, and practice toward *H. pylori* and also to determine the prevalence of *H. pylori* infection from 4 health districts (Bamenda, Ndop, Tubah, Kumbo) in the North West Region of Cameroon. A total of 5,225 subjects between 4-98 years old of both sexes were recruited in the study from January 2014 to March 2016. An open ended questionnaire was administered to assess knowledge and practices toward *H. pylori.* Venous blood samples were collected and tested for the presence of the bacteria using the Pylori test strip. The data was analyzed using SPSS statistical software package version 20.0 and P value of < 0.05 was considered statistically significant. The prevalence of *H. pylori* in the study population was 1,438 (27.5%). There was a significant difference p < 0.05 in the prevalence of *H. pylori* among the age group, and communities. The highest prevalence's; 455 (30.2%), 857 (27.6%) and 135 (67.5%) was seen in the age group < 29 years, female and in Kumbo respectively. The higher proportion 254 (55.5%) had poor knowledge about the disease with a significant difference seen in age (P = 0.03), gender (P = 0.010), level of education (P = 0.000) and occupation (P = 0.000). The mean (SD) knowledge score of the participants was 22.3 (10.93) and ranges from 4-38. Our study revealed an overall good practice 341 (74.5%) with a significant difference seen with level of education (P = 0.000) and occupation (P = 0.000). The total score ranges for practice was 3-11 and mean (SD) practice scores of participants was 7.23 ± 1.50. Evaluating the mean practice scores of the respondents by their individual practices revealed that the most correspondents had a good source of potable water (74.7%) followed by a good toilet facility (72.48%).

Keywords: *Helicobacter pylori; Prevalence; Knowledge; Practice*

Abbreviations: *H. pylori: Helicobacter pylori;* SD: Standard deviation; P: P-Value

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Introduction

Helicobacter pylori (H. pylori) formerly called *Campylobacter pylori* is now a global public health problem, affecting about half of the world's population making it one of the most widespread infection in the world [1]. Annually *H. pylori* infection is associated with over a third of a million deaths each year [2]. The infection is acquired early in life and is associated with the development of chronic gastritis, gastric ulcers, gastric cancer, peptic ulcer disease, duodenal ulcers and stomach mucosal atrophy [2]. The prevalence of *H. pylori* infections varies with countries from 20% to 90% and is lower in developed countries than in developing countries [3]. In Cameroon the prevalence of *H. pylori* is > 60% [4].

In both developing and developed countries, high prevalence of *H. pylori* is apparently related to poor socioeconomic conditions, such as overcrowded housing, low income, older siblings and large family size are key elements that increase the risk of *H. pylori* infection [5].

The infection generally becomes less common as standards of living rise. The prevalence of *H. pylori* is usually higher in remote rural communities compared to urban communities [6]. The sources of *H. pylori* and the mechanisms of acquisition remain poorly understood. Childhood appears to be the principal period during which *H. pylori* is acquired in developing countries where most children are infected by the age of 10 years and unless treated, infection apparently remains for life [7]. Person-to-person transmission within the family has been considered as major modes of transmission by epidemiological and microbiological studies, both in developed and developing countries.

Studies in some developed countries have shown a very high knowledge and practice range of 81%-95.8% while studies in developing countries gave a lesser prevalence of 26.7%-68% [8], [1]. This study to the best of our knowledge, will be the first study to assess the knowledge and practice toward *H. pylori* and also to determine the prevalence of *H. pylori* infection in the North West Region of Cameroon.

Materials and Methods

Study design

This cross sectional prevalence study was carried out using data collected from January 2014 to March 2016 from health 4 districts ;Bamenda, Ndop, Tubah, Kumbo of the Northwest region of Cameroon. Ethical clearance was obtained from the ethical committee of the different hospitals. The study populations consisted of 5,225 out patients with gastrointestinal disorder symptoms and were screened for *H. pylori* at a doctor's request. The population was stratified into the following; males, females and the age groups; < 29 years, 30-39 years, 40-49 years, 50-59 years and > 59years.

Qualitative data collection

The questionnaire was designed based on a framework to assess knowledge and practices as defined by the World Health Organization Guide to Developing Knowledge, Attitude, and Practice Surveys. The pre-tested open ended questionnaire was administered to evaluate the knowledge and practices on *H. pylori*. The questionnaire consisted of 3 parts with a total of 25 questions. The socio-demographic part consisted of questions on; age, sex, level of education and occupation. Knowledge was assessed using 8 questions with a total score of 41 including; definition of the disease (1 point), the causes (2 points), mode of transmission and risk factors (2 points), signs and symptoms (9 points), complications (3 points), diagnosis (3 points), methods of treatment (4 points) and prevention (9 points). In a similar way, practice was accessed using 6 questions with a total score of 11 and this includes food preparation (3 points), source of drinkable water (1 point), type of toilets used (1 point), personal hygienic practices (3 points), if tested before (1 point) and participating in any educational talk on *H. pylori* (2 points). In all, 500 questionnaires were given out and the questions were read and explained to those who could neither read nor write and their responses noted. A score of 1 was given to any right answer and 0 to any

wrong answer. The total for each person was calculated and a value > 30 was considered Excellent knowledge, 19-30 good knowledge and < 19 as poor knowledge. Similarly practice was stratified as good with a score of > 5, and < 5 for bad practices.

Laboratory procedure

Five milliliters of venous blood was collected in an anticoagulated potassium EDTA (Ethylene Diamine Tetracetic Acid) tubes using standard laboratory procedures. The sample was centrifuge at 3000 rpm to obtain plasma. Fifty microliter of plasma was added to a labeled test cassette. If the patient sample contains *H. pylori*-specific IgG antibodies, a faint pink-to-red test line was visible in the result window along with a control line, indicating a positive result. If *H. pylori*-specific IgG Antibody was not present or was present at very low levels in the patient sample, only the procedural control line was visible. If the control line does not develop within 5 minutes, the test was considered invalid.

Data was entered and double checked using Microsoft excel. The data was then transferred to the SPSS statistical software package version 20.0 for statistical analysis. Discrete variables were tested using the chi-square test. P value of < 0.05 was considered statistically significant.

Results and Discussion

In all, 5,224 subjects were recruited into the study. Their age ranged from 4-98 years, with a mean (standard deviation; SD) of 41.28 (19.6) years. The female gender constituted the highest population 3,105 (59.4%). The subjects were further classified according to different age groups with the age group < 29 years representing the highest population 1,504 (28.8%) as shown on Table 1.

Variables	Characteristic	Frequency	Percent (%)
Age groups in years	< 29	1,504	28.8
	30-39	1,009	19.3
	40-49	866	16.6
	50-59	752	14.4
	> 59	1,093	20.9
Gender	Female	3,105	59.4
	Male	2,119	40.6
Place	Bamenda	651	12.5
	Kumbo	4174	79.9
	Ndop	199	3.8
	Tubah	200	3.8

Table 1: *Characteristics of study population.*

Prevalence study

The prevalence of *H. pylori* was 1,438 (27.5%). The prevalence was significantly (P = 0.000) highest 455 (30.2%) in the age group < 29 years and lowest 284 (26.0%) in the age group 50-59years. Accessing gender, the prevalence was higher in females 857 (27.6%) than in males 582 (27.5). This difference was not significant p = 0.91. The various study sites revealed that prevalence was significantly (P = 0.000) highest in Ndop 135 (67.5%) and lowest 963 (23.1%) in Kumbo as shown on Table 2.

Variables	characteristic	*H. pylori* infection (n = 5225)			
		Negative n (%)	Positive n (%)	χ^2	P-value
Age in years	< 29	1050 (69.8)	455 (30.2)	25.50	0.000
	30-39	728 (72.2)	281 (27.8)		
	40-49	630 (72.7)	236 (27.3)		
	50-59	558 (74.2)	194 (25.8)		
	> 59	809 (74.0)	284 (26.0)		
Gender	Female	2248 (72.4)	857 (27.6)	0.014	0.91
	Male	1538 (72.5)	582 (27.5)		
Place	Bamenda	430 (66.1)	221 (33.9)	320.8	0.000
	Kumbo	3211 (76.9)	963 (23.1)		
	Ndop	65 (32.5)	135 (67.5)		
	Tubah	80 (40.0)	120 (60.0)		

Table 2: *Association between H. pylori status and various demographic data.*

Assessing knowledge and practice toward *H. pylori*

Out of the 500 questionnaires that were administered, 458 responded completely giving a response rate of 91.6%.

a. Knowledge of *H. pylori*

The study revealed that 103(22.5%) of those who answered the questionnaire had an excellent knowledge, while 101(22.1%) and 254 (55.5%) respectively had good and poor knowledge toward *H. pylori.* Assessing knowledge with demographic data showed significant differences in age (P = 0.03), gender (P = 0.010), level of education (P = 0.000) and occupation (P = 0.000). The highest prevalence of excellent knowledge was seen among the age group 40-49 years; 18 (36.7%), male gender; 54 (29.8%), persons with tertiary education; 68 (52.7%) and civil servants; 36 (58.1%) while the highest prevalence of poor knowledge was seen among the age group > 49 years; 81 (65.9%), female gender; 162 (58.5%), persons who did not go to school; 31 (75.6%) and traders; 48 (78.71%) as shown on table 3A.

The mean (SD) knowledge scores of participants was 22.3 (10.93) ranges from 4-38. Evaluating the mean knowledge scores of the respondents by question showed that most correspondents knew that hospital base treatment is the best option, followed by the definition of the disease. On the other hand most people did not know the cause of the infection and how the bacterium was transmitted (Table 3B).

Variables	Characteristic	Knowledge *H. pylori* infection (n = 458)				
		Excellent (%)	Good (%)	Poor n (%)	χ^2	P-value
Age in years	< 29	50 (22.1)	52 (23.0)	124 (54.9)	13.70	0.033
	30-39	16 (26.7)	14 (23.3)	30 (50.0)		
	40-49	18 (36.7)	12 (24.5)	19 (38.)		
	> 49	19 (15.4)	23 (18.7)	81 (65.9)		
Gender	Female	49 (17.7)	66 (23.8)	162 (58.5)	9.34	0.010
	Male	54 (29.8)	35 (19.3)	92 (50.8)		

Level of Education	None	1 (2.4)	9 (22.0)	31 (75.6)	115.34	0.000
	Primary	9 (10.8)	15 (18.1)	59 (71.1)		
	Secondary	25 (12.2)	43 (21.0)	137 (66.8)		
	Tertiary	68 (52.7)	34 (26.4)	27 (20.9)		
Occupation	Civil servants	36 (58.1)	14 (22.6)	12 (19.4)	93.41	0.000
	Farmers	8 (6.1)	42 (32.1)	81 (61.8)		
	Students	44 (27.8)	34 (21.5)	80 (50.6)		
	Technicians	8 (17.4)	5 (10.9)	33 (71.7)		
	Traders	7 (11.5)	6 (9.8)	48 (78.7)		

Table 3A: *Association of demographic variables with the knowledge classification.*

S. No	Area	Max score	Mean score	Mean % score	Level of knowledge
1	Etiology of the organism	2	0.49	24.27	Poor
2	Definition	1	0.55	55.12	Good
3	Transmission and risk factors	8	2.28	28.54	Poor
4	Sign and symptoms	9	4.21	46.79	Average
5	Complications	3	1.39	46.30	Average
6	Diagnosis	3	1.63	54.21	Average
7	Treatment	4	2.84	70.89	Good
8	Prevention	9	4.40	48.90	Average

Table 3B: *Mean score and mean percentage of knowledge score.*

b. Practice toward *H. pylori*

Our study revealed an overall good practice 341 (74.5%) toward *H. pylori.* Evaluating practice with demographic data showed significant differences level of education (P = 0.000) and occupation (P = 0.000) and insignificant differences with age (P = 0.29), gender (P = 0.87). The highest prevalence of good practice was seen among the age group 30-39 years; 49 (81.7%), female gender; 207 (74.7%), persons with tertiary; 117 (90.7%) and civil servants; 57 (91.9%) while the highest prevalence of bad practice was seen among the age group > 49 years; 37 (30.1%), male gender; 47 (26.0%), persons who did not go to school; 19 (46.3%) and traders; 48 (78.71%) as shown on Table 4A.

The total score ranges for practice was 3-11 and mean (SD) practice scores of participants was 7.23 ± 1.50. Evaluating the mean practice scores of the respondents by their individual practices revealed that most correspondents had a good source of potable water (74.7%) followed by a good toilet facility (72.48%). Alternatively most people have never done the test (42.56%) followed by poor dieting (45.57) as shown on Table 4B.

Variables	Characteristic	Practice toward *H. pylori* infection (n = 458)			
		Good (%)	Bad n (%)	χ^2	P-value
Age in years	< 29	167 (73.9)	59 (26.1)	3.69	0.29
	30-39	49 (81.7)	11 (18.3)		
	40-49	39 (79.6)	10 (20.4)		
	> 49	86 (69.9)	37 (30.1)		
Gender	Female	207 (74.7)	70 (25.3)	0.03	0.87
	Male	134 (74.0)	47 (26.0)		
Level of Education	None	22 (53.7)	19 (46.3)	32.08	0.000
	Primary	63 (75.9)	20 (24.1)		
	Secondary	139 (67.8)	66 (17.1)		
	Tertiary	117 (90.7)	12 (9.3)		
Occupation	Civil servant	57 (91.9)	5 (8.1)	29.49	0.000
	farmer	107 (81.7)	24 (18.3)		
	student	11 5(72.8)	43 (27.2)		
	technician	28 (60.9)	18 (39.1)		
	trader	34 (55.7)	27 (44.3)		

Table 4A: *Association of demographic variables with the practice classification.*

S. No	Area	Max score	Mean score	Mean % score	Level of Practice
1	Food preparation	3	1.37	45.57	Average
2	Source of drinkable water	1	0.75	74.71	Excellent
3	Type of toilets used	1	0.73	72.87	Good
4	Personal hygienic practices	3	1.95	64.94	Good
5	Test done	1	0.43	42.56	Poor
6	Educational talk	2	1.27	63.38	Good

Table 4B: *Assessing mean score of knowledge score.*

Discussion

The overall prevalence of *H. pylori* in this study 27.5 % (1438 of 5224). This prevalence was far lower than 52.27% registered in Buea, another town of the same country [1] and 63.41% in other studies carried in China [5]. The low prevalence seen in this study is likely due to the advances in treatment that has led to the development of an unfavorable gastric environment. Secondly, the low prevalence can be attributed to the good practices seen in the survey study. This is in line with health care improvement which involves community mobilization. In addition the mode of transmission share similar route with other diseases such as cholera. As such the prevention of these diseases also accounts for the low prevalence of *H. pylori*

The prevalence was significantly (P = 0.000) highest 455 (30.2%) among the age group < 29 years and declined with increase in age. This finding was similar to studies in other countries [8], Kate., *et al*. 2001 [9], Rodrigues., *et al.* [10], Yangchun., *et al.* [11], Ameri., *et al.* [9], and contrary to studies that have reported a peak prevalence in the age of 30–39 years Yangchun., *et al*. [11]; Rastogi., *et al*. [12]; Shi., *et al. [*5], and 50–59 years [13]. However in children less than 30 years the prevalence increase with age [1,13]. This finding could be due to an increasing antibody production with increasing age or decreasing specific immune response among older individuals [10].

The high prevalence in this group is probably because people were usually infected with *H. pylori* at an early age. This can be attributed to the fact that the prevalence of *H. pylori* infection is very high in children and ranges from 62-83% [1,3,15]. In addition these groups of people are selective in their mode of feeding which is also a risk factor for the development of the disease.

The high prevalence seen in females (75%) could be attributed to life style since most female eat very little or no food at all ('in the name of fashion') so as to reduce their weight and size. This is in line with studies carried out in the United States of America by WGO in 2010. Although female gender reported a higher prevalence there was no association seen between gender similar to studies by Yangchun., *et al*. [11], Windsor., *et al*.[6], Ndip., *et al*.[1], Hestvik., *et al*. [16], Klein., *et al*. [17], Shi., *et al*. [5], and Aguemon., *et al*. [18]. The high prevalence in female is most probably related to the hormonal differences between male and females as other study has identified an important role of oxytocin in the gastric evacuation rate [5]. Secondly it could be due to their lifestyle such as eating very little or no food so as to reduce their weight and size. It could also be due to the frequent use of antibiotics for other common diseases since home treatment is a common practice in most rural areas [16]

Participants in rural areas (Ndop and Tubah) registered a significantly higher prevalence compared to those in Urban or semi urban area. It has been reported that the geographical distribution of *H. pylori* infection varies in different regions of the world and within the same country Ankouane., *et al*. [15]. Similar results have been reported in other studies [6,12,17]. On the contrary Aguemon., et al. [18] reported that there was no association between communities. This is probably due to the high risk factors such as high number of occupants per house or large families, lower education level, low socioeconomic status poor low standards of living, and poor sanitary conditions [5,1,3,11]seen in the rural areas.

General knowledge about *H. pylori* was poor across all studies. Similar results were recorded in a review carried by Driscoll., *et al*. [19] and studies in other countries [12]. Compared to other studies, our data reveal that knowledge was associated with age, sex, level of education and occupation [8]. In our study the mean percentage scored showed that most of the participants only knew the type of treatment (70.89%) and the definition of gastric (55.12%). However participants did not know it was a bacterial infection caused by the bacterium *H. pylori* (24.27%). This has led to increase in the knowledge of the people with regards to treatment. Based on this review, there is limited knowledge about *H. pylori* among the general population, especially with respect to transmission. However because of common practices that cut across other infection (cholera, helminth) has contributed to the low prevalence seen. Only 31.4% of the respondent knew it was transmitted via contaminated food, while 21.3% said it can acquire contaminated water and 15.8% said oral transmission was possible. Unfortunately 49% of the people said they do not know. Of the 500 respondents 18.6%, 46.4%, 30.7%, 38.4% and 57.0% knew that crowded rooms and communities, poor food preparation, stress (anger), type of food and poor personal hygiene were risk factor associated with the disease respectively. Few participants knew vomiting 38% and abdominal pain 41% as the sign and symptom of *H. pylori*. Interestingly 54% knew that gastric cancer and not peptic ulcer was related to *H. pylori.* Majority of the people (73.6%) knew that the disease could be diagnosed in the laboratory however 35.4% and 42.3% of the participants knew that stool and blood samples can be used for diagnosis respectively.

Our data showed an overall good practice 341 (74.5%). Good practices have also been registered elsewhere [12]. This was seen especially in their source of drinkable water and type of toilets. However poor food preparation was common in this area. Thus the low prevalence of *H. pylori* correlates with the high prevalence of good practice since it has been reported that poor practice led to high *H. pylori* prevalence [6]. Generally good source of water and good toilet as indicated by most participants has reduced the transmission rate. Improving the sanitary conditions as well as good practices have been shown to decrease the prevalence of *H. pylori* in Indonesia [13]. This therefore explains the low prevalence registered in this area.

Conclusion

This data indicates the lack of information in evaluating public awareness in our communities. As such it is important to provide community based strategies such as screening, surveillance, and outreach programs so as to further reduce the prevalence of *H. pylori* infection among those at risk.

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Conflict of interest

There is no conflict of interest

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