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Dyspepsia and Associated Risk Factors at Yirga Cheffe Primary Hospital, Southern Ethiopia

Basha Ayele* **and Eshetu Molla**

Department of Medical Laboratory Science, College of Health Sciences and Medicine, Dilla University, PO Box 419, Dilla, Ethiopia

***Corresponding author**: Ayele B, Department of Medical Laboratory Science, College of Health Sciences and Medicine, Dilla University, PO Box 419, Dilla, Ethiopia, E-mail: ayelebasha@gmail.com

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Abstract

Dyspepsia is a common symptom of gastrointestinal disease with global distribution. The prevalence of this disorder varies between 3% and 40%. Dyspeptic symptoms account 10% of hospital admissions in Ethiopia. The aim of this study was to determine the contributing factors for dyspepsia at Yirga cheffe primary hospital, Southern Ethiopia.: A case control study design was conducted between July 6, 2016 and August 10, 2016 on a total of 168 patients at Yirga cheffe primary hospital, South Ethiopia. The *Helicobacter pylori* (*H. pylori*) stool antigen test was used to analyze the stool samples and a face to face interview was taken to assess other contributing factors for the infection. Ethical clearance and informed consents was obtained before data collection. Logistic regression analysis was used to estimate odds ratio (adjusted with 95% confidence interval) of positive responses to the different risk factors. Comparisons between groups were assessed with chi-square test and a P-value of <0.05 was considered statistically significant. *Helicobacter pylori* antigen was detected in 13 of the 168. *Helicobacter pylori* infection was six times more associated with dyspeptic patients than non-Dyspeptic individuals. Anxiety and depression was six and three times more likely associated with dyspepsia, respectively. Although dyspepsia was greater among male, and peaked in the age groups of 21-30 years old, the association was not statistically significant. Moreover, patients who consume foods containing peppercorn ("key wot") have high chance of developing Dyspepsia. Study subjects who depend on untapped drinking water sources, treating their drinking water, smoking habit, chewing khat, washing their hand with soap, and their toilet with flush tank were not significantly associated with dyspepsia (P>0.05). Thus, early diagnosis of *H. pylori*, psychological treatment of patients and food habit of the individuals should give attention to prevent and control Dyspepsia even though additional studies need to be conducted.

Keywords: *Helicobacter pylori*; Stool Antigen test; Dyspepsia; Risk factors; Yirga cheffe

Introduction

Dyspepsia is a common symptom of gastrointestinal disease with global distribution [1]. It can occur due to organic causes, but the majority of patients suffer from Functional Dyspepsia (FD). It is broadly defined as pain or discomfort centered in the upper abdomen with symptoms such as epigastric pain, postprandial fullness, early satiety, anorexia, belching, nausea and vomiting, upper abdominal bloating, and even heartburn and regurgitation [2,3]. Dyspepsia is a symptom complex, rather than a diagnosis. Definitions of Dyspepsia have evolved over the years, from one that includes any symptom felt to be preferable to the upper gastrointestinal (GI) tract [4] to the Rome criteria [5-8] which have deliberately attempted to exclude heartburn and regurgitation from the definition, as these are felt to be indicative of underlying gastro-oesophageal reflux disease. Dyspeptic patients who undergo upper GI investigation and have pathological findings that may be responsible for the symptoms, such as peptic ulcer, are classed as having organic Dyspepsia. Those without a detectable cause, who make up over three-quarters of individuals, are labeled as having functional Dyspepsia, while gastro-oesophageal malignancy remains rare as a cause of Dyspepsia [9].

Dyspepsia is a global concern, although most of the published data have arisen from western countries. It is assumed that Dyspepsia in populations from developing countries is mostly organic in nature, whilst functional Dyspepsia is more prevalent in western nations [10]. The prevalence of this disorder varies between 3% and 40% according to different studies [11,12]. This variation in the prevalence rates may be related to differences in the definition of Dyspepsia in those studies. Although not life-threatening, the symptoms are long-lasting [13]. Various risk factors have been found to have associated with these disorders such as *Helicobacter pylori* (*H. pylori*) infection [14,15], psychiatric disorders [14,16,17] and behavioral characteristics [18]. In addition, geographical distribution of functional Dyspepsia is different in the world [19-22]. Although people with Dyspepsia have a normal life expectancy [23,24], the impact on quality of life is substantial. There have been several studies reporting a reduced quality of life in patients with functional Dyspepsia, compared with healthy controls or the general population [25-28]. The direction of the association between reduced quality of life and Dyspepsia remains unclear, although in a 10-year follow-up of individuals from the community, one of the strongest predictors of the development of new-onset Dyspepsia was poor quality of life at baseline [29].

In many reports it has been estimated that 15% to 20% of people infected with *H. pylori* will develop ulcers. Some evidence also links *H. pylori* infection to gastric cancer, gastric mucosa-associated lymphoid tissue (MALT) lymphoma, and perhaps pancreatic cancer and cardiovascular disease [30]. As noted in a review by Barik [31] on *H. pylori* infection in developing countries, it was obvious that the health economics of managing *H. pylori* infection to prevent the occurrence of peptic ulcer and gastric cancer is highly expensive. Therefore, it is advisable knowing the magnitude and contributing factors for the

infection in a particular area to eradicate *H. pylori*, and apply prevention and control measures which are appropriate and efficient particularly in economically depressed area. This should be done based on the data that show the association between *H. pylori* infection and dyspepsia. There are studies that showed the seroprevalence of *H. pylori* in different countries. These studies found that the prevalence vary with geographic location, ethnicity, and demographic factors of the studied population [32]. Studies revealed that the prevalence increases in dyspeptic patients than non dyspeptic individuals and dyspeptic symptoms account 10% of hospital admission in Ethiopia [33]. There are studies that were conducted on the seroprevalence of *H. pylori* in adult dyspeptic patient in Ethiopia but few on stool antigen test which shows active infection. These studies didn't consider other contributing factors for disease. The prevalence of Dyspepsia varies among different ethnic groups, behaviors and with in different environmental factors, socioeconomic status (SES), *H. pylori* infection and hygiene practice, which are common factors in most developing countries. Up to 40% of persons who have functional dyspepsia consult a physician [33,34], and the condition negatively affects attendance and productivity in the workplace. Dyspepsia has substantial financial implications for patients, health care organizations, and society as a whole; costs associated with the condition in Ethiopia is high [33].

Considering the negative effect of this disorder on patients' quality of life [35-37]; understanding its prevalence in the general population in different regions of Ethiopia and other populations as well as the implementation of suitable interventions can lead to health promotion in the community. It also helps better understanding about the problem and remains a good resource for clinical researches [38-40]. There is no comprehensive investigation in Ethiopia about Dyspepsia. Considering the high prevalence of the Dyspepsia symptoms in Ethiopia through daily clinical experiences and very low information about Dyspepsia particularly in Yirga cheffe (Y/cheffe), Ethiopia, it seems that an understanding of Dyspepsia and potentially relevant risk factors can help the policy makers to establish a program for training and early diagnosis of the disease in the future.

It is important that physicians be able to recognize Dyspepsia, use investigations and diagnostic tests judiciously, and recommend effective treatments, in order to minimize the potential adverse social and economic effects of the condition. The finding be evidence to take some public health measure like testing susceptible people with dyspeptic symptoms and treating them, and for prevention and control of the disease around the studied area and may also for the country. Thus, this study attempt to identify contributing factors of Dyspepsia at Y/Cheffe health center, South Ethiopia an area where similar studies were not under taken.

Materials and Methods

Study area and period

The study was conducted at Y/Cheffe primary hospital. The hospital is one of the governmental hospitals, found in Gedeo Zone, southern nations, nationalities and people's regional state (SNNPRs). It has providing curative and rehabilitative services for about 1 million catchment populations from the beginning of its establishment 24 hours of day and 7 days of week with over all staff of 132. It has two outpatient departments (OPD's), 1 laboratory, 1 pharmacy, 1 youth and reproductive health department, laundry, duty rooms, administrative offices and other units [41]. The study was employed between July 6, 2016 and August 10, 2016.

Study design and sampling

A case-control study design was carried out among subjects attending the Yirga cheffe primary hospital at outpatient department. A total of 168 participants (84 cases and 84 controls), who came to OPD of Y/Cheffee hospital and voluntary individual for the control group were involved. The sample size was determined by using the two population proportions formula.

Data collection procedures

Data such as socio demographic characteristics, environmental conditions, personal habits and life style were collected through face to face interview by a pre-tested and structured questionnaire. Fresh stool samples were collected using in a clean, dry receptacle container from each study participant. The *H.pylori* stool antigen (HpSA) test (Premier Platinum HpSA Meridian Diagnostics, Inc., Cincinnati, OH, USA) was used to analyse the stool samples as per the manufacturer's instructions. The C-line (control) develops after adding specimen extract. Otherwise, reviewed the whole procedure and repeated test with a new device. The temperature used during storage of the kit was based on manufacture instruction.

Prespecified explanatory factors

Study participants were categorized as Dyspepsia and non-symptomatic Dyspepsia. Dyspepsia (based on hospital case definition) was defined as chronic abdominal pain or discomfort with bloating, nausea, vomiting and early satiety for >3 months. Generally, presence of at least two of the following symptoms; upper abdominal pain or discomfort, bloating, nausea, vomiting, or early satiety; 2) persistent or recurrent symptoms occurring at least three times per week during >3 months in the year or years preceding the study; 3) absence of nocturnal or postprandial symptoms of gastroesophageal reflux; 4) no previous abdominal surgery except for uncomplicated appendectomy, cholecystectomy, or hernia repair. Dyspepsia in the control group was excluded by clinical interview. All participants (cases and asymptomatic controls) were interviewed by physicians, to assess symptoms. Those individuals who were unable to communicate due to different illness were excluded from the study.

Data analysis

All data were coded and information from the laboratory analysis and questionnaires were double entered into EPiData 3.1 and exported to STATA 12 for further analysis. To determine the association between dyspepsia and the different risk factors, logistic regression analysis together with their corresponding 95% confidence interval were computed. Comparisons between groups were determined with chi-square test and a P-value of <0.05 was considered statistically significant.

Ethical considerations

The study was approved by ethical clearance committee of the college of health sciences and medicine and Research & Dissemination of Dilla University. Permissions were obtained from Gedeo Zone health and Y/Cheffe hospital administrators. Moreover, informed consent was obtained from the study participants.

Results

Demographic characteristics of the study participants

One hundred sixty eight (84 symptomatic dyspepsia and 84 asymptomatic dyspepsia) patients, who did not have a history of *H. pylori* treatment were involved in this study. Of these, 89 were men (52.98%) and 79(47.02%) were women. The median age of the subjects was 25 and standard deviation 9.98 with a range of 12 to 70 years. Majority, 106 (63.1%), of the patients were Gedeo in ethnicity. One hundred twelve (66.7%) of the patients were urban residents and 85 (33.3%) were from rural. The majority were between 21 and 30 years of age (46.4%) and a high school level (46.43%). A high number of individuals were recorded in those who had five to six family size (Figure 1 and Table 1).

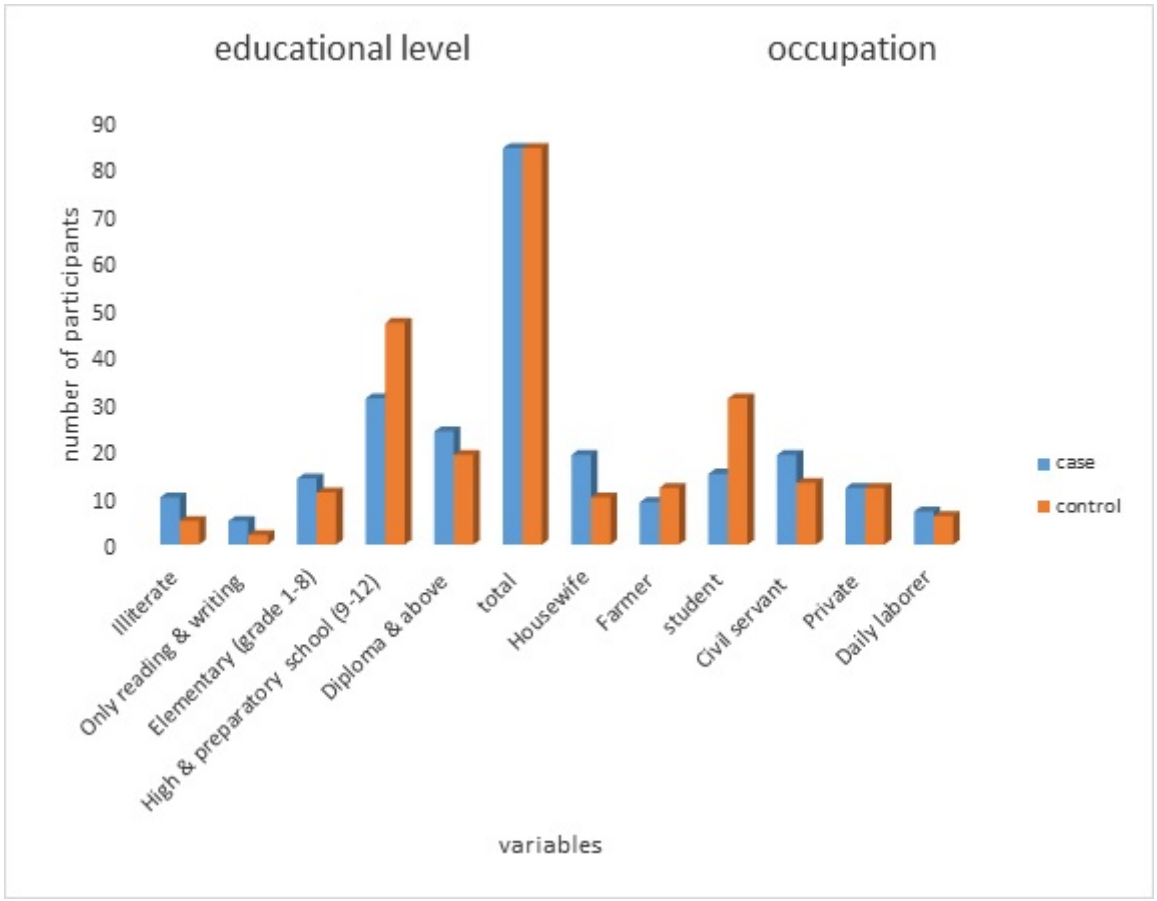

Figure 1: Frequency of educational level and occupation of the study participants.

Helicobacter pylori infection

From the total participants (184) 13 (7.7%) patients had a positive stool antigen test. The frequency of *H. pylori* infection was highest in the age group of 21 to 30 years (3.6%) and lowest in the age group above 40 years (0.6%). The highest frequency of *H. pylori* infection was noted in families with 2 members (2.29%). A high frequency of infection was also observed in those subjects who only consumed tap water and lived in urban area (92.31%).

Other risk factors associated with dyspepsia

About 25 patients' dyspepsia symptoms were associated with food containing peppercorn ("key wot") and about 15 patients were said that the cause of Dyspepsia symptoms were unknown. But slightly higher proportion of patients' symptom of Dyspepsia was recorded in any food type than the remaining food habits (Figure 2).

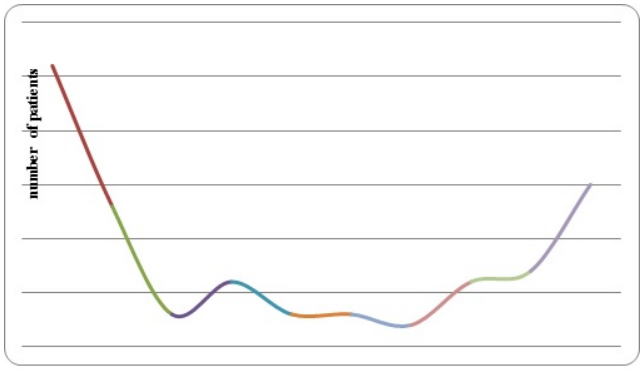

Figure 2: Frequency of cases with the cause of Dyspepsia.

High proportion of dyspeptic patients were used nothing to decrease the symptom of Dyspepsia and secondly more than 15 patients were used water followed by medication. However, less than five patients took soft drink as a treatment mechanism to get relief from the symptoms of Dyspepsia (Figure 3).

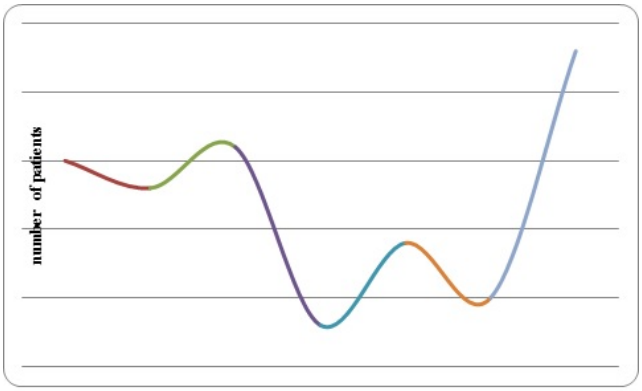

Figure 3: Study participants with their treatment mechanism to get relief from the symptoms of Dyspepsia.

Association of contributing factors with dyspepsia

Age range 31 to 40 and family dimension with 5 to 6 were shown to have a meaningful relation with Dyspepsia (P <0.05). Therefore, in these age range and family dimension, those individuals were 80% and 60% associated with Dyspepsia compared to non-Dyspepsia, respectively (Table 1); however, no relation was observed between Dyspepsia and gender, residence, level of education and other socio-demographic characteristics.

Variable		Cases (n=84) (%)	Control (n=84) (%)	AOR (95% CI)	P-value
Gender	Male	44 (52.4)	45 (53.6)	1*	
	Female	40 (47.6)	39 (46.4)	0.9 (0.5, 1.9)	0.9
Age group	Less than 21	20 (23.8)	32 (38.1)	1*	
	21-30	37 (44)	41 (48.8)	0.6(0.3, 1.5)	0.3
	31-40	17 (20.2)	6 (7.1)	0.2(0.05, 0.8)	0.02
	Above 40	10 (11.9)	5 (6)	0.3 (0.08, 1.4)	0.1
Residence	Urban	56 (66.7)	56 (66.7)	1*	
	Rural	28 (33.3)	28 (33.3)	1.2 (0.5, 2.9)	0.6
Religion	Orthodox	31 (36.9)	34 (40.5)	1*	
	Protestant	43 (51.2)	43 (51.2)	0.7 (0.3, 1.6)	0.4
	Muslim	9 (10.7)	7 (8.3)	1 (0.3, 3.6)	1
Ethnicity	Gedeo	48 (57.1)	58 (69)	1*	
	Amhara	11(13.1)	7 (8.3)	0.6 (0.2, 1.7)	0.3
	Oromo	9 (10.7)	8 (9.5)	0.7 (0.2, 2)	0.5
	Others	16 (19)	11 (13.1)	0.5 (0.2, 1.3)	0.2
Marital status	Single	28 (33.3)	42 (50)	1*	
	Married	54 (64.3)	39 (46.4)	0.8 (0.3, 1.8)	0.6

	Divorced	2 (2.4)	2 (2.4)	1.1 (0.1, 9.4)	1
Level of education	Illiterate	10 (11.9)	5 (6)	1*	
	Only reading & writing	5 (6)	2 (2.4)	1.1(0.1, 8.7)	0.9
	Elementary (grade 1-8)	14 (16.7)	11 (13.1)	1.5 (0.4, 6.4)	0.6
	High & preparatory school (9-12)	31 (36.9)	47 (56)	2.6 (0.6, 11.2)	0.2
	Diploma & above	24 (28.6)	19 (22.6)	1.2 (0.3, 5.9)	0.8
Occupation	Housewife	19 (22.6)	10 (11.9)	1*	
	Farmer	9 (10.7)	12 (14.3)	3.7 (0.9, 14.9)	0.07
	Student	15 (17.9)	31 (36.9)	2.6 (0.7, 10.3)	0.2
	Civil servant	19 (22.6)	13 (15.5)	0.9 (0.2, 4.1)	0.9
	Private	12 (14.3)	12 (14.3)	2.6 (0.6, 10.9)	0.2
	Daily laborer	7 (8.3)	6 (7.1)	1.6 (0.3, 7.7)	0.6
Family dimension	Less than 3	15 (17.9)	24 (28.6)	1*	
	3-4	21 (25)	25 (29.8)	0.6 (0.2, 1.4)	0.2
	5-6	30 (35.7)	19 (22.6)	0.4 (0.1, 0.9)	0.04
	7-9	18 (21.4)	16 (19)	0.6 (0.2, 1.8)	0.4
Family income	Less than 1000	17 (20.2)	16 (19)	1*	
	1001-2000	29 (34.5)	25 (29.8)	0.8 (0.3, 2.1)	0.7
	2001-3000	23	30 (35.7)	1.2 (0.4, 3.4)	0.7
	Above 3000	15 (17.9)	13 (15.5)	1 (0.3, 3.3)	1

1*, reference; CI, confidence interval; AOR, Adjusted odds ratio; P-value, value for significance

Table 1: Logistic regression analysis of socio-demographic factors on dyspeptic and non- Dyspeptic study participants.

Helicobacter pylori antigen was detected in 13 of the 168 participants giving an overall prevalence of 7.7%. *Helicobacter pylori* infection was 6 times more associated with Dyspeptic patients than non-Dyspeptic individuals, 84.6% (11 of 13) (OR=6.2, 95% CI: 1.3-29.8). Anxiety and depression were six and three times more likely associated with Dyspepsia. Study subjects who brush their teeth once a day and frequently eat "kocho" were 70% and 60% associated with dyspepsia compared to non-Dyspepsia, respectively. However, Dyspepsia was not significantly associated with individuals consume alcohol, coffee and tea compared to those who do not take them. Additionally, study subjects who depend on untapped drinking water sources were not significantly associated with Dyspepsia. Moreover, study participants who treating their drinking water, smoking habit, chewing khat, washing their hand with soap, and their toilet with flush tank were not significantly associated with dyspepsia (P>0.05).

Variable		**Case** (n=84) (%)	**Control** (n=84) (%)	**AOR** (95% CI)	**P-value**
Source of water	Pipe	79 (94)	77 (91.7)	1*	
	Non pipe	5 (6)	7 (8.3)	2 (0.5, 7.7)	0.3
Treat drink water	Yes	12 (14.3)	11 (13.1)	1*	
	No	72 (85.7)	73 (86.9)	0.7 (0.2, 2)	0.5
Alcohol consumption	Sometimes	34 (40.5)	31 (36.9)	1.1 (0.6, 2.4)	0.7
Coffee consumption	Always	58 (69)	52 (61.9)	1*	
	Sometimes	18 (21.4)	24 (28.6)	1.8 (0.7, 4.6)	0.2
	No	8 (9.5)	8 (9.5)	1.3 (0.4, 4.4)	0.7
Tea consumption	Always	24 (28.6)	30 (35.7)	1*	
	Sometimes	55 (65.5)	43 (51.2)	0.7 (0.3,1.7)	0.4
	No	5 (6)	11 (13.1)	2.9 (0.6, 14.4)	0.2
Smoking cigarette	Yes	9 (10.7)	4 (4.8)	1*	

	No	75 (89.3)	80 (95.2)	2 (0.5, 8.4)	0.3
Chewing khat	Always	5 (6)	5 (6)	1*	
	Sometimes	14 (16.7)	10 (11.9)	0.8 (0.1, 4.2)	0.8
	No	65 (77.4)	69 (82.1)	0.9 (0.2, 4.3)	0.9
Brushing tooth	No	34 (40.5)	51 (60.7)	1*	
	Once a day	39 (46.4)	24 (28.6)	0.3 (0.1, 0.6)	0
	Twice a day	5 (6)	6 (7.1)	0.8 (0.2, 3.8)	0.7
	Sometimes	6 (7.1)	3 (3.6)	0.3 (0.1, 1.5)	0.1
Washing hand with soap	Yes	72 (85.7)	74 (88.1)	1*	
	No	12 (14.3)	10 (11.9)	0.6 (0.2, 1.7)	0.3
Toilet	Flesh tank	24 (28.6)	18 (21.4)	1*	
	No flesh tank	60 (71.4)	66 (78.6)	1.5 (0.6, 3.5)	0.4
Type of food frequently eat	"Injera"	45 (53.6)	55 (65.5)	1*	
	"Kocho"	35 (41.7)	27 (32.1)	0.4 (0.1, 0.9)	0.04
	Meat	3 (3.6)	2 (2.4)	0.8 (0.1, 5.9)	0.8
Anxiety	Yes	52 (61.9)	16 (19)	1*	
	No	32 (38.1)	68 (81)	6.1 (1.6, 32.1)	0
Depression	Yes	33 (39.3)	40 (47.6)	1*	
	No	51 (60.7)	44 (52.4)	3.3 (0.6, 18.4)	0.03
Stool antigen test	Positive	11 (13.1)	2 (2.4)	1*	
	Negative	73 (86.9)	82 (97.6)	6.2 (1.3, 29.8)	0.02

1*, reference; CI, confidence interval; AOR, adjusted odds ratio; P-value, value for significance

Table 2: Logistic regression showing *H. pylori*, environmental sanitation and behaviors of study participants.

Discussion

This study showed that Dyspepsia was significantly associated with *H. pylori*, five to six family dimensions, anxiety and depressive. Although Dyspepsia was slightly greater among male, and peaked in the age group 21 to 30 years old, that association was not statistically significant. This was similar to the findings of another study in which the prevalence of Dyspepsia was equally distributed between the genders [42], however, this study was in contrast to other previous studies, which showed that Dyspepsia was more prevalent among females [43,44]. Our study is consistent with one study conducted by Arvind Kumar et al. [42], indicated that there was significant association between 31 to 40 year age group and Dyspepsia. On the other hand, in studies conducted in Shiraz [14] and US [45], there was no relationship between age and Dyspepsia, while other studies found the positive and reverse associations between age and functional Dyspepsia, respectively [44,46].

In the current study, we noted a significant association between Dyspepsia and psychological depression & anxiety. This was in keeping with the findings of Hu and his colleagues in China who reported that average anxiety and depression scores were higher in patients with Dyspepsia in comparison to those with non-Dyspepsia [38]. Similarly, Barzkar et al. [42] study in Tehran showed that 41.4% of patients with uninvestigated dyspepsia had a history of depression and 66.1% self-reported stress [42]. Likewise, in their study of primary care patients with organic or functional dyspepsia, Pajala and colleagues concluded that mental distress was common in these patients and recommended that mental distress should be taken into consideration when treating Dyspepsia [44].

Moreover, psychological disorders, particularly depression and anxiety have been shown to be the major risk factors for Dyspepsia in study [43], as indicated in our study. In addition, another study revealed that anxiety seemed to be related to abnormal retention of food in functional dyspeptic patients. Since psychological stresses have been shown to affect gastrointestinal motility, it seems that the emotional factors, such as depression and anxiety, have also a negative effect on gastric motility. However, there is some evidence which suggests that there is an association between psychological abnormalities and impaired gastric motor function in patients with functional Dyspepsia [47]. In the present study, families with five to six members had the highest frequency of developing dyspepsia (35.7%), while families with three members were least developed Dyspepsia (17.9%). Thus, the observed difference was significant statistically (P=0.04). The studies in Taiwan [48] and Sari [49], *H. pylori* infection was more prevalent in families with more than five members. However, their studies were said nothing about the family members with Dyspepsia.

Helicobacter pylori antigen was detected in 13 of the 168 patients giving an overall prevalence of 7.7%. *Helicobacter pylori* infection was six times more associated with Dyspeptic patients than non-Dyspeptic individuals, with 84.6% (11 of 13) (P=0.02). Similarly, a case control study [50] conducted at Noble Higher Clinic; Addis Ababa, Ethiopia using non-invasive tests (*H. pylori* stool antigen) showed that there was a significant difference between dyspeptic and non-Dyspeptic participants. Even though, many studies [32,51-53] conducted to investigate the association between Dyspepsia and *H. pylori* on rapid antibody, almost all found that *H. pylori* infection was significantly associated with Dyspepsia.

As observed in our finding, the behavioral risk factors such as smoking, alcohol use and coffee consumption had no relationship with Dyspepsia [54,55]. That was in contrast to one finding which indicated a harmful effect of smoking [56]. In this study coffee or tea intake has not been shown to be related to the presence of Dyspepsia similarly studied in rural Asia [57]. In addition, some western studies have

reported that excessive coffee or tea intake has not been shown to be related to the presence of Dyspepsia [58,59].

This study showed that study subjects who brush their teeth once a day and frequently eating "kocho" have a high chance of getting Dyspepsia. Moreover, high Dyspeptic patients were associated with food containing peppercorn ("key wot") and about 17.9% patients were said that the cause of Dyspepsia symptoms were unknown. But slightly higher proportion of patients' symptom of Dyspepsia was recorded in any food type. High proportion of Dyspeptic patients were used nothing to decrease the symptom of Dyspepsia and secondly more than 17.9% were used water followed by medication. However, less than five patients took soft drink as a treatment mechanism to get relief from the symptoms of Dyspepsia.

Conclusions and Recommendation

In this study some risk factors have been identified and underlying psychological disturbances and *H. pylori* infection have been shown to be important factors in Dyspepsia. Age range 31 to 40 and family dimension with five to six were shown to have a meaningful relation with Dyspepsia but gender and ethnicity do not appear to be predictive of Dyspepsia. Study subjects who brush their teeth once a day and frequently eat "kocho" (false banana) were 70% and 60% associated with dyspepsia compared to non Dyspepsia, respectively. However, Dyspepsia was not significantly associated with individuals whom consume alcohol, coffee and tea. This study was not showed severity of the disease. Psychological factors were based on the patients' self reported stress and depression. Information about food consumption was based on only frequency of usage without detection of units and calories of dietary regimens due to shortage of budget. More precise studies collecting detailed information the above mentioned criteria and area of residence could lead to better estimation of the effect of such risk factors.

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