Dyspepsia in Homeless Adults

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Goals: To determine the prevalence of and risk factors for dyspepsia in a representative sample of homeless persons using shelters in Toronto, Canada.

Background: Homeless people have many risk factors for dyspepsia, but little information is available on gastrointestinal symptoms in this population.

Study: Cross-sectional survey of a representative sample of 100 homeless adults, with serologic testing for *Helicobacter pylori* infection.

Results: The prevalence of moderate, severe, or very severe symptoms within the past 3 months was 18% for upper stomach pain and 59% for any dyspeptic symptom. Nonwhite ethnicity (odds ratio, 3.5; 95% confidence interval, 1.1–10.9) and a history of gastrointestinal disease (odds ratio, 8.6; 95% confidence interval, 2.5–29.6) were significantly associated with moderate to very severe upper stomach pain. *H. pylori* infection was identified in 31% of participants but was not significantly associated with dyspepsia.

Conclusions: Dyspepsia is a common problem among homeless adults in Toronto. The presence of upper stomach pain is most strongly associated with a history of gastrointestinal disease.

Key Words: homeless persons, dyspepsia, peptic ulcer disease, *Helicobacter pylori*

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Homelessness is a widespread problem in North America. Previous studies have estimated that 800,000 Americans are homeless in any given week and about 3.5 million individuals experience homelessness over the course of a year.[1] Homeless adults suffer from high levels of illness and disease, which are further exacerbated by poverty, lack of stable housing, and barriers to obtaining health care.[2] Research on health problems among homeless people has focused primarily on mental illness, substance use, and infectious diseases such as tuberculosis, human immunodeficiency virus (HIV) infection, and viral hepatitis.[2] To our knowledge, no published studies have focused on gastrointestinal problems (other than viral hepatitis) among homeless people.

The term *dyspepsia* refers to a group of symptoms related to epigastric pain such as acid regurgitation, excessive burping/belching, and increased abdominal bloating.[3] Individuals presenting with these symptoms are initially designated as having "uninvestigated dyspepsia." After assessment and appropriate investigations, the underlying diseases most commonly identified are gastric ulcers, duodenal ulcers, and reflux esophagitis.[4] However, no definite cause is found in as many as 60% of investigated patients, who are then categorized as having "functional dyspepsia."[4]

The prevalence of dyspepsia has not been previously defined among homeless persons, although many risk factors for conditions that may cause dyspepsia are common in the homeless population. For example, smoking, which is a risk factor for both peptic ulcer disease and reflux esophagitis, is significantly more prevalent among homeless persons than in the general population.[5–9] Homeless people are exposed to a number of factors that increase the risk of *H. pylori* infection, including low socioeconomic status,[10,11] crowded living conditions,[12,13] and poor sanitation and hygiene.[12,13] *H. pylori* infection often occurs at a young age, and low socioeconomic status during childhood increases the risk of infection[13]; not surprisingly, homeless adults frequently come from a background of childhood poverty.[1] Homeless people face a variety of barriers to obtaining healthcare, which may increase the risk of poor health outcomes.[14] In addition, standard approaches for the diagnosis and treatment of dyspepsia may be difficult to apply to homeless patients.[14]

The primary goal of the present study was to determine the prevalence of dyspepsia in a representative sample of homeless people using shelters in Toronto, Canada. Secondary goals were to identify factors associated with the presence of upper stomach pain and to determine the prevalence of *H. pylori* infection in this population.

MATERIALS AND METHODS

Sample Selection

We approached a random sample of individuals residing at homeless shelters for single adults in Toronto,

Canada, in January and February 2000. Participants were recruited at 21 shelters, out of a total of 25 shelters for single adults with a total capacity of 2,018 beds. Three shelters declined to participate and one small shelter was excluded from sampling. Enrollment at each shelter was proportionate to the shelter's bed capacity. Individuals in dining areas or sleeping quarters were selected according to a table of random numbers and were approached to ask if they would participate in the study. Of 134 individuals approached, 100 consented to participate, for an overall response rate of 75%. Participants gave written informed consent and received a $5 cash payment. The St. Michael's Hospital Research Ethics Board approved this study.

Survey Interview

Participants underwent a face-to-face interview that obtained information on demographic characteristics and history of gastrointestinal conditions associated with dyspepsia, including gastric ulcer, duodenal ulcer, gastritis, esophagitis, reflux, gastric cancer, and upper gastrointestinal bleeding. Potential risk factors for these conditions were assessed, including age, alcohol use in the past 3 months, current use of aspirin or nonsteroidal anti-inflammatory drugs (NSAID), smoking status, and duration of the current episode of homelessness. Country of birth and ethnicity were recorded because of their association with H. pylori infection.[15-17]

Gastrointestinal symptoms in the prior 3 months were assessed with a previously validated instrument that uses a Likert Scale ranging from 1 to 5 to evaluate each of eight different symptoms: upper stomach pain, burping/belching, heartburn, bloating, passing gas, sour taste, nausea, and bad breath.[18] The dyspepsia symptom score for this instrument varies from 8 (asymptomatic for all symptoms) to a maximum of 40 (very severe level of all symptoms). We dichotomized the dyspepsia symptom score as ≤ 20 or > 20 on the basis of previous data indicating a mean symptom score of 20.3 for untreated patients with H. pylori–associated gastritis.[19] Significant upper stomach pain was defined as moderate, severe, or very severe upper stomach pain during the past 3 months (Likert Scale score, ≥ 3), as determined with the above instrument. Of the eight symptoms assessed by the dyspepsia score, upper stomach pain was selected because it is the symptom most likely to elicit concern among clinicians in routine practice.

Serologic Testing for Helicobacter pylori

Serum specimens were collected from subjects and tested for IgG against H. pylori by the Ontario Public Health Laboratory with use of the Hp-G Screen (Genesis Diagnostics, Cambridgeshire, UK). Results were reported as positive, negative, or indeterminate. This assay has a sensitivity of 98% for individuals with biopsy-proven H. pylori and a specificity of 91% for individuals negative for H. pylori by western blotting (Neal den Hollander, personal communication).

Sample Size Calculation and Statistical Analyses

A sample size of 100 subjects was chosen to provide an estimate of the prevalence of dichotomous outcomes (eg, H. pylori seropositivity) with a 95% confidence interval no wider than $\pm 10\%$. Logistic regression was used to determine risk factors for the following dichotomous outcome variables: moderate or worse severe epigastric pain, a dyspepsia symptom score > 20, and H. pylori seropositivity. Risk factors found to be significant in univariate analyses were entered into a multivariate model. Variables were retained in the multivariate model if they remained significant predictors at the $P < 0.05$ level.

RESULTS

The demographic and clinical characteristics of the 100 shelter residents enrolled in the study are shown in Table 1. A dyspepsia symptom score > 20 was observed for 17% of subjects (95% confidence interval [CI], 11%–26%). Overall, 59% of subjects (95% CI, 49%–68%) had at least one dyspeptic symptom that was rated moderate, severe, or very severe. Moderate, severe, or very severe upper stomach pain was reported by 18 subjects (18%; 95% CI, 12%–27%). Three of these individuals were taking H2-blockers, none were taking proton-pump inhibitors, six were taking only aluminum-, calcium-, or magnesium-based antacids, and nine were taking no antacid therapy. Among the 38 subjects with a self-reported history of gastric ulcer, duodenal ulcer, gastritis, esophagitis, reflux, or bleeding from the stomach or bowels, 37% had experienced moderate, severe, or very severe upper stomach pain in the last 3 months.

In univariate analyses, nonwhite ethnicity and a history of pertinent gastrointestinal conditions (as specified above) were significantly associated with the presence of moderate to very severe upper stomach pain (Table 2). Both of these factors remained significant in a multivariate model. Similar results were obtained in a model predicting the presence of any upper stomach pain, including mild pain. In a separate analysis, a dyspepsia symptom score > 20 was used as the primary outcome. Again, nonwhite ethnicity and a history of pertinent gastrointestinal conditions were significant predictors in univariate analyses, but only a history of pertinent gastrointestinal conditions remained significant in the multivariate model.

Results of serologic testing for H. pylori infection were indeterminate in nine participants. Of the 91 remaining individuals, 28 (31%; 95% CI, 22%–41%) were infected with H. pylori according to serology. In univariate analysis, only older age (> 50 years) was significantly associated with positive serology for H. pylori infection (Table 3). There was no significant association between H. pylori serology status and the presence of upper stomach pain or a self-reported history of gastric or duodenal ulcers. Among persons with a dyspepsia symptom score < 20, there was a nonsignificant trend toward higher rates of H. pylori infection.

TABLE 1. Demographic and Clinic Characteristics of Homeless Persons (n = 100)

Characteristic	Number*
Age, years	
19–34	33
35–49	49
50–69	18
Sex	
Male	79
Female	21
Place of birth	
Canada or United States	77
Other country	22
Unknown	1
Race/ethnicity	
White	63
Black	8
Aboriginal/Native Indian	8
Other	21
Duration of current episode of homelessness, years	
≤1	59
>1 to ≤2	11
>2 to ≤5	19
>5	10
Unknown	1
Current use of aspirin or NSAID	28
Current smoker	87
Alcohol use (last 3 months)	
4 to 7 times per week	13
2 to 3 times per week	15
1 time per week	15
1 to 3 times per month	12
<1 time per month	17
None	28
Dyspepsia symptom score	
Mean ± SD	15.0 ± 6.4
8 to 15	67
16 to 20	16
21 to 30	14
31 to 40	3
Upper stomach pain in last 3 months	
None	67
Mild	15
Moderate	9
Severe	5
Very Severe	4
History of gastrointestinal conditions	
Gastric ulcer	23
Duodenal ulcer	9
Surgery for ulcers (stomach, duodenum)	7
Any history of peptic ulcer disease	26
Gastritis	12
Esophagitis	2
Reflux	13
Gastric cancer	0
Bleeding from the stomach or bowels	19

NSAID, nonsteroidal anti-inflammatory drug.
*n = 100; thus, the number and percent are identical.

DISCUSSION

In this study, 18% of a representative sample of shelter users in Toronto reported moderate, severe, or very severe upper abdominal pain within the past 3 months. In addition, 59% reported at least one dyspeptic symptom that was moderate, severe, or very severe. In comparison, a study of 1,036 adults in the Canadian general population using a similar instrument to assess dyspepsia found that only 29% (95% CI, 26%–31%) reported experiencing moderate, severe, or very severe symptoms in the last 3 months.[20] These findings suggest that dyspepsia is much more common among homeless people than in the general population. Our findings are consistent with previous studies reporting symptom prevalence in homeless populations: a survey of 72 shelter residents in Detroit showed that 54% had at least one gastrointestinal problem (bowel disorders, nausea or vomiting, abdominal pain, liver disorder, or ulcers) within the last year,[21] and a survey of 310 homeless and marginally housed people in San Francisco showed that 17% reported frequent stomach pain.[22]

Nonwhite race was significantly associated with moderate to severe upper stomach pain in our sample of homeless adults. The explanation for this association is unclear, and our data do not suggest that this association was mediated by *H. pylori* infection.[15] Cigarette smoking and frequent use of alcohol were common among our subjects, but it is interesting that these factors were not significantly associated with the presence of upper abdominal pain or dyspeptic symptoms in general. In comparison, a study of 1,036 Canadian adults revealed that smoking at least six cigarettes per day, but not alcohol consumption, was associated with an increased risk of chronic upper gastrointestinal symptoms of at least moderate severity.[20]

It is plausible that homelessness might be associated with an increased risk of *H. pylori* infection, because known risk factors for infection include childhood poverty, low socioeconomic status, crowded living conditions, and poor sanitation.[10–13] However, the prevalence of *H. pylori* infection among shelter users in this study (31%; 95% CI, 22%–41%) was similar to levels reported for healthy young adults in the United States (26%–27%) and in the general population of Canada (35%–38%).[23–26] Because our study included only persons who were using homeless shelters, it is unknown whether this finding is generalizable to homeless people living on the street or in outdoor encampments.

Management of Dyspepsia in Homeless Patients

Our findings suggest that clinicians seeing homeless patients should routinely ask whether they have symptoms of dyspepsia, and if so, provide appropriate care. However, current guidelines for the management of dyspepsia may be difficult to implement for homeless patients. These guidelines recommend prompt investigation of new-onset dyspepsia in patients > 50 years old or patients with associated alarm features (persistent vomiting, gastrointestinal bleeding or anemia, presence of abdominal mass, unexplained weight loss, dysphagia).[3] Although endoscopic investigation is preferred, this may be difficult to achieve for homeless patients, because more than half of all homeless people in the United States lack health insurance.[1] In addition, the unstable and transient nature of homeless people's lives can make it difficult for

TABLE 2. Odds Ratio Estimates of Potential Risk Factors for Upper Stomach Pain* (n = 100)

Risk Factor	Unadjusted Odds Ratio (95% CL)	Adjusted Odds Ratio (95% CL)
Age > 50 years	0.7 (0.1, 3.2)	—
Male sex	1.4 (0.4, 5.4)	—
Born outside Canada or United States	0.7 (0.2, 2.5)	—
Nonwhite ethnicity	3.4 (1.2, 9.7)	3.5 (1.1, 10.9)
Current episode of homelessness > 12 months	1.0 (0.3, 2.7)	—
NSAID or aspirin use	1.4 (0.5, 4.1)	—
Smoker	2.9 (0.4, 24.0)	—
Alcohol use > 3 times per week	0.8 (0.2, 4.0)	—
History of pertinent gastrointestinal conditions**	8.5 (2.5, 28.3)	8.6 (2.5, 29.6)
H. pylori seropositivity	0.6 (0.2, 2.0)	—

CL, confidence limits; NSAID, nonsteroidal anti-inflammatory drug.

*Defined as moderate, severe, or very severe upper stomach pain during the past 3 months.

**Any history of gastric ulcer, duodenal ulcer, gastritis, esophagitis, reflux, or bleeding from the stomach or bowels.

them to keep appointments for procedures.[14] The post-procedure recovery process can be complicated by the lack of a suitable living environment.[14]

For patients younger than 50 years and with no alarm features, guidelines suggest medical therapy with a proton-pump inhibitor or H2-receptor antagonist if the dominant symptom is heartburn and/or regurgitation or if the patient has a negative test for *H. pylori* infection.[3] In homeless patients, the feasibility of urea breath testing for *H. pylori* infection may be limited by the need to arrange a separate visit to a healthcare facility equipped to conduct this test. Serologic testing can be performed more easily, although lack of health insurance may still be an issue. When healthcare providers prescribe medications to homeless patients, they should be aware of their potential

TABLE 3. Odds Ratio Estimates of Potential Risk Factors for *H. pylori* Seropositivity (n = 91)*

Current Risk Factor	Unadjusted Odds Ratio (95% CL)
Age > 50 years	4.6 (1.4, 15.8)
Male sex	1.9 (0.6, 6.3)
Born outside Canada or United States	1.8 (0.7, 4.9)
Nonwhite ethnicity	0.4 (0.2, 1.2)
Current episode of homelessness > 12 months	0.8 (0.3, 2.1)
NSAID or aspirin use	0.8 (0.3, 2.1)
Smoker	1.4 (0.3, 5.6)
Alcohol use > 3 times per week	1.3 (0.4, 5.0)
Dyspepsia symptom score > 20	0.2 (0.1, 1.2)
Presence of upper stomach pain**	0.6 (0.2, 2.0)
History of gastric or duodenal ulcer	1.1 (0.4, 2.9)

CL, confidence limits; NSAID, nonsteroidal anti-inflammatory drug.

*Serologic testing for *H. pylori* infection was indeterminate for nine subjects.

**Defined as moderate, severe, or very severe upper stomach pain during the past 3 months.

need for access to reduced-cost medications or free samples.[14,27] To facilitate adherence, medication regimens should be as simple as possible, with once-daily dosing preferred.[14]

Study Limitations

Certain factors may limit the interpretation and generalizability of our results. This study did not enroll homeless persons living outside of shelters because of the difficulty of obtaining a representative sample of the street-dwelling population. The use of serologic testing for *H. pylori* infection was dictated by practical considerations related to the recruitment of participants in the shelter setting; however, this method may have overestimated the prevalence of infection owing to persistence of IgG antibodies in individuals from whom the organism had previously been eradicated.[28–30]

This study's relatively small sample size limited its power to detect associations between various individual characteristics and the prevalence of dyspepsia and *H. pylori* infection. In addition, this study was conducted in a single city, and the generalizability of our findings to other localities is unknown. However, the characteristics of homeless adults in Toronto have been found to be similar to those of homeless populations in other urban areas in North America.[31]

CONCLUSIONS

This study, the first to assess dyspeptic symptoms in a representative sample of homeless persons by means of a previously validated instrument, indicates that dyspepsia is more common among homeless shelter users than in the general population. Although clinical guidelines for the management of dyspepsia are available, unique challenges are encountered when attempting to manage dyspeptic symptoms in homeless persons. The diagnosis and management of gastrointestinal problems in this vulnerable population should be coordinated with multidisciplinary primary healthcare teams that are experienced in providing care for this population.[14]

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