RESEARCH COMMUNICATION

Status of *Helicobacter pylori* Infection among Migrant Workers in Shijiazhuang, China

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Abstract

Background: *Helicobacter pylori i*nfection leads to many upper gastrointestinal diseases. Migrant workers are the main part of floating population in China. However, up to now, their health status has not been a focus of attention. Methods: In order to assess the status of *H. pylori* infection among migrant workers in Shijiazhuang, over five years we interviewed 324 individuals between 2007 and 2011. Each underwent a rapid urease test to identify *H. pylori* infection and socio-demographic indicators were collected using a survey questionnaire. Results: Our results showed that family income (P = 0.003), dietetic hygiene (P = 0.005), education (P = 0.004) and marital status (P = 0.007) were associated with *H. pylori* infection. Conclusion: We found that migrant workers had little basic knowledge of *H. pylori* and their prevalence of infection remains high. Therefore, we need to promote education and awareness of *H. pylori* and to ensure access to diagnosis and treatment for infected workers.

Keywords: *Helicobacter pylori* - migrant workers - fast urease test - Shijiazhuang - socio-demographic characteristics

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Introduction

Helicobacter pylori is an important etiologic agent of gastritis, peptic ulcers, and gastric cancer (Blaser et al., 1997; Ernst and Gold, 2000). In 1994, the International Agency for Research on Cancer categorized H. pylori infection as a group I carcinogen (IARC, 1994). H. pylori has an extremely high infection rate and in developing countries reaching 50% to 90% (Fox, 2002; Jafri et al., 2010). H. pylori is disseminated by mouth mouth, excrement mouth and intimate contact, therefore, prevention is difficult. H. pylori strains are likely a result of intra-familial transmission combined with recycling within local communities (Schwarz et al., 2008). Moreover, various techniques are utilized for identify Helicobacter species, such as immunohistochemistry staining (IHC), fast urease test (FUT) and enzyme-linked immunosorbent assay (ELISA) (Lee et al., 2010; Boonyanugomol et al., 2011). In our studies, we used fast urease test (FUT) to detect the patients infected with H. pylori for its unusual rapidity and high accuracy. The Chinese government relaxed the migration restrictions led to an unprecedented growth of economically driven rural-to-urban migration in China (Ping and Pieke, 2003). Greater disparity between rural and urban economies is another important cause to the migration (Zhang, 2004). Not only destination cities were directly influenced by this massive peasant migration but also the migrants themselves underwent many troubles. For example, medical resources are difficult to

distribute to the migrants (Xiang, 2007). According to the statistical data of Shijiazhuang trade unions, Shijiazhuang now has 300,000 migrant workers. They are the main part of floating population in Shijiazhuang. To measure H. pylori infection status of migrant workers in Shijiazhuang, would be critical for providing early detection, early diagnosis and early treatment to migrant workers not merely an academic research. It could play a significant role in decreasing the economic burden on patients and country.

Materials and Methods

Mission and Guiding Principles

The objectives of our studies are (1) to make public and health care provider are aware of the significance of H. pylori infection among migrant workers in Shijiazhuang; (2) to make H. pylori testing to migrant workers as a standard of care in the primary medical community; and (3) to ensure access to treatment for H. pylori infected migrant workers.

Materials

HelicotecUT Gel Rapid Urease Test kits were purchased from STRONG BIOTECH CORP (Taiwan, China). HelicotecUT is designed to detect urease activity of Helicobacter Pylori via color change on test gel. If the color of gel remains yellow, it is a negative result. If the color changes to magenta or red, it is a positive result.

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Table 1. Basic Questions of *Helicobacter pylori* Infection

Variable and Response
1. Have you heard *Helicobacter pylori*? Positive: Yes: 22%, No: 78%. Negative: Yes: 35%, No: 65%.
2. In your opinion, which way *Helicobacter pylori* can be transmitted by? Positive: Eating unclean food: 27%, sharing utensils/chopsticks: 26%, bodily fluids from an infected person: 13%, don't know: 34%. Negative: Eating unclean food: 42%, sharing utensils/chopsticks: 35%, bodily fluids from an infected person: 12%, don't know: 11%.
3. Do you think you could be infected with *Helicobacter pylori*? Positive: Yes: 14%, No: 86%. Negative: Yes: 11%, No: 89%.
4. Do you have any uncomfortable feelings in you stomach? Positive: stomach ache: 54%, acid reflux: 35%, stomach swell: 46%, belching: 72%, nausea and vomiting: 36%, asymptomatic infection: 21%. Negative: stomach ache: 10%, acid reflux: 7%, stomach swell: 6%, belching: 8%, nausea and vomiting: 3%, no symptoms: 77%.
5. Have you ever taken *Helicobacter pylori* testing? Positive: Yes: 2%, No: 98%. Negative: Yes: 5%, No: 95%.
6. Do you have any treatment of *Helicobacter pylori* Positive: Yes: 1%, No: 99%. Negative: Yes: 2%, No: 98%.
7. Do you family has the same symptoms as you? (only to HP+ migrant workers) Positive: Yes: 37%, No: 63%.
8. Life satisfaction Positive: Dissatisfied: 51%, Just OK: 22%, Satisfied: 27%. Negative: Dissatisfied: 21%, Just OK: 35%, Satisfied: 44%.
9. Job satisfaction Positive: Dissatisfied: 60%, Just OK: 18%, Satisfied: 22%.

Methodology

The study was carried out in Shijiazhuang city, the capital of Hebei province located in the north of China. The local labor bureau helped us to communicate with the managers who were willing to cooperate with this study. Between 2007 and 2011, a total of 324 migrant workers underwent rapid urease test. At the start of the interview, works were given written or verbal information regarding the study. According to the methods of Crabtree and Miller, we carried a long interview in order to gather in-depth information from each works (Crabtree and Miller, 1991). The 324 migrant workers aged 23 to 54 years have different job and salary. This study used information from six socio-demographic items (e.g. age, sex, marital statu, occupation, education level, family income).

A survey questionnaire was designed to obtain their basic knowledge of *H. pylori*. In order to minimize potential respondent bias, migrant workers were asked to complete the self-administered questionnaire and deposit the completed questionnaire in a sealed envelope. The questionnaire is shown in Table 1.

Data analysis

The χ^2 test was used to assess the relationship between the different categorical variables. All statistical analyses were conducted using SPSS 11.0 (SPSS Inc., American). In all cases P-values <0.05 were considered to statistically significant.

Table 1. Survey Questionnaire of Basic Characteristics

Socio-demographic variable	Respondent characteristics	HP (+)	χ^2 value	P value
Sex			1.13	0.112
Female	138	52		
Male	186	81		
Age(years)			2.29	0.258
<40	211	93		
≥40	113	40		
Marital status			22.04	0.007
Married	224	75		
Single or never married	69	45		
Divorced or separated	31	13		
Education			19.29	0.004
Elementary school	44	22		
Junior high school	137	45		
Senior high school	89	31		
Vocational school	54	35		
Occupation			7.58	0.078
Manageria	13	1		
Sales	77	31		
Service	82	36		
Repair	66	22		
Laborers	86	33		
Family income (¥)			36.78	0.003
1000 or less	87	39		
1000-2000	149	81		
2000-3000	68	11		
3000 or more	20	2		
Dietetic hygiene*			23.49	0.005
A (excellent)	17	1		
B (good)	46	13		
C (fair)	208	85		
D (poor)	53	34		

*according to the catering health standard made by Shijiazhuang City's Health Department; Abbreviations: χ^2 value chi-squared distribution

Results

Socio-demographic characteristics of the 324 migrant workers

From the 350 participants sampled, 324 participants met the criteria for this study. Twenty-six participants were excluded because of missing data or illogical answers. An overview of their socio-demographic characteristics is given in Table 2. The mean age for 324 migrant works was 37.8 years. One hundred and thirty-three migrant works infected with H. pylori. No significant difference was found between men and women (P=0.112). And there was no significant difference in age (P=0.258). However, the results showed that the migrant works with higher family income got lower risk of H. pylori (P=0.003). We also found that dietetic hygiene (P=0.005) and education (P = 0.004) were two significant factors associated with H. pylori infection. But very interesting, another factor, marital status showed significantly associated with H. pylori infection (P = 0.007).

The knowledge level and associated factors

In Table 1, nine questions about basic knowledge of H. pylori were included in the questionnaire. We listed the key topics addressed in our studies. Three main purposes stand out: (1) awareness of H. pylori infection; (2) symptoms of

the migrant works infected with H. pylori; (3) the status of their family members.

About one-fifth of HP+ migrant workers reported that they had heard of H. pylori, however, only 2% of them reported that they have H. pylori testing. A little more HP- migrant workers than HP+ ones had heard of H. pylori. 5% of HP- migrant workers reported that they have H. pylori testing. Whether HP- or HP+ migrant workers, only a small number had taken H. pylori testing. There appears a correct understanding of how H. pylori transmitted among most migrant workers. Only 11% of HP- migrant workers reported they don't know. But HP+ migrant workers (34%) had a higher percentage. Sizable proportions of respondents reported that they had uncomfortable feelings in stomach. 21% of HP+ migrant workers were asymptomatic infection. The questionnaire showed us a bad indicator that 37% of respondents reported their family members had the same symptoms. Other two questions seems no related with H. pylori were included in the questionnaire. The reason why we added the two questions will clarify in discussion. 51% of HP+ migrant workers were dissatisfied with their present life. 60% of HP+ migrant workers were dissatisfied with their present job. The percentages of the two indexes in HP- migrant workers were significant lower than HP+ migrant workers.

Discussion

Helicobacter pylori infection is very common in China with prevalence rates up to 70% (Cheng et al., 2009). Helicobacter pylori has been associated with chronic gastritis, gastric and duodenal ulcers and gastric cancer (Blaser et al., 1997; Ernst and Gold, 2000). Asian-Pacific guidelines on gastric cancer prevention recommend screening for and eradicating H. pylori in high-risk populations (Fock et al., 2009). Since 2003, numerous studies have also been conducted to examine the prevalence of H. pylori in healthy people in different regions of China, with reported prevalence ranging from 40% to 81% (Shi et al., 2008). In our studies, we found 41.5% of migrant workers were infected with H. pylori. It indicated that the infection rate of migrant workers of Shijiazhuang was lower compared with most other areas of China. H. pylori infection was generally thought to be related to socioeconomic status, but the results from different groups have been contradictory. Koch et al. (2005) showed that age of the examined participants was associated with H. pylori seropositivity. Huang et al. (2004) found no differences in age, sex, and socioeconomic/domestic variables between antigen-positive and antigen-negative subjects among the Penan. Our results showed that age of migrant workers didn't associate with H. pylori infection. Different ethnic groups may induce the difference between our results and Koch's. Consistent with Huang, we also found sex and age were not associated with H. pylori infection. H. pylori infection could also be related to food and eating habits (Miyazaki et al., 2000). Kurzeja et al. (2004) found that the H. pylori infections are significantly affected by sanitary conditions. We also identified that poor sanitary conditions may lead

more migrant workers to infection. Previous studies revealed that family income was an important risk factor of H. pylori infection (Aguemon et al., 2005). Our results also showed that the infection rate increased significantly when family income was less than RMB 2000. But very interesting, we found that single person has a higher infection rate compared with married one.

In our questionnaire, we found that many migrant workers had little knowledge of H. pylori. However, only one significant difference between HP- and HP+ migrant workers. More HP- migrant workers were satisfied with job and life than HP+ ones. We predicted that mental state might have important effects on H. pylori infection. We will identify our hypothesis in future studies.

To promote routine H. pylori testing of all migrant workers into standard health care, education of health care providers is essential. We kept contact with Shijiazhuang City's Health Department to obtain health information of migrant workers. Simultaneously, our volunteers published 100 billboards and sent out more than 5000 leaflets. E-mail messages reached an estimated 10,000 readers. We hope these methods can promote education and awareness of H. pylori.

Taken together, the prevalence of H. pylori infection was related to education status, annual family income, symptoms (e.g. vomiting, belching, and nausea), marital status and health habits but was not related to sex or age. The relationship between H. pylori infection and mental state is still to be investigated.

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