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Alimentary Tract

Work productivity and activity impairment in gastroesophageal reflux disease in Korean full-time employees: A multicentre study

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ABSTRACT

Introduction: The costs of gastroesophageal reflux disease have not been assessed in Asia, even though the prevalence of gastroesophageal reflux disease is gradually increasing. We evaluated work presenteeism and absenteeism as indirect costs of gastroesophageal reflux disease in Korea.
Methods: This was a cross-sectional and multicentre study using patient-reported outcome instruments. A total of 1009 full-time employees who visited the gastrointestinal department for any reason (281 patients with gastroesophageal reflux disease and 728 controls) were included. Main outcomes were presenteeism and absenteeism measured as work productivity loss and monetary cost per week.
Results: Absenteeism and presenteeism were significantly higher in the gastroesophageal reflux disease than the control group (1.49% vs. 0.46%, $P = 0.0010$; 34.13% vs. 9.23%, $P < 0.0001$). Loss of work productivity was significantly greater in the gastroesophageal reflux disease than the control group (33.09% vs. 9.02%; $P < 0.0001$). This loss of work productivity difference between the two groups represented an additional productivity loss of 11.7 h/week in the gastroesophageal reflux disease group compared with the control group. Assuming average hourly wages of $14.12, the weekly burden of gastroesophageal reflux disease reached $165.07 per person.
Conclusions: Gastroesophageal reflux disease was associated with substantial work productivity loss, mainly due to presenteeism rather than absenteeism, in Korean full-time employees.

1. Introduction

Gastroesophageal reflux disease (GERD) is a chronic and costly disease that impairs health-related quality of life (HR-QOL) considerably. A previous study has shown that GERD symptoms adversely affect HR-QOL in the same way as other chronic diseases, such as back pain and headaches [1]. According to the Montreal definition of GERD, when gastroesophageal reflux symptoms interfere with an individual's well-being GERD can be diagnosed without endoscopic examination [2]. A systematic review reported that approximately 20% of the general population of the United States experienced at least weekly heartburn and/or regurgitation over the past year [3]. The United States' direct costs of GERD, including health care and pharmaceutical treatment, were approximately $12 billion in 2004 [4]. The indirect costs of GERD, including reduced work productivity (known as presenteeism) and work loss (known as absenteeism), are higher than the direct costs. In fact, a 10% loss of work productivity due to GERD can reach a total GERD-related loss of $75 billion per year, based on average wages in the United States in 2005 [5].

In contrast to Western countries, the prevalence of GERD in Asia ranges from 3 to 9%, although it is gradually increasing [6–8]. The prevalence of typical GERD symptoms, such as heartburn and regurgitation, was 5% in a nationwide Korean study conducted in 2006 [9], which was higher than that in a Korean local area survey

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conducted in 2000–2001 [10]. Accordingly, we hypothesized that the work productivity loss due to GERD in Korea could be as high as in Western countries. In addition, to the best of our knowledge, no study has evaluated the indirect costs of GERD as related to work productivity loss in Asian countries. Furthermore, there is no Korean version of the Work Productivity and Activity Impairment (WPAI)-GERD questionnaire, frequently used patient-reported outcome (PRO) instrument for evaluating HR-QOL in specific diseases, which has been translated into various languages [11,12]. Therefore, we conducted this multicentre study evaluating the indirect costs of GERD in Korea, and assessed the validity of the Korean version of the WPAI-GERD.

2. Patients and methods

2.1. Study design

This study was a cross-sectional study using PRO instruments. The Scientific Committee of the Korean College of *Helicobacter* and Upper Gastrointestinal Research and the Medical Research Collaborating Center in Seoul National University designed this study. This was conducted in three steps. First, the translation of the WPAI-GERD (English-US, Version 2.0) into Korean was carried out. Second, a pilot study (control = 41, GERD = 14) was carried out at Kangdong Sacred Heart Hospital of Hallym University Medical Center to construct and confirm our study protocol. Third, the study subjects were recruited from seven university hospitals in three cities (Seoul, Pusan, and Jeju) between March 2009 and March 2010. Written informed consent was obtained from enrolled subjects, and the Institutional Review Board of each hospital approved the study protocol.

2.2. Study subjects

The calculated target number of subjects was 281 for the GERD group. The target sample number was calculated using the results of our pilot study (absenteeism of 0.5% in control and 4% in GERD, unpublished data), a statistical test power of 80%, and a 2-sided test. Amongst the subjects who visited the gastrointestinal department, all eligible subjects were included in the subsequent analyses after interview of gastroenterologists. The inclusion criteria were at least 20 years of age, employed full time, and earned weekly wages of at least $123.81 (150,800 KRW). The exclusion criteria were as follows: (1) patients who have alarming symptoms and signs, including weight loss, anaemia, melena, and repeated vomiting, (2) asthma or chronic obstructive pulmonary disease, (3) chronic hepatitis or liver cirrhosis, (4) angina, myocardial infarction, or heart failure, (5) chronic renal failure, (6) malignancy, (7) neurosis or psychosis, (8) dementia, and (9) use of medications for heartburn or regurgitation within the previous four weeks. Then, the GERD-Symptom and Medication Questionnaire (SMQ) was offered to eligible subjects for screening of GERD patients. The GERD-SMQ is a validated PRO instrument used to evaluate the frequency and severity of heartburn (0–10 points) and acid regurgitation (0–10 points) within the previous 12 months, and the duration of medication for GERD within the previous 4 weeks to 28 weeks (0–24 points) [13]. Scores range from 0 to 44. The GERD patients were defined as those with a score of 10 or higher on the GERD-SMQ. Amongst these GERD patients, the patients who had no history of taking GERD associated medication were defined as new GERD patients. The control group, non-GERD patients, was defined as less than 10 of GERD-SMQ score.

2.3. Validity of the Korean version of the WPAI-GERD

The validity of a PRO instrument can be defined as the extent to which it measures what it is intended to measure [12,14]. We assessed content validity, the sampling adequacy of the measurement, through a review of the WPAI-GERD. First, the WPAI-GERD (English-US, Version 2.0) [11] was translated into Korean by 10 expert panels from the Scientific Committee of the Korean College of *Helicobacter* and Upper Gastrointestinal Research. Next, a professional translator, recommended by Dr. Wahlqvist who designed the original WPAI-GERD, translated the preliminary Korean version of the WPAI-GERD back into English. The 10 experts and the professional translator reviewed this back-translated version to compare the meanings of the translated and original English versions. All the items of these versions were consistent with each other without further changes. Construct validity is evaluated by assessing whether the measured variables behave consistently with theoretical and logical expectations. It is usually divided into convergent and discriminant validity [12]. In this study, convergent validity was defined as a high correlation between work productivity loss and the related SF-36 dimension such as role physical [15]. High discriminant validity was defined as a low correlation between each WPAI variable and other expected variables such as the general health dimension of the SF-36. Furthermore, we considered a high correlation between each WPAI variable and the severity of heartburn as an indication of high discriminant validity [14].

2.4. WPAI

We used the Korean version of the WPAI-GERD to assess loss of work productivity in terms of presenteeism, absenteeism, and a lost work productivity score (LWPS) [14] that expressed lost work productivity caused by only GERD symptoms as a percentage of the potential total work. All questions included on this questionnaire refer to the preceding seven days, and GERD symptoms were defined as heartburn or acid regurgitation. After the respondent's employment status was identified, three open-ended questions about work time were asked: (1) hours absent from work because of GERD symptoms; (2) hours absent from work for other reasons; and (3) hours actually worked. These were followed by two questions, which used an 11-point Likert-type scale ranging from 0 to 10, about the impact of GERD symptoms on work productivity and daily activities other than work for the past seven days. Absenteeism was expressed as both the total work time lost (the sum of total hours absent for GERD symptoms) and the percentage of work time lost during employed time (the total hours actually worked) for the past seven days. Presenteeism was expressed as both total limited work time (calculated as self-rated limited productivity/10 × hours actually worked) and the percentage of limited productivity whilst at work. The LWPS was calculated as follows: [(hours absent from work + percentage reduced productivity at work × hours actually worked)/(hours absent from work + hours lost due to other reasons + hours actually worked)] × 100. Absenteeism, presenteeism, and overall productivity loss were converted into a monetary cost using the human capital method [16], which was calculated as the total number of hours lost multiplied by the average hourly wages of a Korean employee, which was $14.12 (17,197 KRW) between April 2009 and September 2009 [17].

Respondents were asked to complete the other questionnaire form using a seven-point Likert-type scale ranging from 0 to 6 to describe the severity (none, very mild, mild, moderate, slightly severe, severe and very severe) of heartburn and regurgitation in the previous week. Based on the severity of symptoms, patients were classified into three groups: the mild group (0–2 points), the moderate group (3–4 points), and the severe group (5–6 points). Additionally, the respondents were asked to select their reasons for presenteeism from the following options: (1) need to meet supervisor's expectation, (2) heavy workload, (3) fear of missing an opportunity for promotion, (4) long distance from a hospital, (5) high medical costs, (6) symptoms were not severe, and (7) I am