

Gastro esophageal reflux disease is associated with absence from work: Results from a prospective cohort study

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Abstract

AIM: To study the association of gastro-esophageal reflux disease (GERD) with the absence from work and to estimate the extent of loss in gross domestic product due to inability to work.

METHODS: Analysis was based on the prospectively gathered data of a large European cohort study involving 6 215 symptomatic GERD patients (ProGERD). Among these patients, 2 871 were initially employed. The calculation of the loss of gross domestic product was based on the assumption that the prevalence of GERD was about 15% in Germany. According to the German Federal Statistical Office, the mean gross wage of employees was 150 €/d in 2002.

RESULTS: The data of 2 078 employed patients who were prospectively followed up for over 2 years were analyzed. At study entry, the patients reported a mean of 1.8 d per year of inability to work. During the prospective follow-up under routine clinical care, the proportion of patients reporting days with inability to work decreased from 14% to 6% and the mean number of days per year with inability to work decreased to 0.9 d. Assuming a prevalence of troublesome GERD of 15% in the employed German population, the loss of gross domestic product amounted to 668 million €/year in Germany.

CONCLUSION: GERD causes a relevant impairment on the national economics by absence from work. The presented data demonstrate the importance of GERD, not only for patients and health insurance companies, but also for the community at large.

INTRODUCTION

With a prevalence of 15-40%, gastro-esophageal reflux disease (GERD) is a common adult condition in Western countries^[1-3]. GERD may be associated with a marked decrease in quality of life, a loss of productivity and impairment of daily activities^[4]. In some patients symptoms may be severe enough to prevent the patient from going to work. The resulting decrease in working time is associated with a significant loss in productivity. In North America, up to 10% of GERD patients have to be absent from work^[5,6] and the indirect costs in the USA caused only by time away from paid labor resulting from consumption of health care were 470 million US\$ in 1998^[7]. The complete costs of labor lost have to be borne by employers and/or health insurance companies, and there is an accompanying decrease in the gross domestic product. The aim of the present investigation was to estimate the extent of such losses on the basis of the data of a large prospective European trial in patients with symptomatic GERD.

MATERIALS AND METHODS

The ProGERD study is an ongoing prospective, multicenter cohort study comprising an initial treatment phase and a 5-year follow-up phase. Patients ($n = 6\ 215$) were recruited from centers ($n = 1\ 253$) in Germany (more than 90%), Austria and Switzerland. The majority of these patients were recruited by gastrointestinal specialists in private practice. The protocol of the study was designed to include half of the patients with erosive reflux disease (ERD) and half with non-erosive reflux disease (NERD). Barrett's esophagus was not an exclusion criterion and in 702 patients this condition was diagnosed. The patients were treated with esomeprazole for up to 8 wk, and in

the follow-up period at the discretion of their physicians. After 2 years of follow-up, 64% of the patients were still on proton pump inhibitor (PPI) medication (continuous PPI or on demand treatment).

At study entry and every year, the patients completed a standardized questionnaire that assessed demographic, medical, and social characteristics and quality of life. One section of the questionnaires dealt with the patient's inability to work (IW) caused by reflux symptoms in the year prior to inclusion in the study and to the last year before the study visit. The patients were carefully instructed about the aims and the methods of the study, including repetition of the initial questionnaire. Further details of the ProGERD trial have been published elsewhere^[8].

The most reliable assumption of the frequency of GERD in Europe was available from a large population-based telephone survey performed in 5 046 randomly chosen persons^[1]. More than 1 000 persons per country (Germany, France, Italy, Sweden, and UK) were interviewed. Reflux symptoms occurred in 28% of German adults with about 58% of them claiming impaired quality of life. This means that the overall frequency of GERD is 16% in the entire adult population of Germany^[9].

The number of overall IW days reported in the ProGERD trial was projected on the overall German employed population, based on the data from the German Federal Statistical Office. Germany has 82.5 million inhabitants and the labor force is composed of 36.5 millions, of whom some 33 millions are compulsorily insured. The mean gross wage of employees was 150 €/d in 2002.

In this study, the human capital method was used to calculate the indirect costs of GERD, a method that uses the full replacement costs independent of whether the worker is replaced or not^[10]. We assumed a loss of the gross domestic product in the same amount of the whole mean gross wage of employees. The basis for the calculation of the decrease of gross domestic product was the number of IW days caused by GERD symptoms reported in the ProGERD trial.

We conducted an explorative analysis of potential patient-associated predictors (gender, age, BMI, consumption of alcohol, smoking, and severity of the GERD disease) of IW days using univariate statistics as appropriate. The level of significance was 5%.

RESULTS

Data about employment were available from 5 965 out of 6 215 patients (96.0%). At the beginning of the trial, 2 871 out of 5 965 (48.1%) patients were gainfully employed, 2 103 retired (35.3%), and 991 without employment (16.6%). After a 2-year follow-up period, the data about employment of 5 286 patients were available (2 312 employed, 2 097 retired, 877 without employment). We included the data of 2 078 patients who were gainfully employed and answered the respective questions about

inability to work due to GERD at the initial visit and during the 2-year follow-up period. This excluded the data of those who lost their work or retired in the follow-up period or did not answer the questions at both time points of investigation.

Initially 14% of the employed patients were admitted retrospectively to IW due to reflux symptoms during the past year. During the 2-year follow-up period, the percentage decreased to 6% under routine clinical care. The mean number of IW days was 2.5/yr prior to inclusion in the study (mean value 2.5 d in 12 mo and adjusted with the exclusion of the weekend period: 1.8 d), and decreased to 1.2/yr during the prospective follow-up period (mean value 1.2 d in 12 mo and adjusted with the exclusion of the weekend period: 0.9 d). There was no significant relationship between IW and gender, age, BMI, consumption of alcohol, smoking, and severity of GERD. In Germany, the labor force is composed of 36.5 millions, of whom some 33 millions are compulsorily insured. The mean gross wage of employees is 150 €/d (source: German Federal Statistical Office 2002). Based on the human capital method for calculating costs of illness, the total loss of gross domestic product is shown in Tables 1 and 2 assuming different frequencies of GERD in the labor force. Table 1 shows the retrospective data before entering into the follow-up period, and Table 2 lists the prospective data after the 2-year follow-up period.

Table 1 Loss of gross domestic product due to inability to work (IW) in patients with untreated GERD in Germany on the basis of three different frequency assumptions

Prevalence of GERD in the adult population	10%	15%	20%
Total days of inability to work	5.9 million	8.9 million	11.9 million
Loss of gross domestic product	891 million €	1.34 billion €	1.78 billion €

Table 2 Loss of gross domestic product due to inability to work (IW) in patients with GERD under routine clinical care in Germany on the basis of three different frequency assumptions

Prevalence of GERD in the adult population	10%	15%	20%
Total days of inability to work	2.97 million	4.46 million	5.94 million
Loss of gross domestic product	446 million €	668 million €	891 million €

DISCUSSION

ProGERD is a large prospective cohort study designed to examine the endoscopic and symptomatic progression of GERD in routine care as well as the economic burden of the disease. With more than 6 000 included patients, the study is the largest prospective clinical trial in this field and could answer several questions on a high level of confidence. The influence of GERD on the gross

domestic product, being part of the indirect costs of the disease, was estimated in this analysis. On the basis of these data, the total costs of the economy of GERD, due to loss of gross domestic product were reliably assessable. Assuming a prevalence of 15% of the disease in the employed German population, costs amounted to 668 million €/yr under routine clinical care. The costs in the same population were twice as high in the year before entering the trial. These calculations highlight the great economic importance of GERD, which is not only a problem for patients and health insurance companies, but also has a major impact on the community at large. The total loss of gross domestic product estimated by our analysis was, for example, close to the total yearly PPI sales of 842 million € in Germany in 2003^[11].

Our calculation was based on the human capital method for calculating the costs of illness. Another approach to calculating indirect costs is the friction cost method, which measures the amount of production lost due to the disease based on the time span organizations needed to restore the initial production, so that production losses are assumed to be confined to the period needed to replace a sick worker^[10]. A stated advantage of the friction cost method is that, unlike the human capital method, it takes into account the fact that employees with long-term illness or disabilities can be replaced in markets with less than full employment. There is no general agreement on whether the human capital or friction cost method is more valid for measuring the productivity costs of illness. Long-term sick leave due to GERD symptoms is probably rare—none of the patients included in the ProGERD study reported long-term sick leave because of GERD symptoms during the prospective follow-up period—and replacement of the worker is an exceptional event. Therefore, the human capital method might be the more reliable approach. Even assuming more conservative estimates of indirect costs based on the friction cost method, GERD is certainly still associated with a considerable social and economic burden.

As expected, only a limited portion of about 14% of the GERD patients even got admitted to IW caused by reflux symptoms. The symptoms are mostly mild to moderate, though the quality of life in patients with GERD is markedly decreased^[12], the level is comparable to other chronic or even life-threatening diseases^[13]. In the follow-up period, the portion of patients with IW declined to 6%. Other trials from the USA have reported partially a lower portion of 2-10%^[5,6], suggesting that socioethical factors might influence the willingness to be absent from work.

The follow-up data indicated the effectiveness of the treatment of GERD in reducing the IW days. The mean number of IW days decreased from 2.5 to 1.2 in the 2-year observation period. The patients were treated in the follow-up period at the discretion of their physicians, and around two out of the three patients were still on PPI treatment after the 2-year follow-up period.

GERD is nowadays the disease with the highest direct costs in the USA (9.3 billion US\$)^[7]. European data

are available from Sweden that includes the costs for dyspepsia and peptic ulcer disease. Therefore, it is difficult to compare them with our findings^[14].

Our calculation of the loss of gross domestic product was based on the statement of the patients using a long recall period of one year, and it might result in an underestimation of disease-related absence from work. A recall bias on self-reported work productivity occurs more often already after a 4-wk recall period compared with a 2- or 1-wk recall period^[15]. Therefore, our calculation can be considered as conservative, and the loss might be significantly higher. A recent study showed that the impact of GERD on the costs of reduced productivity is even higher compared to that on the costs of absence from work^[16]. Therefore, it is highly possible that our calculation might further underestimate the overall loss of gross domestic product due to GERD, because we only referred to the IW days instead of estimating the reduced productivity.

The exact calculation of the indirect costs is somehow difficult. Typically indirect costs include costs associated with the lost or impaired ability to work or to enjoy leisure activities because of morbidity, the time required by the patient's family to receive medical care, and loss of future earning potential owing to premature death. Data about impaired ability to work due to GERD are insufficient. In a small cross-sectional study from the USA, about 41% of GERD patients reported that they have lost some work productivity^[6]. The authors have reported here in addition that the time off for physician visits and reduced productivity are the most costly losses from GERD. Our main focus was on the additional part of costs due to absence from work.

The impact of GERD on the economy differs widely between different countries depending on several factors (like cultural, socioeconomic, and economical status). Nevertheless, our data clearly suggest that the loss of gross domestic product due to GERD-related IW days might be higher compared to the total sale volume of PPI in Western countries in general. Definite data on this topic are lacking. It would, therefore, be interesting to study the impact of effective pharmacotherapy not only on clinical symptoms and healing of lesions but also on the loss of productivity.

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