Original article

The importance of socioeconomic factors in symptoms of heartburn

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Abstract

Introduction: Patients’ socioeconomic status is rarely assessed during medical consultations. Objective: To correlate patients’ socioeconomic conditions with symptoms of heartburn. Methods: 1184 patients who answered a questionnaire in three cities on the coast of the State of São Paulo, Brazil, were evaluated prospectively. Socioeconomic status was assessed using several criteria: number of bathrooms, consumer goods present at home, health conditions at home, comfort (cars and/or home helps), monthly family income and head of household’s educational level. Results: 583 patients (49.2%) reported occurrences of heartburn over the 30 days preceding the consultation, with frequencies ranging from five...

Keywords: Gastroesophageal reflux disease, heartburn, symptoms, risk factors, Brazil.

Resumen

Introducción: El estrato socioeconómico de los pacientes rara vez es evaluado en las consultas médicas. Objetivo: Correlacionar las condiciones socioeconómicas de los pacientes con la presencia de pirosis. Métodos: Se evaluaron prospectivamente 1184 pacientes quienes respondieron un cuestionario en tres ciudades. Las clases socioeconómicas fueron evaluadas usando diversos criterios: número de baños, consumidores de bienes presentes en la casa, condiciones de salud en la casa, confort (autos y empleados), ingreso familiar mensual y nivel educacional de la cabeza familiar. Resultados: 583 pacientes (49.2%) reportaron haber tenido pirosis en los 30 días previos a la consulta, con frecuencias entre cinco a 30 episodios...

Keywords: Enfermedad por refluo gastroesofágico, pirosis, síntomas, factores de riesgo, Brasil.
The importance of socioeconomic factors in symptoms of heartburn

Introduction

Heartburn is one of the main symptoms of gastroesophageal reflux disease. This disease is considered to be a public health problem throughout the Western world. Around 10% of the adult population of the United States reports suffering from heartburn on a daily basis and in Brazil heartburn presents weekly prevalence in 11.9% of the population.

Within this high general prevalence certain factors present a close relationship with greater severity of gastroesophageal reflux. Among these are age, obesity, increased intra-abdominal pressure and cigarette smoking. However the mechanism that triggers heartburn, regardless of whether gastroesophageal reflux is present or not, is so far only partially understood.

With regard to epidemiological studies one of the factors that should always be brought in mind is the subjects’ socioeconomic condition. This has importance as a risk factor in relation to the diagnosis, treatment, prevention and even morbidity-mortality of the disease.

Low socioeconomic level is associated with a large range of diseases. However, although the correlation between individuals socioeconomic condition and their overall health is well established in Western countries, few studies have evaluated socioeconomic factors in relation to gastroesophageal reflux disease and even fewer in relation to heartburn. Furthermore there is a lack of epidemiological studies focusing on private gastroenterological clinics. Socioeconomic condition is not routinely evaluated in private gastroenterological clinics. This is perhaps because of short time to carry out complete evaluations or because the patients maybe don’t understand or accept the importance of such data. Patients often report imprecise data simply because they do not wish to feel diminished or depreciated in front of the physician, or because they cannot see the importance that this information might have for achieving correct diagnosis and treatment for the disease.

Because of the high prevalence of heartburn, its direct correlation with gastroesophageal reflux disease and the poor understanding of this symptom, we decided to conduct this study in order to

durante este periodo. Entre los pacientes de la ciudad de Guarujá (condiciones socioeconómicas bajas), 9.7% nunca sintieron pirosis, mientras 65.7% señalaron pirosis, alcanzando significado estadístico en relación a los pacientes con condiciones socioeconómicas medias (São Vicente, p = 0.012). Entre los pacientes de la ciudad de São Vicente (con condiciones socioeconómicas medias) y la ciudad de Santos (condiciones socioeconómicas altas) no hubo diferencia significativa (p = 0.997). Hubo diferencia estadísticamente significativa entre los pacientes con condición socioeconómica alta y baja (p = 0.002).

Conclusiones: La clase social menos favorecida, como se confirmó de acuerdo a la variedad de factores socioeconómicos, presentó mayor incidencia de la pirosis que los pacientes de clase social más alta.

to thirty episodes over this period. Among patients from the city of Guarujá (low socioeconomic condition), 9.7% had never felt heartburn, while 65.7% reported occurrences, reaching statistical significance in relation to patients of medium socioeconomic condition (city of São Vicente) (p = 0.012). There was no difference between patients from medium socioeconomic condition and patients from Santos (high socioeconomic condition) (p = 0.997). There was a statistically significant difference in occurrence of heartburn between the patients with high socioeconomic condition and those of low socioeconomic condition (p = 0.002).

Conclusions: The least favored socioeconomic status patients, as confirmed according to a variety of socioeconomic factors, presented greater incidence of heartburn than did the most favored social class.
correlate heartburn occurrences among patients with different socioeconomic conditions.

**Methods**

We conducted a prospective study over a consecutive 18-month period among 1184 patients living in three cities on the coast of the State of São Paulo, Brazil (Santos, São Vicente and Guarujá) who sought assistance at a private gastroenterological clinic. These subjects answered a previously established questionnaire.

Patients living in one of these three cities who were aged 18 years or over were eligible for inclusion in the study. Pregnant or breastfeeding women, individuals who had undergone surgery on the esophagus and/or gastrointestinal tract (except appendectomy) and individuals who refused to participate in the study were excluded.

The questionnaire was applied by a single examiner and was made simple and with objective questions to avoid confounding issues.

Heartburn was defined as a sensation of retrosternal burning that radiates from the manubrium of the sternum to the base of the neck and into the throat.\(^{17}\)

With the aim of standardizing the procedure for the questionnaire and to avoid biased responses, we chose to apply the questionnaire to the third patient and the last patient on each consultation day. If the third patient did not fulfill the inclusion or exclusion criteria, the next patient was evaluated. If the last patient of the day could not be evaluated, we chose the first patient of the subsequent day.

The clinical questionnaire was divided in four parts. In the first part, personal identification data were sought (name, present address, number of children, marital status and date of birth). In the second, the subjects were asked how often they had felt heartburn or pyrosis over the preceding month and whether such symptoms had interfered with their daily activities and to what extent. In the third, the characteristics of the food consumed in the household were evaluated, along with the educational level of the family member who cooked and the family income. In the fourth and last part, the sanitation conditions of the patient’s home were evaluated.

During the medical consultation, we measured the body mass index (BMI), defined as the weight in kilograms divided by the square of the height in meters (weight/height\(^2\)). We used the World Health Organization classification, such that individuals with BMI of up to 18.5 kg/m\(^2\) were considered underweight; 18.6 kg/m\(^2\) to 25.0 kg/m\(^2\), normal weight; 25.1 kg/m\(^2\) to 30.0 kg/m\(^2\), overweight; 30.1 kg/m\(^2\) to 40.0 kg/m\(^2\), obesity; and greater than 40.0 kg/m\(^2\), morbid obesity.

Qualitative variables were represented by absolute frequencies (n) and relative frequencies (%), and quantitative variables by means, standard deviations (SD), medians, minimum and maximum values. The presence of associations between the variable “city” and the other variables was evaluated using the chi-square test. The same test was used to investigate the presence of any association between the most disturbing symptom and patients personal data. Comparisons between the cities were made using the analysis of variance (ANOVA) technique for quantitative variables with normal distribution. Differences were investigated by means of multiple comparison tests. The distinct quantitative variables (number of television, number of radios, etc.) were analyzed using the nonparametric Kruskal-Wallis test for independent samples. Differences were again investigated by means of multiple comparison tests.

Scores were attributed to frequency variables, as follows: never = 0, up to once a month = 1; between two and four times a month = 2; between five and twelve times a month = 3; and between 13 and 30 times a month = 4. The cities were also compared in relation to the frequency scores, using the nonparametric Kruskal-Wallis test.

The significance level was taken to be 0.05 (\(\alpha = 5\%\)) and descriptive levels (\(p\)) lower than this value, were considered significant.

The study was performed in accordance with the declaration of Helsinki, the protocol was thoughtfully explained and informed consent was obtained from all patients.

**Results**

A total of 1184 patients living in the three cities who sought consultations with a gastroenterologist were evaluated. Out of this sample, 588 (49.7%) lived in Santos, 255 (21.5%) in São Vicente and 341 (28.8%) in Guarujá. The majority of patients were women (713; 60.2%). The patients’ mean age was 45.9 ± 16.3 years, with an age range from 18 to 96
years. Most of the patients were married or cohabiting (698 individuals; 59.0%), while 295 (24.9%) were single, 115 (9.7%) were widowed and 76 (6.4%) were divorced. The mean number of children that the patients had was 1.9 (SD = 1.9). Data on the patients evaluated are showed in Table 1.

There were statistically significant differences between the cities regarding the mean BMI among the individuals attended (p = 0.002) (Table 2).

Comparing the three cities in relation to purchasing power, we inferred that the patients from Santos were in a better economic position than those from the other two cities. This was extrapolated in our study from the greater quantities of electrical equipment installed in the homes in Santos (Table 3). These results show that the people living in São Vicente were characterized by better economic conditions than among those living in Guarujá. The other characteristics that were evaluated also showed Santos as the higher economic status city (Table 3).

The multiple comparisons test showed that there were statistically significant differences between three cities regarding the education levels of heads of households of the patients attended (p < 0.001) (Table 4). Furthermore, monthly family income among the individuals attended also presented statistically significant differences between the three cities (p < 0.001), as shown by the multiple comparisons test (Table 5). The greater economic conditions of patients from Santos in relation to São Vicente and Guarujá reflects their greater purchasing power as shown through the significantly greater family income in Santos than in São Vicente, which in turn was greater than the family income among patients from Guarujá.

Other findings also demonstrated that the patients from Guarujá were the ones with the worst living conditions. They presented the highest number of people living in the same home and the homes of the patients from Guarujá had fewer bedrooms.

There was a statistically significant difference between the cities regarding the distribution of heartburn frequency during the month preceding the patients consultations (p = 0.002). Symptoms at frequencies of five to 30 occurrences over that month were reported by 65.7% of the patients from Guarujá, 55.9% from Santos and 55.7% from São Vicente. The multiple comparisons test showed that the patients from Guarujá differed significantly from those living in the other two cities. Table 6 shows the distribution of heartburn frequency and the extent to which this symptom interfered with daily activities over the month preceding the consultation, among the 1,184 patients studied. The extent of this interference differed significantly between the cities (p <0.001). Within the range of five to 30 occurrences per month, heartburn symptoms interfered with the daily activities of 56.9% of the patients from Guarujá, 43.5% from Santos and 23.1% from São Vicente. The multiple comparisons test showed that Guarujá differed significantly from the other two cities (Table 2).

Table 1. Data on the patients evaluated.

<table>
<thead>
<tr>
<th>Age (years) Mean ± sd</th>
<th>Santos 588 (49.7%)</th>
<th>São Vicente 255 (21.5%)</th>
<th>Guarujá 341 (28.8%)</th>
<th>Total (%)</th>
<th>p &lt; 0.001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>356 (60.5)</td>
<td>187 (73.3)</td>
<td>170 (49.9)</td>
<td>60.2%</td>
<td>A</td>
</tr>
<tr>
<td>Number of children</td>
<td>Mean ± sd</td>
<td>48.0 ± 16.9</td>
<td>46.3 ± 16.4</td>
<td>41.9 ± 14.1</td>
<td>45.9 ± 16.3</td>
</tr>
<tr>
<td>Married / cohabiting</td>
<td>328 (55.8)</td>
<td>142 (55.7)</td>
<td>228 (66.9)</td>
<td>698 (59.0)</td>
<td>C</td>
</tr>
<tr>
<td>Single</td>
<td>155 (26.4)</td>
<td>67 (26.3)</td>
<td>73 (21.4)</td>
<td>295 (24.9)</td>
<td>B</td>
</tr>
</tbody>
</table>

SD = standard deviation; A = Santos ≠ São Vicente ≠ Guarujá; B = Santos ≠ São Vicente; Santos ≠ Guarujá, São Vicente ≠ Guarujá; C = Santos = São Vicente, Santos = Guarujá, São Vicente = Guarujá
Table 2. Comparison of mean body mass index between the three cities.

<table>
<thead>
<tr>
<th>City</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santos (n = 588)</td>
<td>25.68</td>
<td>4.45</td>
<td>25.14</td>
<td>13.27</td>
<td>45.42</td>
</tr>
<tr>
<td>São Vicente (n = 255)</td>
<td>25.53</td>
<td>5.05</td>
<td>25.01</td>
<td>15.69</td>
<td>47.29</td>
</tr>
<tr>
<td>Guarujá (n = 341)</td>
<td>24.61</td>
<td>4.16</td>
<td>24.32</td>
<td>15.43</td>
<td>38.62</td>
</tr>
<tr>
<td>Total (n = 1184)</td>
<td>25.34</td>
<td>4.53</td>
<td>24.88</td>
<td>13.27</td>
<td>47.29</td>
</tr>
</tbody>
</table>

sd = standard deviation; Analysis of Variance (ANOVA): p = 0.002; Multiple comparisons test: Santos versus São Vicente, p = 0.664; Santos versus Guarujá, p = 0.001; São Vicente versus Guarujá, p = 0.014.

Table 3. Statistical difference between cities in numbers of domestic’s appliances and maids or home helps, numbers of bathrooms and cars.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Santos vs. São Vicente (p)</th>
<th>Santos vs. Guarujá (p)</th>
<th>São Vicente vs. Guarujá (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td>0.012</td>
<td>0.001</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Vacuum cleaners</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Microwaves ovens</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Air conditioning units</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Fans</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Computers</td>
<td>0.004</td>
<td>&lt; 0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Televisions sets</td>
<td>0.001</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mean number of maids or home helps</td>
<td>0.004</td>
<td>&lt; 0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Mean number of bathrooms in the home</td>
<td>0.001</td>
<td>0.001</td>
<td>0.181</td>
</tr>
<tr>
<td>Numbers of cars</td>
<td>0.039</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

vs. = versus; p = nonparametric Kruskal-Wallis test.

There were no statistically significant associations between heartburn symptoms and gender (p = 0.282), marital status (p = 0.447), age group (p = 0.102) or number of children (p = 0.491), among the patients attended.

Discussion

It has been estimated that gastroesophageal reflux disease is the digestive system disease with the highest direct and indirect costs in the United States. Heartburn is the principal symptom of this disease and is present in approximately 89% of the individuals affected by this condition.

We prospectively evaluated 1184 adult patients from three different coastal cities using preestablished methodology. We considered that the total number of patients evaluated was acceptable, even though studies with larger samples exist. The study by Jones and Lydeard evaluated 2066 patients who answered a questionnaire and sent it back to the investigator by mail. On the other hand, in the study by Tougas and collaborators 1036 patients in several Canadian cities were evaluated in person. In this light, we believe that our sample was of significant size. Moreover, in our study, all the interviews were conducted in person and by the same investigator, thereby avoiding differences in evaluation criteria based on subjective interpretation. According to the international literature, although the interview method is more laborious, it certainly furnishes better quality data than from self-applied questionnaires. Interviews avoid the possibility of bias relating to patients concern not to displease their physician.

Factors relating to housing conditions provide awareness of how patients live. Although the basic living conditions (electricity, plumbing and
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Sewerage among our patients were good, the number of people living in these homes was high. This may come to be reflected in problems relating to living together day-by-day or in various psychological disorders.

Comparing purchasing power between the three cities it could be seen that the patients from Santos were in a better situation than those from the other two cities. This inference was extrapolated from the patients’ domestic equipment ownership and housing characteristics. Other factors, such as education levels (highest in Santos), also affirm for the economic superiority of Santos in relation to São Vicente and of the latter in relation to Guarujá.

There was no statistically significant difference in heartburn prevalence between the genders in the present study. Likewise, there are studies on gastroesophageal reflux that also did not find greater prevalence for one gender or the other.22,23 We also did not find any statistical differences regarding race/ethnicity, number of children, marital status or age group. However extrapolating from the typical symptoms of gastroesophageal reflux disease there are studies showing greater prevalence among older age groups and among divorced, separated and widowed patients.22

The city of Guarujá presented statistical significance regarding the frequency of heartburn symptoms and their interference with activities.
 durante el mes precedente la consulta. Se ha mostrado que la alteración de la calidad de vida es proporcional a la severidad de los síntomas.24,19

Según Nocon y colaboradores,25 la calidad de vida es peor en individuos con quejan de dolor nocturno.

Observamos que los pacientes de situaciones socioeconómicas inferiores presentaron mayor frecuencia de queja de dolor que interfirió en sus actividades diarias. Un estudio de Nouriaie y colaboradores26 demostró que no hubo mayor prevalencia de enfermedad reflox esofágica en relación con cualquier nivel educacional entre los pacientes. Por otro lado, otro estudio demostró una relación inversa entre el nivel educacional y la presencia de enfermedad reflox esofágica.16 Sin embargo, los pacientes en esos estudios fueron evaluados en relación a enfermedad reflox esofágica, en lugar del síntoma de dolor. Por lo tanto, nuestros hallazgos fueron diferentes a estos otros estudios, en que cuanto más bajo era el nivel educacional, mayor era la prevalencia de síntomas de queja de dolor.

Asimismo, encontramos en nuestro estudio que los pacientes de Guarujá presentaron un índice de masa corporal bajo significativamente menor que aquel de Santos y São Vicente. Se sabe que el dolor es un resultado de refluo ácido desde el estómago hasta el esófago pero hay otras causas implicadas en estos síntomas. La estimulación química o mecánica, así como la hiperalgesia, pueden causar el síntoma.2

Nuestro estudio nos hizo conscientes de varios factores que pueden interferir con el enfoque y el éxito terapéutico en pacientes con dolor. Nos enfocamos en que el dolor de corazón está estrechamente relacionado con la situación económica del paciente. Esto directamente refleja cómo el paciente responde al dolor, potencialmente exacerbando el síntoma. Es importante evaluar a los pacientes con dolor de corazón más allá de la historia clínica, enfocándose en los factores ambientales en los que viven.

Asimismo, también encontramos que los pacientes de Guarujá presentaron una frecuencia significativamente menor de queja de dolor que interfirió en sus actividades habituales que los pacientes de Santos y São Vicente, lo cual puede ser un resultado de que los pacientes de Guarujá presentaron una menor prevalencia de enfermedad reflox esofágica. Algunos de estos pacientes pueden ya presentar enfermedad esofágica no erosiva o incluso dolor de corazón funcional, una condición compatible con enfermedad reflox esofágica. Lo que puede ser de mayor importancia es que estos pacientes pueden presentar el síntoma antes de desarrollar enfermedad reflox esofágica. Estudios adicionales deben realizarse con este fin y con el objetivo de entender mejor el dolor de corazón con y sin enfermedad reflox esofágica. Conocer la epidemiología y los factores de riesgo del dolor de corazón dentro de una región es el primer paso para formular estrategias de prevención y tratamiento.

### Conclusión

La prevalencia de dolor de corazón fue directamente relacionada con las condiciones socioeconómicas bajas de la ciudad en la que los pacientes vivían. La prevalencia y severidad del dolor de corazón fueron irrelacionadas con el género, el estado civil, laimonial
status, race/ethnicity, age or number of children. The less favored social class evaluated by a variety of socioeconomic factors presented greater incidence of heartburn than did the more favored social class.

References