



Gastroesophageal reflux disease in primary care

Prevalence, epidemiology and Quality of Life of patients

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SUMMARY

Aim — To determine the prevalence of typical symptoms of gastroesophageal reflux disease in a large group of patients consulting their general practitioners (GP) for diverse reasons, as well as the quality-of-life (QoL) of patients with such symptoms.

Patients and methods — During the same day, participating GPs (N = 3 200) systematically asked all of their patients about the presence of heartburn and regurgitation. For all patients who responded positively, the GPs filled in a questionnaire and the patient a specific QoL questionnaire.

Results — Among 40 982 patients attending GP consultations, 4 124 (10.1 %) had one or both symptoms. Prevalence was higher in men (11.1 %) than in women (9.3 %, $P < 0.001$), and increased with age up to 50-59 yrs then slowly declined. Symptoms were present on a weekly basis in 72.8% of patients. Smoking, frequent or nocturnal occurrence of symptoms, regurgitation, and esophagitis were significantly linked up with a higher occurrence of extra-digestive symptoms (cough, ENT symptoms, chest pain). QoL declined with increasing frequency of symptoms, which especially affected food intake, psychology, well-being and daily life.

Conclusion — In France, typical symptoms of gastroesophageal reflux disease are observed in 10% of the adult population, and markedly alter their QoL.

RÉSUMÉ

Le reflux gastro-œsophagien en médecine générale : prévalence, caractéristiques épidémiologiques et qualité de vie des malades

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Objectifs — Déterminer dans une large population de malades consultant leur médecin généraliste (MG) la prévalence des symptômes typiques de reflux gastro-œsophagien et la qualité de vie des malades ayant ces symptômes.

Malades et méthodes — Au cours d'une même journée, une enquête chez 3 200 MG répartis sur le territoire a évalué chez tous les malades consultant la présence d'un pyrosis et/ou de régurgitations. En cas de réponse positive, un questionnaire était rempli par le MG, et le malade répondait à un questionnaire de qualité de vie. **Résultats** - Parmi les 40 982 consultants, 4 124 (10,1 %) avaient au moins un des symptômes. La prévalence, plus élevée chez les hommes (11,1 %) que chez les femmes (9,3 %, $P < 0,001$), augmentait jusqu'à la tranche d'âge 50-59 ans puis diminuait ensuite. Les symptômes étaient au moins hebdomadaires chez 72,8 % des malades. Un tabagisme, des symptômes fréquents ou nocturnes, des régurgitations, une œsophagite étaient significativement associés à une plus grande fréquence de manifestations extra-digestives (toux, signes ORL, douleurs thoraciques). La qualité de vie était d'autant plus altérée que les symptômes étaient fréquents avec un retentissement prédominant sur l'alimentation, le psychisme, le bien-être et la vie quotidienne.

Conclusion — En France, le reflux gastro-œsophagien typique touche environ 10 % de la population adulte et altère significativement la qualité de vie des malades.

Introduction

The prevalence of typical symptoms of gastroesophageal reflux disease (GERD) appears to be high in the general population [1-4], constituting one of the most frequent reasons for seeking care [5, 6]. The real prevalence of GERD remains nevertheless poorly known with figures varying from 15 to 60% of the adult population [2]. Such a wide range of estimates reflects methodological difficulties related to sampling techniques (exhaustive, representative) and diagnostic criteria. The clinical polymorphism of GERD further complicates the problem. In the published epidemiological studies, the diagnostic criteria have generally been heartburn and/or acid regurgitation because both are highly specific for GERD [7].

Besides obtaining a crude estimate of the prevalence of GERD, it is important to establish an epidemiological assessment of disease severity. Most studies thus examine severity scores in addition to symptom frequency since both affect the patients' quality-of-life (QoL) [8, 9]. GERD has a marked effect on all the dimensions of QoL, particularly social and relational life [10]. Although the importance of measuring QoL is well demonstrated, specific epidemiological data are lacking on this point.

Although all patients with symptoms of GERD do not attend consultations [5, 6, 11], the ubiquitous situation of primary care general practitioners (GPs) in France offers an excellent opportunity for assessing the prevalence of GERD. Proper evaluation requires a standardized methodology, exhaustive data collection and a representative sample of the study population.

The purpose of this work was to: 1) assess the prevalence of typical symptoms of GERD among ambulatory adult patients attending primary care consultations in France, 2) determine the QoL of patients presenting typical symptoms of GERD, and 3) search for characteristic features of altered QoL.

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Material and methods

A national observatory of management practices for GERD in adults was established for the purpose of this study designed to determine the prevalence of symptoms of GERD among all patients consulting GPs during a single day (a Tuesday). The 3 200 GPs participating in this survey were randomly selected from a GP database (TVF) maintained by Cegecim (Boulogne, France). The TVF database, which includes active GPs (providing care and writing prescriptions), is updated regularly; at the time this study was designed, it included 61,228 GPs. The survey sample was established with SAS[®] version 6.12 (SAS Institute, Cary, NC, USA) with geographic stratification. The medical population thus selected was highly representative of the GP population practicing in France. When examined by geographical region, the differences between the participating sample and the general population of GPs were less than 1 %, except for one region, Ile-de-France. For this region, the participating medical population represented 14 % of the sample whereas the theoretical percentage would be 17 %. Participating GPs received documents describing the study protocol and standardized charts for data collection.

The day of the survey, participating GPs searched for typical symptoms of GERD (heartburn and acid regurgitation) in all adults aged more than 18 years. Each GP conducted the research for symptoms according to his/her personal practices but recorded all data on an observation chart which was present on the GP's desk the day of the study and clearly raised the following question "does your patient have heartburn or regurgitation?". The search for symptoms did not include patients seen at home visits, patients with insufficient knowledge of French, patients who declined to participate, or patients who had an organic or psychiatric condition the GP considered superseded participation in the present interrogation. When the GP identified at least one typical symptom of GERD, the patient was included in the study, irrespective of the intensity or frequency of the symptoms, the reason for consulting, or whether or not GERD was disclosed by questioning the day of the study. In compliance with the recommendations of the National Commission on Informatics and Freedom, the GP then delivered to included patients a document describing the purpose of the survey and the study protocol. The GP then conducted a face-to-face interview to fill out an anonymous questionnaire for each included patient. This general questionnaire included items for demographic data, characteristic features of the symptoms (duration, frequency, association with atypical manifestations), and endoscopic and therapeutic management practices undertaken.

After having completed the general questionnaire, the GP gave to the patient a QoL questionnaire specifically designed for GERD patients. The patient was asked to complete the Reflux-Qual[®] questionnaire [9] later, then send it to the data collector in the stamped addressed envelope provided with the questionnaire. Reflux-Qual[®] measures QoL in GERD patients using well-defined criteria on a scale of 0 (poorest QoL) to 100 (best QoL) [8, 12, 13]. Reflux-Qual[®] contains 37 items in 7 dimensions (6 items for daily life; 2 items for relational life; 8 items for well-being; 7 items for psychology, 5 items for worries; 5 items for sleep; 4 items for diet) [9].

Data analysis

Data from the general and QoL questionnaires were centralized. Prevalences were expressed as percentage with 95% confidence intervals (CI95). Comparisons were made with the chi-square test. In order to search for association with atypical symptoms of GERD, the presence or absence of each atypical symptom (chronic cough, chronic hoarseness, recurrent rhinopharyngitis, chest pain), together with smoking and sleep disorders, was considered separately as a dependent variable in the logistic regression model. Explanatory variables studied were age (continuous variable), gender, body mass index (BMI) (continuous variable), history of esophagitis, heartburn, regurgitation, frequency of typical symptoms, and presence or not of GERD prior to present consultation. Since this epidemiological survey was conducted with a very large number of patients, and in order to retain only the most robust factors, explanatory variables significantly linked to the variable to be explained were retained for analysis at $P < 0.05$. A separate logistic regression analysis was performed for variables to be explained. Explanatory variables were retained for the logistic model when the correlation test was not significant at 1. If this was not the case, the variable having the strongest link with the other explanatory variables was removed from the model.

The results of the QoL questionnaire were expressed as item scores for each of the 7 dimensions and as an overall score. In compliance with

the data analysis modalities used for Reflux-Qual[®], missing data for each dimension were filled in with the mean value from the other values of the dimension when a minimal number of responses (value depending on the dimension) were available for the dimension concerned. Results were expressed as median and 1st and 3rd quartiles. Comparisons between QoL scores for the different characteristics of patients with GERD were done with appropriate non parametric tests (Wilcoxon T test and Kruskal and Wallis H test) with SAS[®] version 6.12 (SAS Institute, Cary, NC, USA).

Results

Prevalence of heartburn and regurgitation

Among the 3 200 randomly selected GPs, 2 572 (80.4%) participated in the survey. Their mean age was 47 ± 7 years (m \pm SD) and 82% were men. The day of the survey, 48606 patients attended consultations; the survey population was composed of 40982 adults (86%), mean age 52.1 ± 18.9 years, 41.1% men. Mean number of patients questioned per physician the day of the survey was 15.9 ± 7.5 (range: 0-50). Among the population concerned by the survey, 4124 patients had at least one typical symptom of GERD. Thus in this population, the overall prevalence was 10.1 % (CI95: 9.8-10.4), 11.1 % (CI95: 10.6-11.6) for men and 9.3 % (CI95: 8.9-9.7) for women ($P < 0.001$). Mean age of patients with typical symptoms of GERD was 55.7 ± 15.9 years. The prevalence of typical GERD increased with age up to the 50-59 year age group then declined progressively. This pattern was found for both genders with a higher peak (15.4%, CI95: 10.4-16.7) in men aged 50-59 years (N = 2858) (figure 1).

Among the 4124 patients with at least one of the two typical symptoms of GERD, the prevalence of heartburn was 80%, that of acid regurgitation 77%. Half of the patients (50.3%) had two symptoms. Symptoms occurred daily in 14.9% of patients and at least weekly in 72.8%. The prevalence of typical GERD with frequent symptoms occurring at least once a week was thus 6.8% (CI95: 6.6-7.1). Symptoms were slightly more frequent in patients with BMI > 25 kg/m² (73.7%) than in those with BMI ≤ 25 kg/m² (71.9%, NS). GERD symptoms occurred solely during the day for 36.7% of patients, only at night for 14.2% and both diurnal/nocturnal for 49.1%. This pattern was found for all age groups and independently of gender.

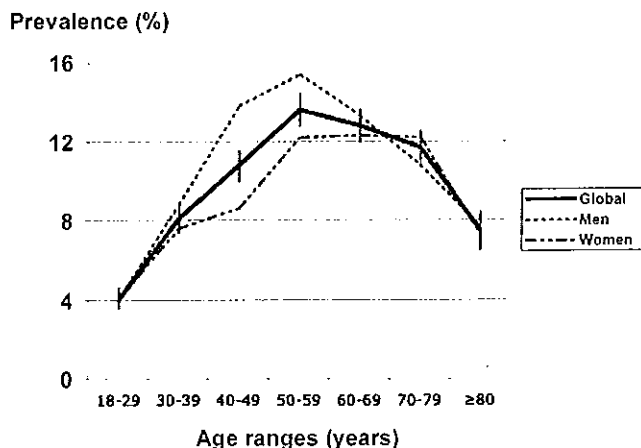


Fig. 1 – Overall prevalence (95% confidence interval), and prevalence according to the sex of typical symptoms of gastroesophageal reflux disease within a group of consulting patients in primary care.

Prévalences globales, avec intervalle de confiance à 95%, et par sexe du reflux gastro-œsophagien dans la population consultant en médecine générale.

Time since diagnosis of GERD

For 440 patients (11%) GERD was diagnosed the day this study was conducted. These patients were significantly younger than those whose GERD was known (48.9 ± 16.5 vs 56.6 ± 15.6 years, $m \pm SD$, $P < 0.001$). Similarly, GERD symptoms were less frequent in these patients than in those whose diagnosis was known ($P < 0.001$). For the 3594 other patients (89%), the diagnosis of GERD had been known for four years (median) and had been established by a GP for 76.9% and by a gastroenterologist for 19.4%. At least one upper gastrointestinal endoscopic procedure had been performed for 64% of patients and had demonstrated esophagitis in 72% of the explored patients (grade I-II: 86%). For 21% of patients with GERD, the reason for consulting was related to GERD; these patients accounted for 2.1% of the patients consulting the day of the study.

Prevalence of associated atypical manifestations

Among the patients with GERD, 70.3% complained of epigastric burning pain. At least one extradigestive symptom related to GERD (see methods) was noted for 47% of patients. The presence of extradigestive symptoms — chronic cough, chronic hoarseness, recurrent rhinopharyngitis, chest pain — was reported for 31%, 20%, 12% and 22% of patients, respectively. These percentages were similar for men and women, except for chest pain which was significantly more frequent among men (24 vs 20%, $P = 0.01$). There was a significant increase in chronic cough ($P < 0.001$), chronic hoarseness ($P < 0.001$), and chest pain ($P < 0.001$) with age. Inversely, the prevalence of recurrent rhinopharyngitis decreased with age ($P < 0.001$) (figure 2).

Smokers reported extradigestive manifestations significantly more often than non-smokers (52% vs 46%, $P < 0.001$). Chest pain was significantly less frequent among women (0.8-fold

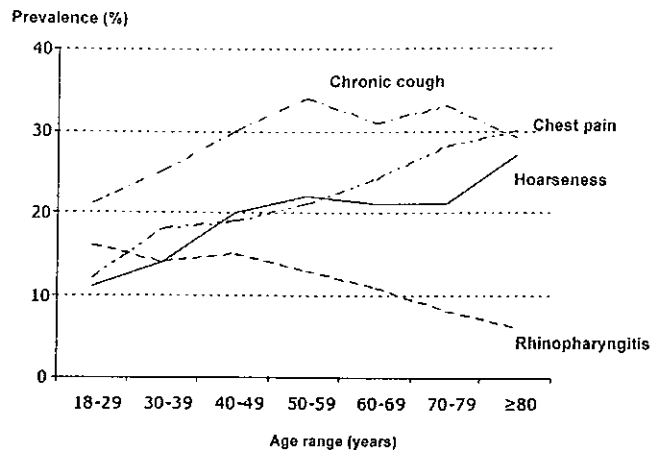


Fig. 2 – Prevalence of extra-digestive symptoms in patients with typical symptoms of gastroesophageal reflux disease within a group of consulting patients in primary care.

Prévalence selon l'âge des symptômes atypiques chez des malades ayant une symptomatologie de reflux gastro-œsophagien dans la population consultant en médecine générale.

risk). The presence of atypical symptoms was significantly more frequent among patients who had GERD symptoms at least once a week than among those whose symptoms occurred less than once a week (56% vs 35%, $P < 0.001$). This difference was also noted for each extradigestive symptom considered individually.

The clinical characteristics significantly related to the presence of extra-digestive symptoms were, after adjustment: frequent typical symptoms, nocturnal symptoms, known esophagitis, smoking, and to a lesser degree, prior knowledge of GERD and presence of regurgitation (table I). BMI did not appear to affect extra-digestive symptoms.

Table I. – Characteristics of reflux significantly associated with non digestive symptoms in patients consulting in primary care for any reason, but indicating after a systematic questionnaire they had heartburn and/or regurgitation.

Figures in the table are the calculated risk to present the non digestive symptom according to the presence or the absence of the tested factor in the regression analysis.

Facteurs significativement associés à la présence de manifestations extra-digestives chez des malades vus en médecine générale ayant indiqué la présence d'un pyrosis et/ou d'une régurgitation.

Les valeurs indiquées correspondent au risque relatif d'avoir la manifestation extra-digestive selon l'existence ou non du facteur testé dans le modèle de régression logistique.

	Odds ratio [IC 95%]				
	≥ 1 extra-digestive manifestation	Chronic cough	Hoarseness	Recurrent rhino-pharyngitis	Chest pain
Female gender					0.842 [0.712 ; 0.995]
Smoking	1.246 [1.069 ; 1.452]	1.460 [1.234 ; 1.728]	1.264 [1.045 ; 1.528]		
Nocturnal symptom	1.829 [1.592 ; 2.100]	1.856 [1.585 ; 2.173]	1.915 [1.595 ; 2.300]	1.577 [1.272 ; 1.959]	1.509 [1.268 ; 1.795]
Prior esophagitis	1.555 [1.348 ; 1.795]	1.447 [1.233 ; 1.697]	1.337 [1.120 ; 1.594]		1.813 [1.531 ; 2.147]
Acid regurgitations	1.252 [1.055 ; 1.486]				1.658 [1.310 ; 2.099]
Frequent typical symptoms	1.921 [1.644 ; 2.245]	2.120 [1.749 ; 2.570]	1.812 [1.451 ; 2.263]	1.515 [1.171 ; 1.960]	1.803 [1.459 ; 2.227]
Known GERD	1.445 [1.135 ; 1.838]	1.814 [1.328 ; 2.479]			

Quality-of-life in patients with GERD

Among the 4124 patients included in the survey who presented typical symptoms of GERD, 2467 (59.8%) responded to the QoL questionnaire. Patients who responded to the QoL questionnaire did not differ from the other patients regarding gender, GERD as the reason for consultation, time since diagnosis of GERD, or symptom frequency. The patients who responded to the QoL questionnaire were however slightly older (56 ± 15 vs 55 ± 16 years, $P = 0.012$) and had a higher BMI (26.0 ± 4.5 vs 25.7 ± 4.3 kg/m², $P = 0.042$).

The overall QoL score (median 67, Q1-Q3 53-80) was significantly more affected in women (66, 52-79) than in men (69, 54-82, $P = 0.006$). The overall QoL score differed significantly between age groups with the lowest score observed in the 50-59 age group and the highest in the 70-79 year age group. Similarly, QoL was more affected in patients with a high BMI (59, 51-66 vs 69, 55-82 for BMI > 40 vs BMI 20 to 25, $P < 0.002$).

The QoL scores are presented in table II by dimension explored. The most affected scores, i.e. less than or equal to the median overall score (score = 67) were noted for diet (score = 56), psychology (score = 64), well-being (score = 66), daily life (score = 67). The two items within each dimension contributing most to altered QoL are indicated in table III. Four situations (corresponding to four items) could be distinguished as contributing most to altered QoL in one quarter to one third of patients: bothersome digestive disorders (31.9%), avoiding large meals (31.5%), requirement to wait after dinner before going to bed (28.4%), and the feeling of not getting enough sleep (25.8%).

All QoL dimensions were significantly more altered ($P < 0.001$) with higher symptom frequency (figure 3), presence of atypical extra-digestive symptoms, and severer endoscopic lesions at prior explorations. Likewise, QoL scores were significantly lower ($P < 0.001$) among patients who had symptoms both during the day and at night than among those who had symptoms only during the day or only during the night (figure 4).

Management practices

Among the 440 patients whose diagnosis of GERD was established during the consultation on the day of the study, 37%

Table II. – Quality of life scores (median – interquartiles) of patients with typical symptoms of gastroesophageal reflux disease within a group of consulting patients in primary care.

Scores (médianes et interquartiles) de qualité de vie des malades ayant des symptômes de RGO et consultant en médecine générale.

	Scores
Daily life	67 (50-83)
Relational life	75 (50-100)
Well being	66 (50-78)
Psychology	64 (46-82)
Worries	80 (60-90)
Sleep	70 (50-85)
Diet	56 (44-81)
Overall score	67 (53-80)

Table III. – Response rate (%) inside each of the seven dimension of the quality of life questionnaire. For each dimension, the 2 questions with the higher percentage of response are only shown. Number of patients responding to the quality of life questionnaire, $N = 2\ 467$.

Taux de réponse (en pourcentage) aux deux questions à l'intérieur de chacune des 7 dimensions du questionnaire qualité de vie ayant entraîné les taux de gêne les plus élevés des malades ayant des symptômes de RGO et consultant en médecine générale. Nombre de malades ayant répondu au questionnaire de qualité de vie, $N = 2\ 467$.

	Response rate ^{1,2,3}
Daily life (N = 6)	
Are you bothered when you wear tight clothes ² ?	22.0
Do you avoid movements which aggravate your digestive disorders ¹ ?	18.4
Relational life (N = 2)	
During meals, do you feel uneasy with others ¹ ?	11.4
Outside meals, do you feel uneasy with others ¹ ?	10.5
Well being (N = 8)	
Is eating a pleasure for you ³	21.3
Do you feel tired ¹ ?	21.0
Psychology (N = 7)	
Are you upset because of your digestive disorders ¹ ?	31.9
Do you worry about your digestive disorders ¹ ?	24.4
Worries (N = 5)	
Do you think your digestive disorders are getting worse ² ?	18.8
Do you worry about not finding a solution to your digestive disorders ² ?	13.5
Sleep (N = 5)	
Do you get enough sleep ³ ?	25.8
If you wake up at night do you have a hard time getting back to sleep ² ?	20.5
Diet (N = 4)	
Do you avoid large meals because you worry about digestive disorders ¹ ?	31.5
Do you have to wait to go to bed after eating ¹ ?	28.4

N : number of questions in the dimension considered.

The response rate corresponds to the rate of unfavorable responses, i.e. percentage of patients who ticked one of the two most unfavorable responses to the question:

¹ Often - always

² Very often - enormously

³ Never - rarely.

stated they avoided eating certain foods and 52% that they had used self-medication.

Among the patients whose diagnosis of GERD was known 88% had received a prescription for their disease during the preceding year. Fifty-seven percent had a permanent treatment, 30% an intermittent treatment and 13% had had only one period of treatment. Among the patients with permanent treatment, two-thirds were taking medications "on demand". Proton pump inhibitors had been prescribed for 73.7% of patients during the preceding year, at half dose for 56% of them.

Among the 440 patients whose diagnosis of GERD was established the day of the study, an upper endoscopic exploration was prescribed for 73 (17%). The proportion of prescribed endoscopic procedures was not significantly higher among patients aged over 50 years (17% vs 22%).

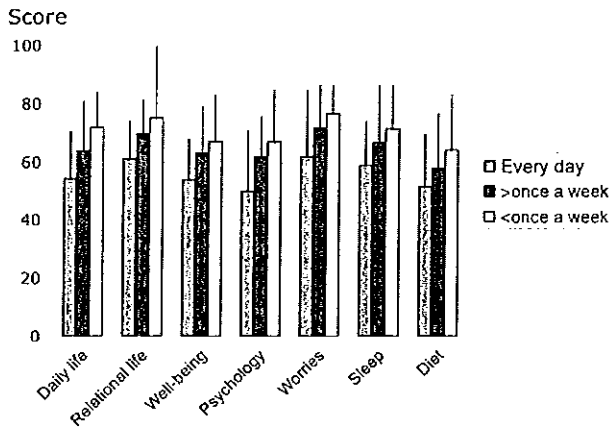


Fig. 3 – Scores of dimensions of quality of life, expressed as median and 3rd interquartile range (questionnaire RefluxQual[®]) according to the rate of occurrence of symptoms (heartburn and/or regurgitation) in patients with typical symptoms of gastroesophageal reflux disease within a group of consulting patients in primary care.

Médianes des scores des dimensions de qualité de vie avec la valeur du 3^{ème} interquartile (Questionnaire RefluxQual[®]) selon la fréquence de survenue des symptômes (pyrosis et/ou régurgitation) chez des malades ayant une symptomatologie de reflux gastro-œsophagien dans la population consultant en médecine générale.

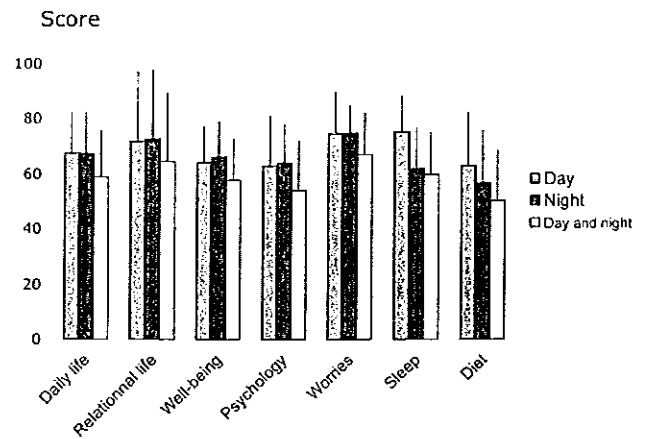


Fig. 4 – Scores of dimensions of quality of life, expressed as median and 3rd interquartile range (questionnaire RefluxQual[®]) according to the diurnal and/or nocturnal occurrence of symptoms in patients with typical symptoms of gastroesophageal reflux disease within a group of consulting patients in primary care.

Médianes des scores des dimensions de qualité de vie avec la valeur du 3^{ème} interquartile (Questionnaire RefluxQual[®]) selon la survenue diurne et/ou nocturne des symptômes chez des malades ayant une symptomatologie de reflux gastro-œsophagien dans la population consultant en médecine générale.

Discussion

According to our findings the estimated prevalence of typical GERD in the general adult population attending primary care consultations with GPs in France is approximately 10%. For persons experiencing symptoms at least once a week, the prevalence of typical GERD is about 7%. Considering all manifestations of GERD, the prevalence is necessarily higher since the typical symptoms used in epidemiological studies are specific but not particularly sensitive for the diagnosis of GERD [7]. Although the prevalence of typical GERD observed in this study is lower than reported in several prior studies [3, 4, 11, 14, 15], the figures we obtained are probably quite representative since they were generated by a very large sample of nearly 41000 adults patients; they were "detected" by simple history taking, and data gathered to characterize the GERD was obtained with a face-to-face interview with the GP and not with a self-administered questionnaire. It is also important to note that the GPs participating in this study can be considered as representative of the urban-rural distribution of GPs in France. The mean number of consultations reported for the study day is close to the national mean reported in a recent survey [16]. The participation rate of the GPs was high (80%); participating GPs were not different from those who did not participate. Nevertheless, the prevalence determined here cannot be considered as representative of the entire French population since the sample was taken from patients consulting GPs, which corresponds to a population with characteristic features different from the French population aged over 18 years, particularly for mean age (47 years vs 52 years in our population of patients consulting GPs) and for gender (52.2% women vs 58.9% in our consulting population) [<http://www.recensement.insee.fr>]. Despite these limitations, the approach used in this study can compensate for certain biases such as those related to postal questionnaires. Widely used, postal questionnaires are usually sent to an initial sample representative of the target population. But certain subgroups tend to respond more than others (particularly older subjects) with the risk of an over-representation of symptomatic subjects [4, 17]. This is also the case in our study for the QoL questionnaire although the age difference remained minimal.

These methodological differences can explain a large part of the discordance observed. In an earlier study on a sample of representative French adults questioned during a phone interview, we noted a 27% prevalence of regurgitation [1], but when the frequency criterion is introduced, the figures become much closer, the prevalence of regurgitation alone at least once a week being 10% [1]. Prevalence estimates closer to ours were also reported in populations from Norway, England, and Spain (10%, 18% and 10%, respectively) [18-20], as well as in a French population recruited with a postal questionnaire [21].

It is interesting to note that on the day of the study, only 2.1% of patients consulted for typical symptoms of GERD. This relatively low figure suggests that reflux, at least its typical presentation, is not a frequent reason for seeking care once treatment is instituted (88% of these patients had had a treatment in the preceding year). Logically, symptom frequency appears to be a factor favoring consultation, as has been observed previously [5].

The higher prevalence estimates for men and older subjects, with a peak in our study in the 50-59 year age group, has been reported variably [1, 2, 4, 11]. The reduction in prevalence observed in older subjects could also be related to lesser sensitivity of the esophageal mucosa [22, 23]. Because of this lesser sensitivity, a certain proportion of older subjects with GERD might be missed in epidemiological studies where diagnosis is based on the presence of typical symptoms.

This work confirmed the relatively high prevalence of dyspepsia and extra-digestive symptoms in patients with typical symptoms of GERD. The prevalence of epigastric burning was about the same as heartburn. This might reflect the difficulties encountered by both patients and physicians to clearly distinguish between these two symptoms; as is often reported in English-speaking populations as a reflux-like dyspepsia and appears to be a frequent symptom and clearly associated with typical symptoms of GERD [4, 7].

The prevalence of extra-digestive manifestations which could be related to GERD are rarely studied in epidemiological surveys on GERD. Data collection by GPs ensures quality information and limits possible confusion or misunderstandings which can arise with self-administered questionnaires. Our study showed

that cough, hoarseness and chest pain are associated with typical symptoms in more than 20% of patients. We have no data to compare these percentages with those in consulting patients without GERD, but the general level is in line with other studies. Thus, the 22% prevalence observed here for chest pain was midway between the prevalence reported in an American study (about 34%) and another from Scandinavia (16%) in GERD patients but much higher than in the population without GERD in the American study (7.9%) [4, 14]. Similar patterns were found for cough. Chronic hoarseness has not been searched for in all surveys despite its prevalence, found in one out of five patients in this study. Hoarseness is considered to be related to GERD in 10% of patients attending ENT consultations, but the prevalence of hoarseness in patients with typical GERD symptoms is not clearly established [24]. The estimate from our study shows that clinicians should search for this symptom in their patients. The multivariate analysis showed that, at least in the context of patients with typical symptoms of GERD, factors of disease severity, particularly nocturnal symptoms and chronic reflux, increase the probability of associated atypical manifestations (table I).

We did not perform a direct comparison with healthy subjects since our questionnaire was specifically designed for GERD patients, but our study tends to confirm an altered QoL in patients with GERD. Our findings also show that symptom frequency, diurnal and nocturnal symptoms, and severe endoscopic lesions are associated with greater impact on QoL [9, 25]. The overall QoL score measured in nearly 2500 patients in this study was about the same as in the validation study or in other clinical studies using the Reflux-Qual questionnaire, confirming the homogeneous nature of these measurements of QoL in this group of patients [9, 10]. Although our study did not provide an explanation for these characteristics, it is important to note that the GERD-related QoL is more altered in women and in individuals with a higher BMI. Most importantly, our study demonstrated the important impact of these symptoms on the patient's psychological equilibrium, sleep and dietary habits (table II).

Analysis of the items concerning therapeutic management demonstrated that self-medication is widely used and also that 9 out of 10 patients with known GERD have taken at least one medication during the preceding year, for half of them on a continuous or an "on demand" basis. These treatments appear to have become habitual, perhaps in response to patient demand. Inversely, it is important to note that among patients whose GERD was diagnosed the day of this study, upper endoscopy was not prescribed more often in patients aged over 50 years as was recommended by the French-Belgium consensus conference in 1999 [26]. This result shows that practice guidelines are implemented with a certain delay [1].

In conclusion, this study demonstrated that the prevalence of GERD in France is to the order of 10%, with a male predominance. The important impact on QoL is confirmed with a marked effect on eating habits, psychology, well-being, and daily life. Our study established a link between a higher frequency of extradigestive manifestations and greater severity of typical symptoms.

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