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Epidemiological, Clinical Aspects and Factors Associated with Typical Gastroesophageal Reflux Disease in the General Population of Parakou, Republic of Benin

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Abstract

Introduction: Gastroesophageal reflux disease (GERD) is a benign and chronic disease that can impair the quality of life. **Objective:** To study the epidemiological, clinical aspects and factors associated with typical GERD in the general population of Parakou in the Republic of Benin. **Methods:** This was a descriptive and analytical cross-sectional study with prospective data collection which took place from May 1, 2019 to June 30, 2019. The study population consisted of any subject aged at least 15 years and living in Parakou. Subjects aged at least 15 years, present on the day of the survey and having given their free and informed verbal consent were included. The Short form of QRS® (Reflux-Qual Short form) questionnaire and the "Hospital Anxiety and Depression" score were used to assess the quality of life and anxiety/depression, respectively. The sampling was probabilistic through a 2-stage cluster sampling. The variable of interest was the presence of GERD. **Results:** Out of 390 subjects surveyed, 28 had symptoms of typical GERD, representing a prevalence of 7.18%. The average age of these subjects was 27.11 ± 7.88 years. Fifteen subjects (53.57%) were male, giving a sex ratio of 1.15. Fourteen (50%) had a secondary level of education, 12 (42.86%) were pupils/students, 18 (64.29%) were single. The monthly income of 22 subjects (78.57%) was lower than the guaranteed interprofessional minimum wage (40,000 FCFA). The average duration of progression of symptoms was 15.89 ± 4.97 months. Symptoms occurred less than twice a week in 22 subjects (78.57%). The clinical manifestations were both diurnal and nocturnal in 12 subjects (42.86%). None of the 28 subjects with GERD had clinical warning signs. Asthma, diabetes, consumption of high fat or spice foods, carbonated drinks, non-steroidal an-

ti-inflammatory drugs, alcoholic beverages and tobacco were statistically associated with the occurrence of GERD. Each of the 28 subjects had at least one associated factor. A significant impair in quality of life was observed in 27 patients (96.43%). **Conclusion:** Typical GERD is relatively common in the general population of Parakou in the Republic of Benin. It often affects young males. Among the risk factors identified, the most common are carbonated drinks, spicy meals and diabetes. GERD significantly impairs quality of life. Raising awareness about the disease and its associated factors is necessary among the general population.

1. Introduction

Gastroesophageal reflux disease (GERD) is the intermittent passage of part of the gastric contents into the esophagus through the cardia without vomiting, causing symptoms and/or complications [1]. Due to the chronic nature of the disease and the frequent need for management, it weighs heavily on the quality of life of patients. In the long term, it poses a risk of esophageal adenocarcinoma through Barrett's esophagus [2].

The global prevalence of GERD varies considerably depending on the geographic region and the criteria used to define it [3]. El-Serag *et al.* [4] in a systematic review published in 2014, concluded at a prevalence of 10% to 20% in Europe and the United States and a prevalence of less than 5% in East Asia. In emerging countries, this prevalence is poorly understood. The surveys carried out in these countries have led to variable estimates depending on the criteria used for the definition of GERD [5]. In Africa, a limited number of hospital-based studies have been reported on GERD and its complications. General population studies describing its prevalence are even rarer, if not non-existent to our knowledge.

GERD has various clinical manifestations. Only the typical forms with pyrosis and regurgitation will be the subject of this study. In this case, the diagnosis is easy and does not require paraclinical explorations [3]. Some risk factors for GERD have been considered: overweight, obesity, fatty foods, high spice foods, carbonated drinks, alcoholic beverages, tobacco, non-steroidal anti-inflammatory drugs (NSAIDs) [6] [7] [8] [9] [10]. The objective of this work is to study the epidemiological, clinical aspects and factors associated with typical GERD in the general population of Parakou in the Republic of Benin.

2. Study Methods

2.1. Type and Period of Study

This was a descriptive and analytical cross-sectional study with prospective data

collection conducted from May 1, 2019 to June 30, 2019.

2.2. Study Site

The study took place in the city of Parakou, located in the northern part of the Republic of Benin.

2.3. Study Population

The study population consisted of any subject aged at least 15 years, living in the city of Parakou.

- *Inclusion criteria*

Subjects aged at least 15 years, present on the day of the survey and having given their free and informed verbal consent to participate in the study were included.

- *Non-inclusion criteria*

Subjects with a mental disability or unable to express themselves were not included.

2.4. Diagnostic Criteria

- GERD in its typical form was considered to exist when the subject had both heartburn and regurgitation.

- The impact of GERD on the quality of life of subjects over the last four weeks was specifically assessed using the short form of QRS$^{®}$ (Reflux-Qual-Short form) questionnaire.

- Anxiety and depression were assessed using a standard questionnaire (the score of Hospital Anxiety and Depression).

2.5. Sampling

The minimum sample size was calculated by SCHWARTZ formula

$$n = k * \frac{z^2 pq}{i^2} = 2 * \frac{(1.96)^2 * 0.145 * 0.855}{(0.0495)^2} = 388.74 \text{, or 389 subjects}$$

k: Cluster effect = 2; z: Statistic gap reduced to risk α = 1.96; p: Prevalence of GERD in Abidjan = 14.5 % [11]; q: 1 − p = 85.5%; i = 4.95% (Desired precision for our results).

The minimum sample size was therefore 389 subjects. The number of clusters recommended by the World Health Organization (WHO) is 30. Thus, 389/30 gives 12.96 subjects or 13 subjects to be investigated per cluster. So, our sample size comes to 390 subjects (13 × 30).

2.6. Sampling Method and Technique

Probabilistic sampling using a two-stage cluster sampling technique was carried out. The first degree represented the neighborhoods and the second degree constituted the subjects. The statistical unit was represented by any subject meeting

our eligibility criteria. The sampling frame consisted of the list of 42 neighborhoods in the city of Parakou with their respective households.

2.7. Selection of Thirty Clusters

The selection of the clusters took place as follows:

- a list of all the neighborhoods of the city of Parakou with their total number in one column and the cumulative number in the second column were drawn up.

- the cluster step k which is equal to the ratio of the total cumulative number to the number of clusters (30 clusters) was calculated.

- a number (n_1) was drawn at random between 1 and k (cluster step). The first cluster was the neighborhood whose population contains n_1.

- the second cluster n_2 was selected by adding the step k to the number n_1 ($n_2 = n_1 + k$).

- the other clusters were selected by each time adding k to the last number found, that is to say $n_3 = n_2 + k$ and so on until the 30 clusters were selected.

2.8. Drawing of Houses

After calculation and drawing, 20 neighborhoods of the city were selected, each having at least one cluster. When we arrived in the neighborhood, we contacted the neighborhood leader and explained to him the purpose of our work. He showed us the limits of his zone as well as the center. We placed ourselves in the center of the neighborhood and randomly drew a direction (using spin-the-pen method). Once the direction had been chosen, we entered one house out of 2, starting on the right side. The choice of the first house to investigate on this side was made randomly between the first house and the second house encountered. There may be one or more households per house.

2.9. Drawing of Households

When several households in the same concession contained people aged 15 or over, each household was numbered on a piece of paper. After all the pieces of paper thus obtained had been mixed in a hat, a third party was asked to draw one of them at random. The number written on the piece of paper corresponded to the household selected for the survey in this concession. Thus, only one household per house was taken into account in the survey.

2.10. Drawing of Subjects in Households

If a household had several people eligible for the survey, the selection technique consisted of numbering each person on a piece of paper and drawing one at random. The number on the drawn piece of paper corresponded to the person in that household selected for the survey.

2.11. Variables

The variable of interest was the presence of signs of typical GERD (both heart-

burn and regurgitation). The other variables studied were the sociodemographic (age, sex, level of education, marital status, socio-professional status, monthly income), clinical characteristics (clinical manifestations and their characteristics) and those relating to medical history (risk factors) and quality of life of the subjects (see the survey sheet in the **Appendix**).

2.12. Data Collection

The data were collected through a semi-structured individual interview, then transcribed onto a survey sheet designed for this purpose (**Appendix**).

2.13. Data Processing and Analysis

The data analysis was carried out using Epi Info version 7.2 software. Quantitative variables were expressed as mean with standard deviation when the distribution was normal and qualitative variables as numbers and percentages.

2.14. Ethical Considerations

The Local Ethics Committee for Biomedical Research of the University of Parakou gave its agreement to carry out the study (N°0255/CLERB-UP/P/SP/R/SA). The data collected was processed confidentially. Subjects with GERD immediately received dietary advice and were referred for a gastroenterology consultation.

3. Results

A total of 390 households were surveyed. Informed consent was obtained from all of them. The study therefore included 390 subjects, for a participation rate of 100%.

3.1. Sociodemographic Characteristics of the General Population

The average age of the respondents was 26.92 ± 7.25 years with the extremes of 15 and 66 years. The age group between 25 and 45 years (51.54%) was the most represented. Two hundred and fifty-five (65.38%) were male, giving a sex ratio of 1.89.

3.2. Prevalence of GERD in the General Population

In the general population of Parakou, 28 subjects in the 390 surveyed had typical clinical manifestations of GERD (regurgitation and heartburn at the same time), representing a prevalence of 7.18%.

3.3. Characteristics of Subjects with GERD

- *Sociodemographic data*

The average age of subjects with GERD was 27.11 ± 7.88 years with the extremes of 15 and 45 years. Fifteen subjects (53.57%) were male, giving a sex ratio of 1.15.

Among the subjects with GERD, 14 (50%) had a secondary level of education, 12 (42.86%) were pupils or students, 18 (64.29%) were single. The monthly income of 22 subjects (78.57%) was lower than the guaranteed interprofessional minimum wage (40,000 FCFA). Table 1 shows the distribution of subjects with GERD according to sociodemographic data.

- *Data relating to risk factors and comorbidities of GERD*

Twenty-one subjects (75%) out of the 28 with GERD consumed carbonated drinks and 07 (25%) were asthmatic. In terms of anthropometric data, the average waist circumference of subjects with GERD was 79.57 ± 12.57 cm with the extremes of 64 and 116 cm. All 15 men with GERD had a waist circumference less than 94 cm and 8 women (61.54%) out of the 13 with GERD had a waist circumference greater than 80 cm.

Table 1. Distribution of subjects with GERD according to sociodemographic data (Population of Parakou, 2019, n = 28).

	Size	%
Sex		
Male	15	53.57
Female	13	46.43
Age (years)		
<25	13	46.43
[25 - 45]	15	53.57
≥45	00	00.00
Level of education		
None	02	07.14
Primary	05	17.86
Secondary	14	50.00
Higher	07	25.00
Socio-professional status		
Pupil/Student	12	42.86
Trader/Reseller	05	17.86
Housekeeper	04	14.29
Farmer/Breeder	04	14.29
Artisan/Laborer	03	10.70
Marital status		
Single	18	64.29
Married	10	35.71
Monthly income (FCFA)		
<40,000	22	78.57
[40,000 - 100,000]	06	21.43
≥100,000	00	00.00

In the population of subjects with GERD, the average weight was 64.17 ± 14.61 kg with the extremes of 40 kg and 98 kg. Two subjects (07.14%) were obese. Table 2 shows the distribution of subjects with GERD according to risk factors and comorbidities.

- Clinical data

Two hundred and eighty-four subjects (72.82%) did not present any symptoms related to GERD; 57 (14.62%) reported isolated heartburn; 21 (5.38%) had isolated regurgitation and 28 subjects (7.18%) had both heartburn and regurgitation (typical GERD). The average duration of progression of symptoms was 15.89 ± 4.97 months with the extremes of 1 month and 24 months. Symptoms occurred less than twice a week in 22 subjects (78.57%). The clinical manifestations were both diurnal and nocturnal in 12 subjects (42.86%), only diurnal in 11 (39.28%) and only nocturnal in 5 (17.86%).

None of the 28 subjects with GERD in this study had clinical warning signs such as dysphagia, odynophagia, weight loss, or externalized gastro-intestinal bleeding.

- Data relating to anxiety, depression and quality of life

Among subjects with GERD, 06 (21.43%) had definite anxiety and 01 (03.57%) had definite depression. As for the alteration of quality of life, it was moderate or severe in 27 (96.43%). Table 3 shows the distribution of subjects with GERD according to anxiety, depression and quality of life.

Table 2. Distribution of subjects with GERD according to risk factors and comorbidities (Population of Parakou, 2019, n = 28).

	Size	%
Comorbidities		
Asthma	07	25.00
Diabetes	03	10.71
Risk factors		
Consumption of carbonated drinks	21	75.00
Consumption of high spice foods	20	71.43
Consumption of high fat foods	16	57.14
Use of non-steroidal anti-inflammatory drugs	13	46.43
Consumption of alcoholic beverages	12	42.86
Tobacco consumption	04	14.29
Waist circumference ≥ 94 cm in men (n = 15)	00	00.00
Waist circumference ≥ 80 cm in women (n = 13)	08	61.54
Overweight (BMI between 25 and 29.99 kg/m^2)	07	25.00
Obesity (BMI ≥ 30 kg/m^2)	02	07.14

BMI = Body Mass Index.

Table 3. Distribution of subjects with GERD according to anxiety, depression and quality of life (Population of Parakou, 2019, n = 28).

	Size	Percentage (%)
Anxiety		
Absent	13	46.43
Doubtful	09	32.14
Definite	06	21.43
Depression		
Absent	21	75.00
Doubtful	06	21.43
Definite	01	03.57
Impairment of quality of life		
Absent/Mild	01	03.57
Moderate/Severe	27	96.43

3.4. Factors Associated with GERD

As shown in Table 4, asthma, diabetes, consumption of fatty or spicy foods, carbonated drinks, non-steroidal anti-inflammatory drugs, alcoholic beverages and tobacco were statistically associated with the occurrence of GERD. Asthma, diabetes, overly fatty meals, spicy meals, soft drinks, non-steroidal anti-inflammatory drugs, alcoholic beverages and smoking all increase the risk of GERD by a factor of 5 (p = 0.0001); 7 (p = 0.0002); 5 (p = 0.0001); 7 (p = 0.0001); 8 (p = 0.0001); 6 (p = 0.0001); 5 (p = 0.0001); 4 (p = 0.0048) respectively. Each of the 28 subjects with GERD had at least one of these associated factors found in the study. The presence of GERD significantly impairs the quality of life of the subject who suffers from it.

On the other hand, age (p = 0.7638), sex (p = 0.1726), level of education (0.2666), socio-professional status (p = 0.8336), marital status (p = 0.4141), monthly income (p = 7934), body mass index (p = 0.7048), anxiety (p = 0.4239) and depression (p = 0.4599) were not statistically associated with the occurrence of GERD (Table 5). However, GERD was more common in male subjects, with secondary education, pupils or students, single, with low monthly income, without overweight or obesity and without anxiety or depression.

4. Discussion

This study looked at the typical form of GERD. Therefore, the diagnosis was clinical based on the presence of heartburn and regurgitation. It allowed us to determine the prevalence of this disease in its typical form in the general population as well as the factors associated with it in Parakou in the Republic of Benin. In Africa, studies on the prevalence of GERD in the general population are almost non-existent, which makes the present study both original and difficult to compare with other studies.

In the present study, the prevalence of GERD was 7.18%. Lohouès-Kouacou *et al.* [11] in 2013 in Côte d'Ivoire, Wang *et al.* [12] in 2003 in China, Alsuwat *et al.* [13] in 2016 in Saudi Arabia, Spantideas *et al.* [14] in 2013 in Greece, Manterola *et al.* [15] in 2017 in Chile, found prevalences in the general population that were 14.5%; 16.98%; 28.7%; 52.0%; 44.8% respectively. This disparity in prevalence may be related to the diagnostic criteria used.

Table 4. Data from subjects included in the study associated with the occurrence of GERD (Population of Parakou, 2019, n = 390).

		Occurrence of GERD						
	Total	Yes		No		PR	CI$_{95\%}$	*p*
		n	%	n	%			
Asthma								0.0001
No	366	21	05.74	345	94.26	1		
Yes	24	07	29.17	17	70.83	5.08	[2.36 - 10.75]	
Diabetes								0.0002
No	383	25	06.53	358	93.47	1		
Yes	07	03	42.86	04	57.14	6.56	[2.58 - 16.73]	
Consumption of high fat foods								0.0001
No	308	12	03.90	296	96.10	1		
Yes	82	16	19.51	66	80.49	5.01	[2.47 - 10.16]	
Consumption of high spice foods								0.0001
No	292	08	02.74	284	97.26	1		
Yes	98	20	20.41	78	79.59	7.45	[3.38 - 16.37]	
Consumption of carbonated drinks								0.0001
No	286	07	02.45	279	97.55	1		
Yes	104	21	20.19	83	79.81	8.25	[3.61 - 18.83]	
Use of NSAIDs								0.0001
No	338	15	04.44	323	95.56	1		
Yes	52	13	25.00	39	75.00	5.63	[2.84 - 11.15]	
Consumption of alcoholic beverages								0.0001
No	339	16	04.72	323	95.28	1		
Yes	51	12	23.53	39	76.47	4.98	[2.50 - 9.92]	
Tobacco consumption								0.0048
No	374	24	06.42	350	93.58	1		
Yes	16	04	25.00	12	75.00	3.89	[1.53 - 9.90]	
Impairment of quality of life								0.0001
Absent/Mild	271	01	0.37	270	99.63	1		
Moderate/severe	119	27	22.69	92	77.31	61.49	[8.45 - 47.25]	

Table 5. Data from subjects included in the study, not associated with the occurrence of GERD (Population of Parakou, 2019, n = 390).

	Total	Yes		No		PR	CI₉₅%	*p*
		n	**%**	**n**	**%**			
Sex								0.1726
Male	255	15	05.88	240	94.12	1		
Female	135	13	09.63	122	90.37	1.64	[0.80 - 3.34]	
Age (years)								0.7638
<25	183	14	07.65	169	92.35	1		
[25 - 45]	201	14	06.97	187	93.03	0.91	[0.44 - 1.86]	
≥ 45	06	00	00.00	06	100.00	-	-	
Level of Education								0.2666
Literate	04	00	00.00	04	100.00	-	-	
None	79	02	02.53	77	97.47	0.38	[0.08 - 1.92]	
Primary	76	05	06.58	71	93.42	1		
Secondary	173	14	08.09	159	91.91	1.23	[0.45 - 3.29]	
Superior	58	07	12.07	51	87.93	1.83	[0.61 - 5.48]	
Socio-professional status								0.8336
Housekeeper	56	04	07.14	52	92.86	1		
Artisan/laborer	120	03	02.50	117	97.50	0.35	[0.08 - 1.51]	
Trader	50	05	10.00	45	90.00	1.40	[0.39 - 4.92]	
Farmer	33	04	12.12	29	87.88	1.69	[0.45 - 6.33]	
Official	10	00	00.00	10	100.00	-	[0.61 - 5.72]	
Pupil/student	115	12	10.43	103	89.57	1.46	[0.49 - 4.32]	
Unemployed	06	00	00.00	06	100.00	-	[0.16 - 6.84]	
Marital status								0.4141
Single	222	18	08.11	204	91.89	1		
Married	168	10	05.95	158	94.05	0.73	[0.34 - 1.55]	
Monthly income (FCFA)								0,7934
<40,000	317	22	06.94	295	93.06	1		
[40,000 - 100,000]	70	06	08.57	64	91.43	1.23	[0.52 - 2.93]	
≥100,000	03	00	00.00	03	100.00	-		
Body mass index								0.7048
Thinness	42	04	09.52	38	90.47	1.45	[0.50 - 4.15]	
Normal	228	15	06.58	213	93.42	1		
Overweight	77	07	09.09	70	90.91	1.38	[0.58 - 3.26]	
Obesity	43	02	04.65	41	95.35	0.71	[0.17 - 2.98]	

Continued

Anxiety							0.4239
Absent	197	13	06.60	184	93.40	1	
Doubtful	141	09	06.38	132	93.62	0.97	[0.42 - 2.20]
Definite	52	06	11.54	46	88.46	1.74	[0.69 - 4.38]
Depression							0.4599
Absent	269	21	07.81	248	92.19	1	
Doubtful	80	06	07.50	74	92.50	0.96	[0.40 - 2.29]
Definite	41	01	02.44	40	97.56	0.31	[0.04 - 2.26]

In this study, the manifestations of GERD remain dominated by isolated heartburn (14.62%) followed by the association of heartburn and regurgitation (7.18%). Isolated regurgitations are less frequent (5.38%). The same observation was made in a Burundian study in 2013 among students: isolated heartburn was noted in 81.1% of cases, isolated regurgitation in 2.7% of cases, the association of heartburn and regurgitation in 16.2% of cases [16].

Age was not associated with the occurrence of GERD in the present study. This is similar to the results reported by Sharma *et al.* [17] in 2018 in India, Lohouès-Kouacou *et al.* [11] in 2013 in Ivory Coast who separately looked for an association between heartburn and age then between regurgitation and age. They did not find a significant association. This proves that GERD can occur at any age.

In the present study, diabetes was associated with the occurrence of GERD, increasing the risk by around 7-fold. This result is corroborated by Nishida *et al.* [18] in Japan who noted that the prevalence of GERD in patients with diabetes was 25.3% compared to 9.5% in the control group (p = 0.02). In a study by Wang *et al.* [19] in the United States, the prevalence of GERD was 40.7% among patients with diabetes. This could be explained by diabetic neuropathy which is responsible for gastroparesis in these patients. Indeed, gastroparesis leads to a delay in gastric emptying and subsequently to GERD [20].

Some asthmatic patients had symptoms of GERD before or during asthma attacks [21]. In the present study, of 24 asthmatic subjects, 7 (29.17%) had GERD, and this association was statistically significant. In an American meta-analysis, the prevalence of symptoms of GERD was 59.2% in asthmatic patients and 38.1% in control subjects [22]. This issue surrounding the association of GERD and asthma suggests that there is a link between the two pathologies. During 24-hour pH monitoring, a temporal association between reflux and respiratory symptoms has been documented in 45% to 75% of cases [23]. It appears that asthma is accompanied by GERD but the causal links remain poorly understood.

In this study, tobacco consumption was statistically associated with GERD. In a Norwegian study, Nilsson *et al.* [24] noted that smoking six (6) or more cigarettes per day is a risk factor for GERD. Another study conducted in Germany

reveals that the increase in the number of cigarettes smoked per day is directly proportional to the increased risk of more serious symptoms [25]. The same observation was made in Japan by Watanabé *et al.* [26] who found that active smoking was an independent risk factor for the development of GERD. According to Schindlbeck *et al.* [27] in Germany, the number of GERD episodes was more frequent among smokers of cigarette than among non-smokers. This could be explained by the fact that tobacco causes a reduction in the pressure of the lower esophageal sphincter, thus promoting GERD.

In this work, the consumption of carbonated drinks and alcoholic beverages increased the risk of GERD by approximately 13 times and 5 times, respectively. According to Fass *et al.* [8] in Arizona in the United States, the consumption of carbonated drinks increases the symptoms of nocturnal GERD. In Burundi, according to the study by Ntagirabiri *et al.* [16], consumption of alcoholic beverages is statistically associated with GERD. This could be explained by the fact that alcoholic and carbonated drinks reduce the tone of the lower esophageal sphincter.

In this study, the consumption of meals that are too spicy and too fatty is statistically associated with the occurrence of GERD. In Africa, despite our eating habits rich in spices, data on this subject are almost non-existent. In the United States, the same observation was made by Nebel *et al.* [28] who reported that spicy and fried foods were associated with the occurrence of GERD. Likewise, according to Shapiro *et al.* [29] in the United States, reflux episodes were observed more frequently in patients consuming foods high in fats. Indeed, fatty foods slow down digestion and leads to regurgitation through a delay in gastric emptying. The high spice content of foods combined with gastric acidity will intensify heartburn.

This study noted that the prevalence of GERD is approximately 4 times higher in subjects who took NSAIDs. This result is similar to that of an Australian study where symptoms of GERD were 1.7 times more common in patients who regularly take NSAIDs and aspirin than in patients who do not use these drugs [30]. This observation could be explained by the fact that NSAIDs reduce the tone of the lower esophageal sphincter and therefore promote GERD.

In this study, it was noted that there is a significant association between the occurrence of GERD and impaired quality of life. Indeed, the presence of GERD considerably increases the risk of impaired quality of life. Although GERD is not a serious illness, nighttime awakenings and spontaneous or reactive heartburn in these patients impair their quality of life.

One of the weaknesses of this study is that subjects with atypical manifestations (digestive or extra-digestive) were not included since the diagnosis required additional examinations. Therefore, only the prevalence of GERD in its typical form is determined. The prevalence of GERD, in all its clinical forms (digestive and extradigestive, including pulmonary, ENT and cardiac), remains unknown in the general population of Parakou.

5. Conclusion

The prevalence of typical GERD in the general population of Parakou is relatively high. It often occurs in young males. Several factors associated with GERD were identified in this study. These factors include the consumption of carbonated drinks, alcoholic drinks, tobacco, meals that are too spicy or fatty, taking NSAIDs, asthma and diabetes. This disease, although benign, impairs the quality of life of those who suffer from it. Raising awareness about this disease and its associated factors is necessary among the population.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix. Survey Sheet

N˙	Questions/Links	Details	Answers
I—Socio-demographic and economic characteristics			
1	Identification number		/_____/
2	Collection date	/__/ /__/ 2019	
3	Address/phone number		
4	Nationality	1. Beninese 2. Others to be specified	/___/
5	Sex	1. Male 2. Female	/___/
6	Age (ans)		
7	Level of education	1. Primary 2. Secondary 3. University 4. Literate 5. None	/___/
8	Socio-professional status	1. Household appliance 2. Craftsman/Worker 3. Shopkeeper/Dealer 4. Faemer/Breeder 5. Civil servant 6. Pupil/Student 7. Other (Please spécify)…	/___/
9	Marital status	1. Single 2. Married 3. Divorced 4. Widowed	/___/
10	Religion	1. Christian 2. Muslim 3. Endogenous	/___/
11	Monthly income (FCFA)	1. <40,000 2. 40,000 - 100,000 3. ≥100,000	/___/
II—Clinical characteristics			
12	Clinical manifestations of GERD	1. Isolated heartburn 2. Isolated regurgitation 3. Heartburn and regurgitation 4. No	/___/
13	ENT manifestations of GERD	1. Dysphonia (chronic hoarseness) 2. Pharyngeal burning and/or paresthesia 3. Sensation of a lump in the throat 4. Halitosis 5. Sialorrhea 6. Earache 7. None	/___/
14	Onset of symptoms (days)	/__/ /__//__/	
15	Weekly symptom frequency	≤twice a week ≥twice a week	/___/

Continued

16	Period of occurrence in the nycthemeral period	1. Diurnal 2. Nocturnal 3. Diurnal et nocturnal	/___/
17	Warning signs	1. Yes 2. No	/___/

History and risk factors

18	I feel tense or irritated	0. Never 1. Once in a while 2. Often 3. Most of the time	/___/
19	I enjoy the same things as before	0. Yes, just as much 1. Not so much 2. Only a little 3. Almost more	/___/
20	I have a feeling of fear as if something horrible is going to happen to me	0. Not at all 1. A little, but I'm not worried 2. Yes, but it's not too serious 3. Yes, very serious	/___/
21	I laugh easily and look on the bright side	0. As much as in the past 1. Not as much as before 2. Definitely less than before 3. Not at all	/___/
22	I'm worried	0. Very occasionally 1. Occasionally 2. Quite often 3. Very often	/___/
23	I'm in a good mood	0. Most of the time 1. Quite often 2. Rarely 3. Never	/___/
24	I can sit quietly doing nothing and feel relaxed	0. Yes, whatever happens 1. Yes, in general 2. Rarely 3. Never	/___/
25	I feel like I'm in slow motion	0. Never 1. Sometimes 2. Very often 3. Almost always	/___/
26	I have feelings of fear and a knot in my stomach	0. Never 1. Sometimes 2. Quite often 3. Very often	/___/
27	I've lost interest in my appearance	0. I pay as much attention to it as in the past 1. I may not pay as much attention anymore 2. I don't pay as much attention as I should 3. Not at all	/___/
28	I'm restless and can't keep still	0. Not at all 1. Not so much 2. Somewhat 3. Yes, that's exactly the case	/___/

Continued

29	I'm looking forward to doing some things	0. As much as before 1. A little less than before 2. Much less than before 3. Almost never	/___/
30	I experience sudden feelings of panic	0. Never 1. Not very often 2. Quite often 3. Really very often	/___/
31	I can enjoy a good book or a good radio or television program	0. Often 1. Sometimes 2. Rarely 3. Very rarely	/___/
	Total points		
32	Psychological profile	1. No anxiety 2. Probable anxiety 3. Definite anxiety	/___/
33	Asthma	1. Yes	2. No	/___/
34	Diabetes mellitus	1. Yes	2. No	/___/
35	Scléroderma	1. Yes	2. No	/___/
36	Chronic obstructive pulmonary disease	1. Yes	2. No	/___/
37	Taking non-steroidal anti-inflammatory drugs/acetylsalicylic acid	1. Yes	2. No	/___/
38	Alcohol consumption	1. Yes	2. No	/___/
39	Tobacco consumption	1. Yes	2. No	/___/
40	Excessive consumption of fats	1. Yes	2. No	/___/
41	Excessive consumption of spices	1. Yes	2. No	/___/
42	Consumption of soft drinks	1. Yes	2. No	/___/
43	Foods that trigger symptoms	....		

Anthropometric parameters

44	Weight (kg)	………………………………….
45	Size (cm)	………………………………….
46	BMI (Kg/m^2)	………………………………….
47	Waist circumference (cm)	/__/