

Survey on the Adherence to the 2009 NASPGHAN-ESPGHAN Gastroesophageal Reflux Guidelines by Brazilian Paediatricians

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ABSTRACT

Objective: The aim of the study was to evaluate the management of gastroesophageal reflux in children among Brazilian pediatricians and adherence to the 2009 North American Society of Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN), and European Society of Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Guideline in Brazil.

Methods: An observational cross-sectional study was conducted, applying a standard questionnaire with 12 questions about gastroesophageal reflux (GER) and gastroesophageal reflux disease (GERD) management in infants, children, and adolescents to the pediatricians during the 37th Brazilian Pediatrics Congress in October, 2015. Adherence to the 2009 NASPGHAN-ESPGHAN Guideline was verified through analyses of interviewees' answers. Pediatricians' demographic and professional characteristics were screened.

Results: A total of 390 Brazilian pediatricians answered the questionnaire. None showed complete adherence to Guideline recommendations. GERD diagnosis by history alone was reported by 67%, irrespective of the child's age. The mean score for diagnostic adherence to the guidelines was 0.94 ± 0.86 (range 0–4). Working in public health services ($P = 0.026$) was the only variable retained as a significant predictor of poor adherence for GER/GERD diagnosis after multivariate logistic regression analysis. No significant statistical differences were found between Brazilian regions on total score ($P = 0.774$). Proton pump inhibitors were prescribed by 28.4% of the pediatricians independent of child's age, and 59% use proton pump inhibitors to treat babies with unexplained crying and/or distressed behavior.

Conclusions: 2009 NASPGHAN-ESPGHAN Guideline recommendations had poor adherence by Brazilian pediatricians. Studies evaluating the reasons for the poor adherence to NASPGHAN/ESPGHAN guidelines are urgently needed.

Key Words: Brazil, child, gastroesophageal reflux, proton pump inhibitor

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What Is Known

- Gastroesophageal reflux is a common condition in children.
- Guidelines are essential tools to guide clinical practice toward evidence-based medicine.
- Recent publications show poor adherence to guidelines.

What Is New

- Brazilian pediatricians' approach to gastroesophageal reflux is in overall disagreement with evidence-based recommendations.
- Proton pump inhibitors are usually prescribed empirically for symptoms where lack of efficacy has been demonstrated.

Gastroesophageal reflux (GER) is a physiological process that occurs several times a day, even in healthy infants and children. Gastroesophageal reflux disease (GERD) is GER presented with troublesome symptoms or complications (1). Up to 67% of infants regurgitate in the first 4 months of life, and 2% to 3.3% have GERD (1,2). Recognizing these 2 conditions and appropriate management in pediatric practice are critical; therefore, it is relevant to know how GERD is managed in children. The 2009 North American Society of Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society of Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Guidelines continue to be the main reference (3). The guideline committee had critically evaluated GER and GERD management in children, including diagnostic tests and pharmacologic therapies.

To evaluate the practice and implementation of the guidelines in European countries, Quitadamo et al (4), in 2014, interviewed 567 European pediatricians, observing poor adherence to the recommendations and excessive prescription of pharmacologic treatment with proton pump inhibitors (PPIs). Low-cost training, however, effectively improves adherence to recommendations in European pediatricians' clinical practices (5).

In 2014, a group of Brazilian pediatric gastroenterologists published a review article on GERD, comparing scientific evidence and clinical practice, and showed exaggerations in GER diagnosis

and treatment that needed correction (6). Brazilian pediatricians' knowledge and adherence to the guideline is, however, unknown.

We determined the current approach of Brazilian pediatricians to children with GER/GERD and the adherence to the 2009 NASPGHAN-ESPGHAN Guideline in Brazil.

METHODS

Study Design

This cross-sectional observational study was performed by applying a case report-structured questionnaire previously used in a multicenter study in 11 European countries (4). The same validated questionnaire applied in European surveys was used after translation into Portuguese (4,5,7). The Ethics and Research Committee from the Federal University of Sergipe (protocol number 40980914.9.0000.5546) approved the study (Supplemental Questionnaire, Supplemental Digital Content, <http://links.lww.com/MPG/B270>).

Pediatricians from the 5 regions of the country who were attending the 37th Brazilian Congress of Pediatrics, held in Rio de Janeiro, Brazil, October 13–16, 2015, were randomly invited to participate in this study. After signing an informed consent form, attendees were asked to complete the questionnaire anonymously and to answer questions describing their demographic/professional profile. Eligible participants were Brazilian pediatricians attending the congress that diagnose and treat children with GERD as part of their clinical practice. Other health care professionals attending the congress were not included.

Sample Size

According to Quitadamo et al (4), the overall rate of children managed in full compliance with the 2009 NASPGHAN-ESPGHAN Guideline recommendations is approximately 45%. For a population of 24,516 Brazilian pediatricians, with a confidence level of 95% and a 5% margin of error, a sample size of 375 pediatricians was estimated. Of 393 pediatricians surveyed, 390 completed the entire questionnaire. After data collection, we observed that for a 5% significance and a 99% power, the effect size was 0.217, above the minimum of 0.2 to reach a small effect, as introduced by Cohen in 1977 (8).

Data Collection

The questionnaire included 12 multiple-choice questions regarding the diagnostic and therapeutic approach to GER/GERD in infants, children, and adolescents. Four questions investigated how pediatricians diagnose GER or GERD in different clinical presentations, and 8 questions explored treatment options according to the age of the patient and symptoms, knowledge of different medications for management of GERD, and criteria for interrupting treatment.

Additional information included gender, academic degree, year of medical school graduation, work site, number of children with GER/GERD managed per month, and living region within Brazil.

Outcome

The primary study objective was to evaluate adherence to the 2009 NASPGHAN-ESPGHAN Guideline. The score for adherence was calculated based on the number of questions answered correctly. Each correct answer was given a score of 1, with a total score of 12. For the diagnosis of GER/GERD, the scores range from 0 to 4.

For treatment, the scores range from 0 to 8. The adherence rate was then calculated as a percentage of correct answers.

Data Analysis

The data analysis was conducted using the Bioestat 5.3 software (Mamirauá Institute, Belém, Pará, Brazil). The characteristics of participants were presented as absolute frequency and percentage. Multiple comparisons were analyzed by using *z* test statistics. Statistical significance was accepted at the 95% confidence level.

Binary logistic regression analysis was applied to identify factors associated with non-adherence, while adjusting for covariates. A cutoff point of 75% was used to define adherence and non-adherence to the 2009 NASPGHAN-ESPGHAN Guideline. The following prespecified variables were selected as potential predictors for non-adherence: gender, to live in a capital city (yes or no), time since graduation (≤ 10 years or > 10 years), pediatric residency (yes or no), master's degree/doctorate degree (yes or no), to work in public health service (yes or no), and number of GER/GERD patients per month (≤ 15 or > 15). All potential predictors were tested with univariate analysis. Variables with a *P* value < 0.20 were retained for adjustment, and the final model was found by a backward selection of predictor variables, as described by Hosmer and Lemeshow (9). At each step, the variable providing the highest *P* value was deleted from the model. Variables were kept in the final model if the *P* value was < 0.05 .

RESULTS

Three hundred and ninety pediatricians of 5092 participants attending the 37th Brazilian Congress of Pediatrics (7.7%) were included in the study. Characteristics of the pediatricians included in the study are detailed in Table 1.

None of the pediatricians reported the management of GER/GERD in full compliance with the 2009 NASPGHAN-ESPGHAN Guideline. Only 0.5% of the pediatricians had an adherence rate above 75%. The overall mean adherence score was 4.35 ± 1.60 (range 1–10; median 4), ranging from 4.21 in northern Brazil to 4.63 in the south, but the difference among the 5 regions of the country was not statistically significant (*P* = 0.774).

Diagnosis

The adherence rate for GER/GERD diagnosis was 23.7% (mean score 0.94 ± 0.86 ; range 0–4). Univariate analysis identified a trend for lower adherence among pediatricians ≤ 10 years since graduation who work in the public health service and do not have formal pediatric residency training. In the multivariate logistic regression analysis, practicing in public health services (*P* = 0.026) was, however, the only variable retained as a significant predictor of poor adherence to the NASPGHAN-ESPGHAN guideline for the diagnosis of GER/GERD (Table 2). In addition, no statistically significant difference was observed among Brazilian regions regarding the use of pH monitoring for respiratory symptoms (*P* = 0.406) and the indication for upper gastrointestinal endoscopy and biopsy (*P* = 0.968) for GER/GERD diagnosis (Table 3).

Of the 390 pediatricians interviewed, 266 (67.7%) diagnose GER/GERD based on a typical history of symptoms, irrespective of the age of the child. Specific tests (upper gastrointestinal endoscopy and/or esophageal pH monitoring) are usually requested by 44 (11.4%) interviewees to diagnose GER/GERD. Seventy-two (18.6%) pediatricians interviewed are in agreement with guideline recommendations when considering the age of the child to guide testing for GER/GERD.

TABLE 1. Characteristics of interviewed pediatricians

	N	%
Gender		
Female	276	70.7
Male	114	29.3
Live in urban area		
No	158	40.2
Yes	235	59.8
Region		
CO	28	7.1
NE	70	17.8
NO	24	6.1
SE	229	58.3
SU	42	10.7
Graduation time, y		
≤10	179	46.0
>10	210	54.0
Pediatric residency		
No	66	16.9
Yes	324	83.1
Master's degree/PhD		
No	319	85.1
Yes	56	14.9
Public health service		
No	139	35.8
Yes	249	64.2
GER/GERD patients per month		
≤15	222	68.5
>15	102	31.5

CO = Midwest; GER = gastroesophageal reflux; GERD = gastroesophageal reflux disease; NE = Northeast; NO = North; SE = Southeast; SU = South.

Treatment

The adherence rate for GER/GERD treatment was 42% (mean score 3.36 ± 1.28 ; range 0–7). In the multivariate logistic regression analysis, no variable was found to be a significant predictor of poor adherence to the NASPGHAN-ESPGHAN guideline for GER/GERD treatment (Table 2).

One hundred forty nine (38.2%) pediatricians reported using PPIs as the main management strategy for GER/GERD, with statistically significant differences among regions (Table 3). One hundred seventy (43.6%) reported never prescribing PPIs for infants younger than 1 year with recurrent regurgitation and vomiting. On the other hand, 111 (28.4%) recommend PPI without considering the age of the child, and 123 (31.5%) prescribe PPI for infants under 1 year of age depending on the severity of symptoms. Two hundred thirty (59%) pediatricians recommend PPIs to treat infants with unexplained crying and/or distressed behavior. Most pediatricians (62.1%) are in agreement with the 2009 NASPGHAN-ESPGHAN guidelines regarding treatment in adolescents, based on clinical history of symptoms to prescribe PPI.

DISCUSSION

Our study evaluated the management of patients with symptoms suggestive of GER/GERD by pediatricians in Brazil using a European structured questionnaire⁴, and analyzed the concordance between clinical approach and recommendations based on the 2009 NASPGHAN-ESPGHAN Guideline. We observed that most interviewees (75.8%) scored poorly (<50%) on their questionnaire answers, and none complied fully with Guideline recommendations. Quitadamo et al (4) similarly demonstrated that European pediatricians from 11 different countries were also incompletely

TABLE 2. Univariate and multivariate logistic regression analysis of the variables associated with the poor adherence to the 2009 NASPGHAN-ESPGHAN guideline for GER/GERD diagnosis and treatment

	Diagnosis					Treatment				
	Adherence rate <75%	Univariate OR (95% CI)	P	Adjusted OR (95% CI)	P	Adherence rate <75%	Univariate OR (95% CI)	P	Adjusted OR (95% CI)	P
Gender										
Male	92.0	1.322	0.534	—	—	98.2	3.442	0.103	3.271	0.119
Female	93.8					94.1				
Live in capital city										
Yes	92.7	1.036	0.927	—	—	94.8	1.382	0.527	—	—
No	82.4					96.2				
Graduation time, y										
≤10	95.1	2.014	0.102	1.819	0.168	95.7	1.046	0.928	—	—
>10	90.6					95.5				
Pediatric residency										
No	92.8	1.773	0.208	1.223	0.721	96.1	2.421	0.106	1.418	0.650
Yes	91.1					91.1				
Master's degree/PhD										
No	93.2	1.434	0.641	—	—	95.7	3.733	0.052	2.201	0.153
Yes	90.5					85.7				
Public health service										
Yes	94.8	2.296	0.033	2.391	0.026*	96.5	1.516	0.438	—	—
No	88.7					94.8				
GER/GERD patients per month										
≤ 15	92.8	1.349	0.465	—	—	96.4	1.687	0.324	—	—
> 15	90.5					95.4				

CI = confidence interval; OR = odds ratio.

* $P < 0.05$ were considered statistically significant.

TABLE 3. Guideline adherence per question by Brazilian region

	Region					Total n (%)
	CO n (%)	NE n (%)	NO n (%)	SE n (%)	SU n (%)	
PPI not for infants (under 1 year old)	13 (46.4)a	25 (36.2)	5 (20.8)a	70 (30.7)	10 (24.4)	123 (31.5)
PPI is considered to be the main drug for treatment	12 (42.9)a	35 (50.7)b,c	4 (16.7)a,b,d,e	82 (36)c,d	16 (39)e	149 (38.2)
PPI not for infants with unexplained crying and/or distressed behavior	12 (42.9)	26 (37.7)	11 (45.8)	89 (39)	18 (43.9)	156 (40)
pH monitoring (+MI impedance) for respiratory symptoms	12 (42.9)	22 (31.9)	11 (45.8)	76 (33.3)	18 (43.9)	139 (35.6)
Upper GI endoscopy and biopsy indication	4 (14.3)	12 (17.4)	3 (12.5)	34 (14.9)	5 (12.2)	58 (14.9)

CO = Midwest; GI = gastrointestinal; NE = Northeast; NO = North; PPI = proton pump inhibitor; SE = Southeast; SU = South. Differences ($P < 0.05$) were found between groups stated with the same letters.

following these recommendations. Indeed, 45% of those 567 interviewees scored no more than 50%, and only 1.8% achieved full adherence to the Guideline. Diagnosis of GER/GERD was one of the topics with major violations of the Guideline. Most pediatricians interviewed in Brazil (67.7%) diagnose GERD based on clinical history, even in infants and young children. Evidence from the literature shows that a description of signs and symptoms is inaccurate and unreliable in this age group (3). This percentage is higher than those reported in studies involving Italian, French, American, and European pediatricians where 39%, 59%, 31%, and 45.8%, respectively, of the interviewees make a clinical diagnosis without performing diagnostic tests, irrespective of age (4,7,10,11). Limited access to diagnostic tests could explain the findings in our study, although no statistically significant difference in GERD diagnostic testing, using either pH probe testing with respiratory symptoms or upper endoscopy with biopsy, was found among pediatricians from different regions of the country. Access to these tests may differ in the Brazilian regions because of regional socioeconomic disparities.

GER/GERD diagnosis remains a challenge (12). The adherence rate for diagnosis of GER/GERD was very low, and working in public health services was a significant predictor ($P = 0.026$) of poor adherence, according to the multivariate logistic regression analysis. Guidelines are important tools to guide clinical practice; however, poor adherence is a critical point in both developing and developed countries (13–15). Studies highlight the impact of inequalities between public and private services in health outcomes (16–18), but no published study explores inequalities concerning guideline adherence.

Despite several studies documenting lack of efficacy of PPI for treatment of GERD symptoms in infants with unexplained crying and distressed behavior (3,19–22) and the risk of adverse effects (23–26), PPI prescription for these patients is a common practice among Brazilian pediatricians. The majority still adopts this approach, is unaware of the most common adverse effects, and does not gradually reduce the dose to prevent rebound symptoms when the treatment is discontinued. The frequent use of pharmacological treatment for children with GER/GERD in Brazil has been reported (27).

Pediatric practice without formal residency (currently 3 years of training) is legally allowed for medical school graduates. After 5 years of practice, a general practitioner may apply to get a specialization certification by taking a Pediatric Society Test. This explains why some medical professionals without residency are included, representing 16.9% of the study participants. Other healthcare providers were not interviewed.

This study has some methodological limitations. Interviewing Congress attendees may select more updated pediatricians, but

this is the most important and traditional Pediatric Congress in Brazil, and in this study we have accessed equal proportional of pediatricians from different regions of the country. Even in this population the guideline adherence is poor.

Our study demonstrates that the majority of Brazilian pediatricians do not adhere to the recommendations of the 2009 NASPGHAN-ESPGHAN Guideline for GER/GERD management throughout Brazil, and that PPI use to treat GERD symptoms in infants remains common. Overall, the guideline adherence of Brazilian pediatricians was lower than that of European professionals. Studies evaluating the reasons for the poor adherence to NASPGHAN-ESPGHAN guidelines are urgently needed, particularly with the recent acceptance of new (2018) GER/GERD Guidelines (28).

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