Children Dyspepsia Symptoms Questionnaire Discriminates Dyspeptic versus Non-Dyspeptic and Organic versus Functional Dyspepsia in Children and Adolescents with Chronic Abdominal Pain

Mary de Assis Carvalho, Gabriela Nascimento Hercos, Renato Guilherme Correa Silva, and Nilton Carlos Machado

ABSTRACT

Background: Chronic Abdominal Pain (CAP) is common in children/adolescents, and Dyspepsia is a symptom complex. Their investigation represents a significant burden and a great deal regarding the initial work-up. Consequently, scoring based on clinical symptoms and patients' characteristics comparing organic and functional Dyspepsia would be valuable in assessing CAP.

Objective: To develop and validate a dyspepsia symptoms questionnaire to identify patients with Dyspepsia and discriminate between functional and organic subtypes.

Methods: A single-centre, observational, prospective cohort study in a convenience sample of consecutive cases of children/adolescents for CAP. Inclusion criteria: age of 5-17 years; CAP according to Apley and von Baeyer & Walker criteria; uninvestigated Dyspepsia. Exclusion criteria: genetic, neurological and mental disorders, history of gastrointestinal surgery, active gastrointestinal bleeding, and inflammatory bowel disease. The Questionnaire was developed in four steps: Step 1. Generation of terms. Step 2. Construct the Preliminary Questionnaire. Step 3. A pilot survey confirmed that the Questionnaire was comprehensible. Step 4. The final Children Dyspepsia Symptoms Questionnaire (CDSQ) was based on a Cronbach's alpha coefficient of 0.74. Detailed Clinical protocols for CAP; Alarm signs, and CDSQ were applied at the inclusion visit. The pain was determined using a Pain Faces Scale, and Pain Intensity was obtained.

Results: The study was performed on 338 patients, with no difference in baseline characteristics between Dyspepsia and Non-dyspepsia. The comparisons of CDSQ items between Dyspepsia and Non-dyspepsia reach higher values for Dyspepsia in epigastric pain, retrosternal pyrosis, concomitant epigastric pain and retrosternal pyrosis, belching, early satiety, nausea, and postprandial fullness. The comparisons of CDSQ items between Organic and Functional groups reach higher values for Organic Dyspepsia in retrosternal pyrosis, concomitant epigastric pain and retrosternal pyrosis, nausea and belching. Alarm signs were higher for Organic Dyspepsia, except for unintentional weight loss. There was a positive and statistically significant correlation between the CDSQ score and its eight items' components for the Dyspepsia and the Non-Dyspepsia group. No effect of age of patients, sex, and duration of symptoms was found for CDSQ.

Conclusion: The CDSQ is a brief questionnaire, cost-effective and well suited for uninvestigated Dyspepsia. Patients reported significantly more severe symptoms in Dyspepsia than Non-Dyspepsia. Thus, the primary application of this discriminative instrument is case-finding in epidemiological surveys and clinical trials. Assumed that the CDSQ differentiating organic from functional Dyspepsia would help manage unnecessary endoscopy procedures, compared with a strategy that would entail prompt endoscopy for all patients.

Keywords: Dyspepsia, functional abdominal pain, organic dyspepsia, scores, questionnaire.
I. INTRODUCTION

Chronic Abdominal Pain (CAP) is a common clinical condition in children and adolescents. A meta-analysis of epidemiologic studies from 1957 to 2014 noted a global prevalence of 13.5% [1]. Almost 90% of children and adolescents who seek healthcare advice for their CAP are suffering from Functional Abdominal Pain Disorders (FAPDs), which comprise four conditions: irritable bowel syndrome (IBS), Abdominal Migraine (AM), Functional Dyspepsia (FD), Functional Abdominal Pain-Not Otherwise Specified (FAP-NOS), according to Rome IV criteria [2]. Additionally, in our pediatrics outpatient clinic, reflux esophagitis and non-nuclear dyspepsia Helicobacter pylori-associated are the leading causes of organic chronic abdominal pain (ORGDs) [3], [4]. Incontestably, FAPDs and ORGDs have distinct pathophysiological underlying mechanisms.

Concerning CAP, dyspepsia is a symptom complex rather than a diagnosis per se and accounts for substantial expenditures. Therefore, their investigation represents a significant burden on health services, and there is still a great deal regarding the best initial work-up. In a motivating study [5], the total scores of epigastric pain were significantly related to organic dyspepsia. However, the Likert dyspepsia scale was not beneficial in differentiating the organic versus functional groups, and the authors suggest that the Likert dyspepsia scale should be redesigned for new studies.

Consequently, scoring based on clinical symptoms and patients’ characteristics comparing organic and functional dyspepsia would be valuable in assessing children with CAP. The hypothesis was that children with CAP and dyspepsia could be determined and separated from patients with CAP non-dyspepsia, and the dyspeptic group could be separated into organic and functional. Indeed, measurement is an essential component of research in the health sciences and was approached by developing an appropriate instrument. This study aimed to develop and validate a dyspepsia symptoms questionnaire to identify patients with dyspepsia and discriminate between functional and organic (dyspepsia) subtypes among children and adolescents with CAP.

II. METHODS

A. Study Design and Setting

The study was a single-centre, observational, prospective cohort study in a convenience sample of consecutive cases of children/adolescents from the same basis population and geographic area, referred from the Brazilian Public Health System for CAP investigation between September 2012 and 2018. The available infrastructure consists of an outpatient clinic with the weekly practice, standardization of care and technical capacity for diagnosis. The study was approved by the local hospital's ethics committee (CAAE: 78851717.0.0000.5411).

B. Selection of Participants and diagnosis of Chronic Abdominal Pain

In the Paediatric Gastroenterology Outpatient Clinic, due to the great demand, the variety of etiological possibilities, the complexity, and the high cost of the investigation, a standard approach to children with CAP has been adopted [6]. The inclusion criteria were:

1) Age of 5 to 17 years,
2) CAP according to Apley's criteria [7], and as defined by [8], i.e., abdominal pain that occurs at least once each month, in at least three consecutive months, within the last year, and these episodes are usually severe enough to stay home from school, terminate or avoid play, or take medication for the pain,
3) Uninvestigated Dyspepsia is defined as pain or discomfort centred in the upper abdomen without the performance of an upper endoscopy.

Exclusion criteria were: children with genetic, neurological and mental disorders, history of gastrointestinal surgery, active gastrointestinal bleeding, and inflammatory bowel disease.

C. Developing the Dyspepsia Questionnaire

The Questionnaire was developed in four steps, according recommended [9], [10].

The dyspepsia questionnaire is designed for patient interviews and administration by the researchers.

Step 1. Generation of terms. The items and the response structure for the instrument were based on a detailed review of the published dyspepsia-related review literature [11]–[21]. The questions were based on the way commonly used in the clinical evaluation of children with Dyspepsia.

Step 2. The terms created in Step 1 were used to construct the Preliminary Questionnaire. The generation of the phrases and translation from English into Portuguese was done considering the target audience, prepared by three study authors with fluency in the English language. It consisted of questions on the severity of 09 gastrointestinal symptoms over the past three months: epigastric pain, retrosternal pyrosis, concomitant epigastric pain and retrosternal pyrosis, nausea, vomiting, belching, early satiety, postprandial fullness, and abdominal pain other than epigastric. Perceptions of symptom severity were measured on the Likert scale range 0–3 (0 = no symptom; 1 = mild but easily tolerated; 2 = moderate but not interfere with normal daily activities; 3 = severe and interfere with normal daily activities). Based on the importance of the interrelation of dyspeptic symptoms to meals, weighing was assigned to differentiate the items that would compose the dyspepsia score. One point was added if the symptoms were triggered/enhanced by meals and occurred within two hours. Also, considering epigastric pain as a cardinal symptom in Dyspepsia, the score was doubled if the pain gets up at night. The item nominated concomitant epigastric pain, and retrosternal pyrosis denotes severity.

Step 3. A pilot survey questionnaire of 20 patients confirmed that the Questionnaire was comprehensible, well understood and easy to complete. The baseline characteristics of the sample tested were representative of the population for which the scale is designed.

Step 4. The final Children Dyspepsia Symptoms Questionnaire (CDSQ) construction was based on an analysis of Cronbach's alpha coefficient using the data of the nine items of the questionnaires of all 338 children enrolled. After utilizing the strategy of adding and removing items, a good
level of internal consistency, defined by Cronbach's alpha coefficient of 0.74, was obtained. The only item removed was abdominal pain other than epigastric. Accordingly, the final Questionnaire comprised an eight-item scale: epigastric pain, retrosternal pyrosis, concomitant epigastric pain and retrosternal pyrosis, nausea, vomiting, belching, early satiety, postprandial fullness (Supplementary Table).

D. Data Collection

Detailed Clinical Protocol for CAP, Alarm signs evaluated to suspect organic disease (waking up at night with abdominal pain, unintentional weight loss, poor appetite, and a family history of gastritis/ulcer), and CDSQ were applied at the inclusion visit. The pain was determined using a Pain Faces Scale [22] comprising nine pain faces ranging from no pain (0 points) to the very worst pain imaginable (9.7 points). Pain Intensity was calculated by multiplying the value of the Pain Faces Scale by weekly pain frequency. Questions were asked as those generally questioned in daily practice and easily comprehensible, and responses from both parent and child were obtained simultaneously. All data were reported in a paper case report form, and interviewers were trained to ask the same questions in the same way.

Laboratory investigation (red and white blood tests, C-reactive protein), urine analyses and culture, three stool specimens for intestinal ova and cysts, Helicobacter pylori serology (IgG) and plain abdominal X-ray were performed for all children. Additional tests were performed at the researches discretion if the history suggested a possible diagnosis that could be excluded or confirmed by such tests: tests of liver, pancreas and kidney function, immunoglobulins, prick and patch for food allergies, antitissue transglutaminase antibodies (IgA), abdominal ultrasonography, small bowel follow-through tract, and breath hydrogen testing.

Children/adolescents presenting chronic dyspeptic syndrome for at least three months and alarm symptoms/signs [23], [24] were submitted to esophagogastroduodenoscopy, rapid urease test, and histopathology examination. The routine diagnosis of H. pylori gastritis and Esophagitis was described elsewhere [3], [4]. Briefly, non-ulcer Dyspepsia associated with H. pylori was diagnosed if they presented both: the rapid urease test positive and the presence of the bacterium on histological examination. Dyspepsia associated with chronic Esophagitis was based on clinical symptoms/signs, endoscopic [25] and histologic evaluation [26].

E. Diagnosis

Step 1. The patient's final diagnosis was determined in subsequent visits after three to six months of initial evaluation by two experienced paediatric gastroenterologists' study authors (MAC, NCM), without knowing the questionnaire data. The diagnosis was based on the specific clusters of gastrointestinal symptoms, alarm signs, supplementary laboratory investigation, and endoscopic and histopathology. Researchers evaluated all protocol steps when diagnoses were discrepant and determined the diagnosis by consensus.

Step 2. The chronic dyspeptic syndrome was based on a term describing a complex of persistent or recurrent upper gastrointestinal symptoms [27]. Children with CAP were divided into Dyspepsia and a Non-dyspepsia group.

Step 3. Then, dyspeptic children were subdivided into Functional Dyspepsia if the authors were comfortable making a diagnosis based on Rome III-IV criteria and no further investigations. Organic Dyspepsia, the group has alarm features and should undergo investigations, including upper endoscopy.

Step 4. Patients with FAPDs were diagnosed from 2012 to August 2016 according to Rome III [24] and from September 2016 to December 2018 with Rome IV criteria [2].

F. Statistical Analysis

Based on the authors' subdivision of the children in Dyspepsia, Non-Dyspepsia, Organic Dyspepsia, and Functional Dyspepsia, the analysis of the CDSQ and their item components was executed. Statistical analysis was performed using GraphPad Prism version 8.4.0 for Windows (GraphPad Software, San Diego, California, USA, www.graphpad.com). Median and Interquartile Ratios (IQR) are presented for quantitative variables, and comparisons were evaluated with the Mann-Whitney U test. Qualitative variables were described by counts (N) and percentages (%), and Fisher exact test was used. Tests of association between variables were performed using the Spearman rank correlation. All statistical tests were two-sided, and values of p<0.05 were considered statistically significant.

III. Results

Fig. 1 displays a Flow diagram of children/adolescents with CAP assessed for eligibility, excluded, and enrolled during the study. Thus, the study was performed on 338 patients. Miscellaneous aetiologies were excluded from the Dyspepsia group analysis. Consequently, Organic Dyspepsia was composed of gastritis associated with Helicobacter pylori and reflux esophagitis. The Non-dyspepsia group included: 117 with well-defined FAPDs (67 IBS; 33 AM; 17 FAPD-NOS) and 36 miscellaneous aetiologies. Table I presents the baseline characteristics of children and parents. There were no differences between the two groups, except for the predominance of females in the dyspepsia group (<0.04).

Table II compares Pain Frequency, Pain Intensity, and CDSQ scores between Dyspepsia and Non-Dyspepsia groups. Dyspepsia was higher than Non-dyspepsia in all analyses, except in Pain Faces Scales. The comparisons of CDSQ items between Dyspepsia and Non-dyspepsia were: epigastric pain (p<0.0001), retrosternal pyrosis (p<0.0001), concomitant epigastric pain and retrosternal pyrosis (p<0.0001), belching (p<0.0001), early satiety (p<0.0008), nausea (p<0.005), and postprandial fullness (p<0.001), with higher values for Dyspepsia. There was no statistical difference in vomiting and the prevalence of alarm signs between the two groups.

DOI: http://dx.doi.org/10.24018/ejmed.2022.4.4.1392
Fig. 1. Flow chart of eligibility, exclusion, and enrolled children with Chronic Abdominal Pain.

### TABLE I: BASELINE CHARACTERISTICS OF CHILDREN AND ADOLESCENTS WITH DYSPEPSIA AND NON-DYSPEPSIA

<table>
<thead>
<tr>
<th></th>
<th>Chronic Abdominal Pain Dyspepsia (n=185)</th>
<th>Chronic Abdominal Pain Non-dyspepsia (n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex: Female /Male (% Female) *</td>
<td>116/69 (63)</td>
<td>79/74 (52)</td>
</tr>
<tr>
<td>Age at first visit (months)</td>
<td>118 (63-151)</td>
<td>108 (84-133)</td>
</tr>
<tr>
<td>Duration of symptoms (months)</td>
<td>12 (6-36)</td>
<td>18 (9-36)</td>
</tr>
<tr>
<td>Age of mothers (years)</td>
<td>35 (31-39)</td>
<td>34 (30-39)</td>
</tr>
<tr>
<td>Age of fathers (years)</td>
<td>38 (33-44)</td>
<td>36 (32-42)</td>
</tr>
<tr>
<td>Number of children at home</td>
<td>2.0 (1.8-2.1)</td>
<td>1.8 (1.7-2.0)</td>
</tr>
<tr>
<td>Crowding index</td>
<td>0.8 (0.8-0.9)</td>
<td>0.8 (0.7-0.9)</td>
</tr>
<tr>
<td>BMI z score</td>
<td>0.55(-0.18-0.3)</td>
<td>0.32 (0.03-0.61)</td>
</tr>
</tbody>
</table>

*p<0.05 (Female > in Dyspepsia group)

### TABLE II: COMPARISONS BETWEEN DYSPEPSIA AND NON-DYSPEPSIA SCORES IN CHILDREN AND ADOLESCENTS

<table>
<thead>
<tr>
<th></th>
<th>Chronic Abdominal Pain Dyspepsia (n=185)</th>
<th>Chronic Abdominal Pain Non-dyspepsia (n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Faces Scales</td>
<td>8 (8-9)</td>
<td>8 (8-10)</td>
</tr>
<tr>
<td>Pain frequency</td>
<td>2 (2 – 4)</td>
<td>2 (1 – 3)</td>
</tr>
<tr>
<td>Pain Intensity Score</td>
<td>18 (12 – 29.5)</td>
<td>16 (8.5 – 23)</td>
</tr>
<tr>
<td>Alarm signs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waking up with abdominal pain (n)</td>
<td>66/185</td>
<td>43/153</td>
</tr>
<tr>
<td>Unintentional weight loss (n)</td>
<td>10/185</td>
<td>00/153</td>
</tr>
<tr>
<td>Poor appetite (n)</td>
<td>58/185</td>
<td>39/153</td>
</tr>
<tr>
<td>Family history of gastritis/ulcer (n)</td>
<td>94/185</td>
<td>62/153</td>
</tr>
<tr>
<td>CDSQ* Score</td>
<td>8 (6-13)</td>
<td>4 (3-7)</td>
</tr>
<tr>
<td>CDSQ* Score (95% CI** median)</td>
<td>Lower limit 7</td>
<td>Lower limit 4</td>
</tr>
<tr>
<td></td>
<td>Upper limit 10</td>
<td>Upper limit 5</td>
</tr>
</tbody>
</table>

*CDSQ = Children Dyspepsia Symptoms Questionnaire; ** CI =Confidence Interval

### TABLE III: COMPARISONS BETWEEN ORGANIC AND FUNCTIONAL DYSPEPSIA SCORES IN CHILDREN AND ADOLESCENTS

<table>
<thead>
<tr>
<th></th>
<th>Organic dyspepsia Helicobacter pylori gastritis + Esophagitis</th>
<th>Functional dyspepsia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Faces Scales</td>
<td>8 (7.8-9)</td>
<td>7.8 (7.8-8.2)</td>
</tr>
<tr>
<td>Pain frequency</td>
<td>2 (2-4)</td>
<td>2 (2-3)</td>
</tr>
<tr>
<td>Pain Intensity Score</td>
<td>18 (13-29)</td>
<td>16 (13-23)</td>
</tr>
<tr>
<td>Alarm signs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waking up with abdominal pain (n)</td>
<td>28/87</td>
<td>03/40</td>
</tr>
<tr>
<td>Unintentional weight loss (n)</td>
<td>05/87</td>
<td>00/40</td>
</tr>
<tr>
<td>Poor appetite (n)</td>
<td>28/87</td>
<td>05/40</td>
</tr>
<tr>
<td>Family history of gastritis/ulcer (n)</td>
<td>44/87</td>
<td>10/40</td>
</tr>
<tr>
<td>CDSQ* Score</td>
<td>13 (9-20)</td>
<td>8.5 (5-15)</td>
</tr>
<tr>
<td>CDSQ* Score (95% CI** median)</td>
<td>Lower limit 11</td>
<td>Lower limit 7</td>
</tr>
<tr>
<td></td>
<td>Upper limit 17</td>
<td>Upper limit 13</td>
</tr>
</tbody>
</table>

*CDSQ=Children Dyspepsia Symptoms Questionnaire; ** CI =Confidence Interval
The CDSQ score and its eight items' components for the strong floor effect with a median of 80% (IQR; 56 vomiting (10%). In the No concomitant epigastric pa

The ceiling effect (percentage with the highest possible score) was 54% (IQR; 20

There was no statistical difference for epigastric pain, epigastric pain and retrosternal pyrosis (p<0.003), nausea and belching (72%). The ceiling effect (percentage with the highest possible score) was 54% (IQR; 20

Pain Faces Scales, Pain Frequency, and Pain Intensity. The correlations of CDSQ items between Organic and Functional Dyspepsia. There was no statistical difference for epigastric pain, epigastric pain and retrosternal pyrosis (p<0.003), nausea and belching (p<0.05), with higher values for Organic Dyspepsia. There was no statistical difference for epigastric pain, vomiting, early satiety, and postprandial fullness. Alarm signs were higher for Organic Dyspepsia, except for unintentional weight loss. Table II, III and Fig. 2 present the median and 95% Confidence Interval (CI) of CDSQ scores.

A. CDSQ validation

In the Dyspepsia group, the median floor effect (lowest possible score) was 54% (IQR; 20-65), ranging from concomitant epigastric pain and retrosternal pyrosis (11%) to belching (72%). The ceiling effect (percentage with the highest possible score) was 4% IQR; 03-09, ranging from concomitant epigastric pain and retrosternal pyrosis (02%) to vomiting (10%). In the No-Dyspepsia group, there was a strong floor effect with a median of 80% (IQR; 56-87) and a minor Ceiling effect (no more than 4%). Table IV presents a positive and statistically significant correlation between the CDSQ score and its eight items' components for the Dyspepsia and the Non-Dyspepsia group. No effect of age of patients, sex, and duration of symptoms was found for CDSQ.

IV. DISCUSSION

The main obstacle in research on CAP has been the lack of a reliable clinical measure. Initial endoscopy for all patients is not appropriate; therefore, selecting patients based on clinical symptoms is suitable. Accordingly, this study aimed to develop a discriminative questionnaire instrument to identify patients with dyspepsia between children with CAP and identify different types of dyspepsia. The choice of items was based on an extensive literature search. We avoid items that could make it difficult for children/adolescents and their parents to interpret, such as upper abdominal discomfort, bitter or sour taste in the mouth, and halitosis. The items components of CDSQ were possibly more demonstrative of symptoms of dyspepsia than those nominated by [5].

Additionally, we weighted the Likert scale values when the pain occurred at night, or the symptom was related to the meal. The items were weighted on the theoretical basis observed in the literature. At this first stage in questionnaire development, our interest is in creating the item questionnaire and being as inclusive as possible, and even poor items can be cleared out later.

The baseline characteristics of Dyspepsia and Non-Dyspepsia groups documented a homogeneous population. In summary, discriminating Dyspepsia from Non-Dyspepsia was obtained with pain frequency, pain intensity, CDSQ, and CDSQ items (epigastric pain, retrosternal pyrosis, concomitant epigastric pain, retrosternal pyrosis, belching, early satiety, nausea, and postprandial fullness). Only vomiting does not discriminate. Interestingly, there was no prevalence of alarm signs in Dyspepsia children compared with Non-Dyspepsia. On the other hand, CDSQ, CDSQ items (retrosternal pyrosis, concomitant epigastric pain and retrosternal pyrosis, nausea, belching) discriminate Organic from Functional Dyspepsia. Conversely, there was a higher prevalence of alarm signs, waking up with abdominal pain, poor appetite, and a family history of gastritis/ulcer on Organic Dyspepsia.

The American Academy of Pediatrics and the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition stated in their technical report that there is little evidence for endoscopy in the absence of alarm symptoms to give a significant yield of organic disease [23]. Formerly, Rome III criteria [24] eliminated the mandatory use of upper endoscopy to make a diagnosis of functional dyspepsia. In the current study, alarm symptoms evaluated do not discriminate between Dyspepsia from Non-Dyspepsia but were significant for Organic Dyspepsia. Consequently, in the absence of alarm features with normal physical findings, Functional dyspepsia can be diagnosed, and empirical treatment can be initiated without investigations [20].

A. Validation

For scale construction: a literature review of studies that have been done about dyspepsia, and the questionnaire comprised of items which have been shown empirically to be the characteristics of a group of dyspeptic children, and ensuring that the scale has enough items and adequately covers the domain under investigation.

The measurement properties provided by the instrument depend on its psychometric properties. Questions that must be addressed when choosing a questionnaire study for a
clinical trial or application in clinical practice were explained [28]. Accordingly, in the development of the CDSQ, as the researchers asked the questions, there was no omission of responses, indicating a good quality of the data to be analyzed. Moreover, the advantages of face-to-face interviewing were manifest: the interviewer is sure who is responding, allows non-verbal communication, and determines if the subject is having difficulty understanding the items. About Feasibility: the instrument is short, simple, requires little time and effort in its application, and has a low financial cost. The instrument's acceptability results in a complete data collection, making it easily interpretable.

Reliability and Validity are instruments’ primary measurement properties [29], [30]. Thus, internal consistency through Cronbach's alpha coefficient [9] indicates whether all items of an instrument measure the same characteristic, assessing whether the questions are interrelated. Cronbach's α was also used to explore the effect of removing one or more items from a multi-item scale for the final instrument. This is an important measurement property for instruments using a variety of items [31]. A Cronbach alpha of 0.70 to 0.89 is considered good. In the current study, the internal consistency for all items was 0.74, indicating congruence and homogeneity to measure the same phenomenon, dyspepsia in children with CAP. Consequently, we can conclude that all items were consistent, meaning they measured the same concept.

The Validity Analysis assesses the instrument's psychometric properties that represent the attribute to be measured and how much it captures the concept that will be the target of the measurement. There are three types of Validity: Construct, Criterion, and Content. Construct Validity is the most rigorous method because it is accessible to exploration by statistical analysis. Thus, tests of association between the different variables were performed using Spearman's Correlation, which examines the theoretical relationship of the items to each other. In this study, both for the Dyspepsia and Non-Dyspepsia groups, there were moderate and highly significant correlations between CDQS total score and the various dyspeptic symptoms items. Given this, correlation values greater than 0.30 are considered adequate [32]. These findings suggest a remarkable convergence between the CDQS score and its components, and each question was independently associated with the total questionnaire score, and all questions measured the same underlying construct.

Criterion Validity refers to the extent to which a measure can relate to an external criterion such as another established instrument widely accepted or considered the "gold standard" for the construct being evaluated, performed in children with CAP and dyspepsia. This assessment is rarely used due to the lack of a criterion measure that is widely accepted. No "gold standard" to assess dyspepsia in children with CAP can be used to compare the questionnaire developed in this study.

Content Validity judges whether the scale appears appropriate for the intended purpose. In Content Validity, the questionnaire was exposed to the judgment of six paediatric specialists with extensive clinical experience and asked to review for acceptability, comprehensiveness, relevance, clarity of writing, the ambiguity of items, discrepancies and omissions. Thus, Content Validation involves critically examining the instrument's basic structure. In this analysis, few corrections were suggested.

All the question used requires only a categorical judgement by the respondent, as a 'yes/no' response, followed by an answer on a Likert Scale basis. This analysis can suffer two effects: Floor Effect and Ceiling Effect. In children with CAP and dyspepsia, we observed a considerable variation, with a high percentage of Floor Effect and a low percentage of Ceiling Effect. In children with CAP and Non-dyspepsia, the Floor Effect was high, demonstrating the absence of dyspeptic symptoms in this group. The Ceiling Effect was very low, demonstrating coherence of the results.

The current study determined no cut-off value for differentiation between Dyspepsia from Non-Dyspepsia and Organic from Functional Dyspepsia. However, the analysis of the median and 95% Confidence Interval of scores reveal that the upper limit for Non-Dyspepsia is lesser than the lower limit of the Dyspepsia Group. Too, the upper limit of Functional Dyspepsia is equivalent to the median of Organic Dyspepsia, indicating higher scores values in Organic Dyspepsia.

The study presents some limitations. Firstly, the sample consists of children at a tertiary outpatient clinic, and they are likely to represent the more severe cases. Secondly, the cohort did not involve healthy individuals. Thirdly, responsiveness, that is, the detection of changes over time, was not evaluated. However, some strengths need to be considered. Firstly, to our knowledge, no generally recognized dyspepsia symptom questionnaire has been developed in the Brazilian Portuguese language for children and adolescents. Secondly, it is a short-term instrument that discriminates dyspeptic symptoms. Thirdly, the patients evaluated were from routine clinical practice.

V. CONCLUSION

The CDSQ is a brief questionnaire that evaluates children and adolescents with CAP and dyspeptic symptoms. The investigation of dyspepsia represents a significant burden on health services, and this questionnaire is cost-effective and is particularly well suited for uninvestigated dyspepsia. Patients reported significantly more severe symptoms in Dyspepsia than Non-Dyspepsia groups. Thus, the primary application of this discriminative instrument is in case-finding in epidemiological surveys and is helpful for clinical trials. Assumed that the CDSQ differentiating organic from functional dyspepsia would help manage unnecessary endoscopy procedures, compared with a strategy that would entail prompt endoscopy for all patients.

REFERENCES


