Research Article
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Comparison of two self-report pain intensity scales in children and adolescents with chronic abdominal pain associated with *Helicobacter pylori*-dyspepsia and Irritable bowel syndrome

Abstract

Purpose: To evaluate pain intensity and the agreement between the Visual Analogue Scale (VAS) and Faces Pain Scale (FAS) in children/adolescents with Chronic Abdominal Pain (CAP) both in Irritable Bowel Syndrome (IBS) and *Helicobacter pylori* dyspepsia (HpD).

Methods: Single-centre, observational, cross-sectional study including 217 children/adolescents. Inclusion criteria: age (4-15 years); HpD diagnosis established with endoscopy and histopathological biopsies. IBS diagnosis based on Rome IV criteria. Exclusion criteria: chronic disorders (genetic, metabolic, cardiac, hepatic, renal diseases). In a standardized form, data was achieved, and children marked the "pain over the past month".

Results: The age of first symptoms, first visits, pain (epigastric, retrosternal, nocturnal pain, burning), vomiting, and anorexia were higher in HpD than in IBS children. The pain intensity was categorized as severe (7-10) for the majority of children both in FAS and VAS scales ($p>.0.05$). Also, analysis between IBS and HpD concerning sex, first child, age at first visit (≤10 y or >10y), overweight/obese, average BMI child, and the number of episodes of pain during the week ($p>0.05$). There was a positive and statistically significant correlation between FAS and VAS pain intensity in IBS (All children, male and female) and HpD group (only for All children). On Bland-Altman plots of VAS vs FAS, the 2SD values of differences between scales were: IBS (3.8) and HpD (3.4) group. The calculated limits of agreement (95% CIs) exceeded the a priori limits of acceptability for all measured parameters, indicating that the scales are not interchangeable.

Conclusions: Pain scales were, without difficulty performed, widely accepted and provided evidence that FAS and VAS are valid measures for assessing pain intensity in children with CAP. However, both VAS and FAS did not discriminate IBS from HpD, and the scales are not interchangeable.

Keywords: abdominal pain, pain measurement, irritable bowel syndrome, *Helicobacter pylori*, gastritis, dyspepsia, children

Volume 12 Issue 3 - 2022

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Received: October 25, 2022 | **Published:** November 8, 2022

Abbreviations: CAP, chronic abdominal pain; FAPDS, functional abdominal pain disorders; IBS, irritable bowel syndrome; HpD, *helicobacter pylori*-associated dyspepsia; VAS, visual analogue scale; FAS, facial affective scale; WHO, world health organization; BMI, body mass index; IQR, interquartile range

Introduction

Chronic Abdominal Pain (CAP) is a common problem in children and adolescents. A meta-analysis of epidemiologic studies on abdominal pain noted a global pooled prevalence of 13.5%. It evidenced that most children seeking healthcare advice for their CAP suffered from Functional Abdominal Pain Disorders (FAPDs). Irritable Bowel Syndrome (IBS) was the most prevalent (8.8%) and considered the prototypical of FAPDs.[1] Although IBS is a multi-symptom disorder characterized by the absence of biochemical, anatomical, or metabolic findings, abdominal pain is a predominant feature.

In contrast, non-ulcer *Helicobacter pylori*-associated dyspepsia (HpD) is one of the most common diagnoses in our outpatient clinic.[2,3] Also, abdominal pain is the primary clinical manifestation of *Helicobacter pylori* infection in children, but it is not specific.[2–4] Indeed, these two etiologies have distinct pathophysiological underlying mechanisms.[5,6]

On the other hand, pain is a complex, multidimensional phenomenon, and its assessment includes an estimation of the intensity and its impact on pain-related domains, such as emotional, physical, and social functioning.[7] Accordingly, by age five years and older, most children can express pain verbally and indicate the severity using pain-rating scales if age-appropriate tools are used.[8] Thus, pain intensity is likely the most accessible dimension to assess, and pain rating scales have a central place in clinical practice. Self-report approaches are acceptable for measuring pain,[9] and many face scales were developed for measuring pain intensity in children.[10,11] Currently, five measures of pediatric pain intensity have been recommended for use in systematic reviews or by expert panels,[9,12] of which only 3, the Numeric Rating Scale, Visual Analogue Scale (VAS), and Faces Pain Scale (FPS), were the most mentioned.[13,14]

Aims

To evaluate the intensity of pain and the agreement between the Visual Analogue Scale and a Faces Pain Scale in children with CAP, both IBS and HpD.

Material and methods

Study design, setting and selection of participants

The study was a single-centre, observational, cross-sectional study including consecutive cases of children/adolescents referred between 2017 to 2019 from the Brazilian Public Health System (SUS) seen for initial evaluation of CAP at Outpatient Pediatric Gastroenterology Clinic of Botucatu Medical School, Botucatu, Sao Paulo, Brazil. All children/adolescents were in the same geographic area. Inclusion criteria: CAP defined according to Apley and Naish[15] and Von Baeyer & Walker;[16] aged between 4-15 years; HpD diagnosis established with serology, endoscopy, and confirmed in a histopathological study of gastric biopsies.[2,3] Diagnosis of IBS is based on Rome IV criteria.[17] Exclusion criteria: chronic disorders (genetic, metabolic, immune, cardiac, hepatic or renal diseases, neurodevelopment delay, and previous surgery) and patients unable to self-report pain. The medical institutional review board approved this study. The parent or legal guardian consent to the study.

Procedures

The data extraction from a patient interview and electronic medical records was based on a standardized form that included information on demographics, clinical findings, and alarm symptoms and signs. Patients were stratified by sex (male vs female) and age (≤ 10 y vs >10 y), according to Riley et al.[18] Diagnosis was performed based on a protocol established for CAP.[19] Complete blood cell count, C-reactive protein, urinalysis, stool for ova & parasites, and *Helicobacter pylori* serology were done in all patients. Another diagnostic test was completed at the discretion of the gastroenterology team. The patients' final diagnoses were determined after four months of follow-up by two experienced pediatric gastroenterologists (MAC, NCM). They collaborated on the design, planning, and execution of the study. Afterwards, patients were allocated to the HpD and IBS groups. All data was continuously stored in a databank and entered into an Excel spreadsheet program (Microsoft, Redmond, WA). Data were entered by one author and checked by another author.

Pain evaluation

Patients were assessed for pain by the study's authors, and scores were documented in the medical record. Children mark the "pain over the past month"[20] on two scales at the first visit: The VAS[21] and the FAS.[11,22] The VAS is a 10-cm line, anchored by verbal descriptors, with the endpoint 0 for "no pain" and 10 for "worst pain". Participants mark across a 10-cm line at a point corresponding to the pain intensity level. The distance in centimetres from the low anchor of the VAS to the patient's mark is a numeric index of pain severity.[23] On the other side of the sheet, the FAS[11,22] was evaluated. It consists of nine faces depicting varying levels of distress, ranging from no pain (far left face) to much pain (far right face). Children choose a face that appears similar when they have pain. Numerical values for faces vary from 0.4 to 9.7. The intensity of pain was: absence of pain (0), mild pain (1-3), moderate pain (4-6), and severe pain (7-10), both in FAS and VAS in a 0 to 10 numeric rating scale.[20]

Anthropometric data

Experienced pediatric nurses obtained anthropometric measurements of body weight (kilograms) and height (centimetres) according to World Health Organization guidelines.[24] BMI (kg/m^2) and z-score were evaluated according to de Onis et al.[25] and WHO AnthroPlus.[26] Each child was classified as Obesity (z-score >2), Overweight (z-score between 1 and 2), and, Normal BMI (z-score between -2 and +1). All data were adjusted for sex and age. Then the patients were stratified into two groups: Obesity/Overweight and Normal BMI.

Statistical methods

The analysis was performed using GraphPad Prism version 7.00 for Windows (GraphPad Software, San Diego, CA). Shapiro–Wilk tested the normality of data distribution. Continuous variables were expressed as the median and interquartile range (IQR) and analyzed by the Mann-Whitney test. Fisher's exact test analyzed the categorical data in count and per cent. Spearman's Correlation assessed associations between VAS and FAS pain scales. Results were converted into a numeric value of 0 to 100, the agreement between scores evaluated with the Bland-Altman method, and 95% lower and upper limits reported. We defined a priori the maximum limit of agreement at 2.0 mm, and a value of $p < 0.05$ was considered significant.

Results

The study evaluated pain intensity in a convenience sample of 217 children/adolescents with CAP. In Table 1, the first symptoms and first visit age; epigastric, retrosternal, nocturnal pain; burning, vomiting, and anorexia were higher in HpD than in IBS children. The prevalence of Obesity/Overweight was 23% and 27%, respectively, for IBS and HpD, with the non–statistical difference between groups.

Table 1 Baseline characteristics of children with Irritable Bowel Syndrome and *Helicobacter pylori* associated dyspepsia

Variable	IBS (n=128)	HpD (n=89)	p value
	Median (IQR) or n (%)		
Child characteristics			
Age at first visit, years	9.7 (7.2 - 11.0)	10.1 (8.7 - 13.0)	**
Age at first symptoms, years	7.2 (5.1 - 9.9)	8.3 (6.8 - 10.8)	*
Duration of symptoms, months	12 (6 - 36)	12 (6 - 36)	-
Pain duration ≤12 months	62 (48)	50 (56)	-
Pain duration ≤10 months	39 (30)	30 (34)	-
Female sex	87 (68)	65 (73)	-
First-born child	65 (51)	38 (43)	-
Pain characteristics			
Frequency (weekly)	3.5 (3.5 - 14)	3.5 (3.5 - 14)	-
Epigastric	31 (24)	77 (87)	***
Periumbilical	66 (52)	8 (9)	***
Retrosternal irradiation	5 (4)	44 (49)	***

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Table Continued...

Pain characteristics			
Burning type	1 (0.8)	43 (48)	***
Nocturnal	11 (9)	40 (45)	***
Vomiting	37 (29)	48 (54)	***
Anorexia	28 (22)	46 (52)	***
Nutritional status			
z Weight/Age	0 (-0.63 - 0.83)	0.09 (-0.56 - 1.14)	-
z Height /Age	-0.15 (-0.89 - 0.62)	-0.15 (-0.56 - 0.82)	-
z BMI/Age	0.04 (-0.63 - 1.00)	0.44 (-0.69 - 1.07)	-
Overweight and Obese	30 (23)	24 (27)	-
Parental age, years			
Mother	33 (28 - 37)	32 (29 - 37)	-
Father	37 (32 - 41)	37 (32 - 43)	-
Residence characteristics			
Number of children	2 (1 - 3)	2 (1 - 3)	-
Number of persons	4 (4 - 5)	4 (4 - 5)	-
Number of rooms	5 (4 - 6)	5 (4 - 6)	-
Crowding index (person/room)	0.8 (0.6 - 1.1)	0.8 (0.6 - 1)	-

IBS, irritable bowel syndrome; HpD, *helicobacter pylori* associated dyspepsia; IQR, interquartile range; - not significant; *p<0.05; **p<0.005; ***p<0.0005; p value by Fisher's exact test or Mann-Whitney test

Table 2 compares pain rating scales of children with IBS and HpD. The pain intensity evaluated with FAS or VAS was not statistically different between IBS and HpD groups concerning sex, first child, age at first visit (≤10 y or >10y), Overweight/Obese, Normal BMI child, and the number of episodes of pain during the week. Conversely, in Pain intensity/duration ≤12 months, HpD was higher than IBS children with booth FAS and VAS scales. The pain intensity was categorized as severe (7-10) for the majority of children I both in scales, with no statistical differences.

Table 2 Comparison of children with Irritable Bowel Syndrome and *Helicobacter pylori* associated dyspepsia by pain rating scales

Variable	FAS			VAS		
	Median (IQR) or n (%)			Median (IQR) or n (%)		
	IBS (n=128)	HpD (n=89)	p	IBS (n=128)	HpD (n=89)	p
All children	8.2 (7.8 - 9)	8.2 (7.8 - 9)	-	7.6 (5.4 - 9.7)	7.7 (6.5 - 9.4)	-
Pain scores						
0	0	0	-	1 (1)	0	-
1-3	1 (1)	0	-	10 (8)	2 (2)	-
4-6	23 (18)	11 (12)	-	29 (23)	17 (19)	-
7-10	104 (81)	78 (88)		88 (68)	70 (79)	-
Sex						
Male	7.8 (6.9 - 9.3)	7.8 (7.8 - 8.8)	-	7.6 (5.3 - 9.3)	7.6 (5.1 - 9.3)	-
Female	8.2 (7.8 - 9)	8.2 (7.8 - 9)	-	7.7 (5.6 - 9.9)	7.7 (7.4 - 9.4)	-
First child						
Yes	8.2 (7.8 - 9.7)	8.2 (7.8 - 9)	-	8 (6 - 9.7)	7.8 (7.6 - 10)	-
No	7.8 (7.8 - 9)	8.2 (7.8 - 9)	-	7.6 (5.2 - 9.7)	7.6 (5.2 - 8.3)	-
Age						
≤10 years	8.2 (7.8 - 9)	8 (7.8 - 9)	-	8 (5.1 - 9.9)	7.7 (6.6 - 10)	-
>10 years	8.2 (7.8 - 9)	8.2 (7.8 - 9)	-	7.6 (6 - 9.2)	7.6 (5.5 - 8.3)	-
Pain intensity/duration						
≤12 months	7.8 (7.8 - 9)	8.2 (7.8 - 9.7)	*	7.5 (5.0 - 9.0)	7.7 (7.4 - 10)	*
>12 months	8.2 (7.8 - 9.7)	7.8 (7.8 - 8.2)	*	8 (6.3 - 10)	7.6 (5.1 - 8.2)	-
Nutritional status						
Overweight/Obese	8 (7.8 - 9)	8.2 (7.8 - 9.7)	-	7.8 (6.6 - 9.6)	7.6 (6.5 - 9.3)	-
Normal	8.2 (7.8 - 9.7)	8.2 (7.8 - 9)	-	7.6 (5.3 - 9.7)	7.7 (6.0 - 9.9)	-
Weekly pain frequency						
≤3.5	7.8 (7.8 - 9)	8.2 (7.8 - 9.7)	-	7.6 (5 - 9.5)	7.7 (6.7 - 9.5)	-
>3.5	8.2 (7.8 - 9.7)	8.2 (7.8 - 9)	-	8 (6.6 - 9.8)	7.7 (5.2 - 9.5)	-

IBS, irritable bowel syndrome; HpD, *helicobacter pylori* associated dyspepsia; IQR, interquartile range; FAS, facial affective scale; VAS, visual analog scale; - not significant; *p<0.05; p value by Fisher's exact test or Mann-Whitney test

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DOI: 10.15406/jpnc.2022.12.00474

Table 3 displayed a positive and statistically significant pain intensity correlation between FAS and VAS scales for All children, Male and Female, in IBS and only for All children in the HpD group. On Bland-Altman plots of VAS vs FAS, the 2SD values of differences between scales were respectively 3.8 for the IBS and 3.4 for the HpD group. The calculated limits of agreement (95% CIs) exceeded the a priori limits of acceptability for all measured parameters, indicating that the scales are not interchangeable. The percentages of all children with differences of more than 2 points between scales were respectively 22.5% and 25%.

Table 3 Pain intensity correlations and agreement between Facial Affective Scale and Visual Analog Scale for children with Irritable Bowel Syndrome and *Helicobacter pylori* associated dyspepsia

	FAS vs VAS				
	Spearman correlation			**Bland-Altman test**	
	n	**r**	**p**	**MD±SD**	**LA 95%**
IBS					
All children	128	0.60 (0.47 - 0.70)	***	-0.7±1,9	-7.7
Male	41	0.52 (0.25 - 0.72)	***	-0.7± 2.0	-8.1
Female	87	0.63 (0.48 - 0.74)	***	-0.7±1.9	-7.6
HpD					
All children	89	0.43 (0.20 - 0.61)	***	0.6±1.7	-6.8
Male	24	0.55 (0.14 - 0.80)	*	-0.9± 1.7	-6.7
Female	65	0.35 (0.05 - 0.59)	*	-0.4± 1.7	-6.9

IBS, irritable bowel syndrome; HpD, *helicobacter pylori* associated dyspepsia; FAS, facial affective scale;VAS, visual analog scale; *p<0.05; ***p<0.0005; r, correlation coefficient; MD, mean difference; LA 95%, limits of agreement of 95%

Discussion

The current pre-pandemic COVID-19, single-centre, a cross-sectional study evaluated the intensity of pain and the agreement between the VAS and FPS in children with CAP. HpD children were significantly younger at the age of first symptoms and age at the first visit and more symptomatic (with retrosternal pain, burning, pain that awakens the child, vomiting, and anorexia). However, pain intensity assessed by VAS and FAS did not discriminate the subgroups of IBS and HpD children and are valid measures for assessing pain in children with CAP, but not interchangeable scales.

There has yet to be a consensus on how pain intensity changes classifications from mild to moderate or moderate to severe in pediatric chronic pain.[27] However, Powell et al.[28] determined that the minimum clinically significant difference in VAS pain scores for children aged 8 to 15 years (on a 100-mm VAS scale) is 10 mm (95% confidence interval, 7 to 12 mm). The current study noted subjects' tendency to cluster data around 2 to 3 points for FAS and VAS (median between 7 and 8, and IQR between 6 and 9) according to previous studies.[11,29,30] Also, a positive and highly significant correlation between the two scales for all IBS and HpD children. Former studies demonstrated that it was highly correlated with VAS[31,32] and validated over time.[33,34] Given the lack of agreement between FAS and VAS in the current study, it is advisable using the same scale on an outcome measure in research or pediatric chronic pain clinics.[32]

The present study has some limitations. First, children were enrolled in a tertiary abdominal pain clinic, and the findings may not be generalizable. Second, pain scales were not re-applied to analyze treatment response and efficacy. Third, the study employed a unidimensional assessment tool. Current guidelines suggest using a multidimensional tool that combines behavioural, contextual, and physiologic information available to the subjects describing their perceptions. Fourth, psychological and social factors, including fear, knowledge, and previous experiences of pain, culture and learning, were not evaluated.[8] Some strengths: first, there was consistency and uniformity in demographics, anthropometrics, and clinical data collection using a well-defined form. Second, non-ulcer *Helicobacter pylori* gastritis was established with serology, endoscopy, and histopathological analysis. Third, pain intensity scales were easily administered, widely accepted, and with no stressful conditions during the first visit.

Chronic pain is a biopsychosocial phenomenon resulting from the dynamic integration of biological, psychological and socio-cultural contexts. Therefore, these factors are not independent and interact in various ways to shape the child's experience of pain. Thus, CAP is challenging to manage, and comorbid symptoms and behaviours can add to overall suffering and discomfort, dramatically reducing the quality of life.[7] Pain is considered the "fifth vital sign" in medical care.[35] Consequently, pain assessment is vital for effective pain management. Many single-item pain measures are used for this purpose, and unidimensional pain scales routinely assess pediatric chronic pain. The most commonly used pain scales include VASs and FPS,[8,36,37] as used in this study. VAS is considered appropriate for children above seven[37] and FPS for above four[34] years. The VAS is conceptually complex and requires translating a subjective sensory experience into a linear format.[38] However; VAS is the gold standard for a child older than six. Markedly, children generally prefer FPS when the choice is offered.[9,39,40]

In conclusion, pain scales were, without difficulty performed, widely accepted and provided evidence that FAS and VAS are valid measures for assessing pain intensity in children with CAP. However, both VAS and FAS did not discriminate IBS from HpD, and the scales are not interchangeable.

Author contributions

Carvalho MA contributed on the conception of the work, analysis and interpretation of the data, drafted the initial manuscript and revised the article critically; Carine Dias Ferreira de Jesus, Debora Avellaneda Penatti, Juliana Tedesco Dias performed the collection of the data and drafted the initial manuscript; Machado NC contributed on the conception of the work, analysis and interpretation of the data, drafted the initial manuscript and revised it critically.

Acknowledgments

None

Citation: Carvalho MA, de Jesus CDF, Penatti DA, et al. Comparison of two self-report pain intensity scales in children and adolescents with chronic abdominal pain associated with *Helicobacter pylori*-dyspepsia and Irritable bowel syndrome. *J Pediatr Neonatal Care*. 2022;12(3):164–168. DOI: 10.15406/jpnc.2022.12.00474

Funding

None

Conflicts of interest

The authors declare no conflict of interest.

References

1. Korterink JJ, Diederen K, Benninga MA, et al. Epidemiology of pediatric functional abdominal pain disorders: a meta-analysis. Zhang L, editor. *PLoS One*. 2015;10(5):e0126982.
2. Carvalho MA, Machado NC, Ortolan EVP, et al. Upper gastrointestinal histopathological findings in children and adolescents with nonulcer dyspepsia with *helicobacter pylori* infection. *J Pediatr Gastroenterol Nutr*. 2012;55(5):523–529.
3. Correa Silva RG, Machado NC, Carvalho MA, et al. *Helicobacter pylori* infection is high in paediatric nonulcer dyspepsia but not associated with specific gastrointestinal symptoms. *Acta Paediatr*. 2016;105(5):e228–e231.
4. Kalach N, Bontems P, Raymond J. *Helicobacter pylori* infection in children. *Helicobacter*. 2017;22:e12414.
5. Chmiela M, Kupcinskas J. Review: Pathogenesis of *Helicobacter pylori* infection. *Helicobacter*. 2019;24(S1):e12638.
6. Devanarayana NM, Rajindrajith S. Irritable bowel syndrome in children: Current knowledge, challenges and opportunities. *World J Gastroenterol*. 2018;24(21):2211–2235.
7. Varni JW, Bendo CB, Nurko S, et al. Health-related quality of life in pediatric patients with functional and organic gastrointestinal diseases. *J Pediatr*. 2015;166(1):85–90.
8. von Baeyer CL. Children's Self-Report of Pain Intensity: What We Know, Where We Are Headed. *Pain Res Manag*. 2009;14(1):39–45.
9. Stinson JN, Kavanagh T, Yamada J, et al. Systematic review of the psychometric properties, interpretability and feasibility of self-report pain intensity measures for use in clinical trials in children and adolescents. *Pain*. 2006;125(1–2):143–157.
10. Tomlinson D, von Baeyer CL, Stinson JN, et al. A systematic review of faces scales for the self-report of pain intensity in children. *Pediatrics*. 2010;126(5):e1168–e1198.
11. McGrath PA. Pain in Children. Nature, Assessment, and Treatment. New York: Guilford Press. *Health Psychology & Medical Issues*. 1990. 466 p.
12. Cohen LL, Lemanek K, Blount RL, et al. Evidence-based assessment of pediatric pain. *J Pediatr Psychol*. 2008;33(9):939–955.
13. Fisher E, Heathcote L, Palermo TM, et al. Systematic review and meta-analysis of psychological therapies for children with chronic pain. *J Pediatr Psychol*. 2014;39(8):763–782.
14. Saps M, Biring HS, Pusatcioglu CK, et al. A comprehensive Review of Randomized Placebo-Controlled Pharmacological Clinical Trials in Children with Functional Abdominal Pain Disorders. *J Pediatr Gastroenterol Nutr*. 2015;60(5):645–653.
15. Apley J, Naish N. Recurrent abdominal pains: A field survey of 1,000 school children. *Arch Dis Child*. 1958;33(168):165–170.
16. Von Baeyer CL, Walker LS. Children with recurrent abdominal pain: Issues in the selection and description of research participants. *J Dev Behav Pediatr*. 1999;20(5):307–313.
17. Hyams JS, Di Lorenzo C, Saps M, et al. Childhood functional gastrointestinal disorders: Child/adolescent. *Gastroenterology*. 2016;150(6):1456–1468.
18. Riley JL, Robinson ME, Wise EA, et al. A meta-analytic review of pain perception across the menstrual cycle. *Pain*. 1999;81(3):225–235.
19. Machado NC, Carvalho MA, Moreira FL. Dor Abdominal Recorrente. *Journal of Pediatria*. 2000;76(S1):165–172.
20. Gold JI, Mahrer NE, Yee J, et al. Pain, fatigue, and health-related quality of life in children and adolescents with chronic pain. *Clin J Pain*. 2009;25(5):407–412.
21. Gragg RA, Rapoff MA, Danovsky MB, et al. Assessing chronic musculoskeletal pain associated with rheumatic disease: Further validation of the Pediatric Pain Questionnaire. *J Pediatr Psychol*. 1996;21(2):237–250.
22. McGrath PA, Seifert CE, Speechley KN, et al. A new analogue scale for assessing children's pain: An initial validation study. *Pain*. 1996;64(3):435–443.
23. Fowler-Kerry S, Lander J. Assessment of sex differences in children's and adolescents' self-reported pain from venipuncture. *J Pediatr Psychol*. 1991;16(6):783–793.
24. World Health Organization. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. *World Health Organ Tech Rep Ser*. 1995;854:1–452.
25. De Onis M, Onyango AW, Borghi E, et al. Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ*. 2007;85(9):660–667.
26. World Health Organization. WHO AnthroPlus for personal computers Manual: Software for assessing growth of the world's children and adolescents [Internet]. 2009.
27. Hirschfeld G, Zernikow B. Variability of "optimal" cut points for mild, moderate, and severe pain: Neglected problems when comparing groups. *Pain*. 2012;154(1):154–159.
28. Powell C V, Kelly AM, Williams A. Determining the minimum clinically significant difference in visual analog pain score for children. *Ann Emerg Med*. 2001;37(1):28–31.
29. Miller MD, Ferris DG. Measurement of subjective phenomena in primary care research: the Visual Analogue Scale. *Fam Pract Res J*. 1993;13(1):15–24.
30. McCormack HM, Horne DJ, Sheather S. Clinical applications of visual analogue scales: A critical review. *Psychol Med*. 1988;18(4):1007–1019.
31. Pagé MG, Katz J, Stinson J, et al. Validation of the numerical rating scale for pain intensity and unpleasantness in pediatric acute postoperative pain: Sensitivity to change over time. *J Pain*. 2012;13(4):359–369.
32. Ruskin D, Lalloo C, Amaria K, et al. Assessing pain intensity in children with chronic pain: Convergent and discriminant validity of the 0 to 10 numerical rating scale in clinical practice. *Pain Res Manag*. 2014;19(3):141–148.
33. Garra G, Singer AJ, Taira BR, et al. Validation of the Wong-Baker FACES pain rating scale in pediatric emergency department patients. *Acad Emerg Med*. 2010;17(1):50–54.
34. Hicks CL, Von Baeyer CL, Spafford PA, et al. The Faces Pain Scale - Revised: Toward a common metric in pediatric pain measurement. *Pain*. 2001;93(2):173–183.
35. Phillips DM. JCAHO Pain Management Standards Are Unveiled. *JAMA*. 2000;284(4):428–429.
36. Howard RF, Liossi C. Pain assessment in children. *Arch Dis Child*. 2014;99(12):1123–1124.
37. Castarlenas E, Jensen MP, von Baeyer CL, et al. Psychometric Properties of the Numerical Rating Scale to Assess Self-Reported Pain Intensity in Children and Adolescents. *Clin J Pain*. 2017;33(4):376–383.
38. Gift AG. Visual analogue scales: Measurement of subjective phenomena. *Nurs Res*. 1989;38(5):286–288.
39. Miró J, Castarlenas E, Huguet A. Evidence for the use of a numerical rating scale to assess the intensity of pediatric pain. *Eur J Pain*. 2009;13(10):1089–1095.
40. Tsze DS, Von Baeyer CL, Bulloch B, et al. Validation of self-report pain scales in children. *Pediatrics*. 2013;132(4):e971–e979.

Citation: Carvalho MA, de Jesus CDF, Penatti DA, et al. Comparison of two self-report pain intensity scales in children and adolescents with chronic abdominal pain associated with *Helicobacter pylori*-dyspepsia and Irritable bowel syndrome. *J Pediatr Neonatal Care*. 2022;12(3):164–168.
DOI: 10.15406/jpnc.2022.12.00474