

## Functional constipation and posture in defecation

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### Abstract

**Background** Functional constipation is often a consequence of habitual bowel elimination while sitting on common toilet seats. A considerable proportion of the population with normal bowel movement frequency has difficulty emptying their bowels. The principal cause of this problem may be the obstructive nature of the rectoanal angle and its relationship to the posture normally used in defecation.

**Objective** To assess the relationship between functional constipation with the posture (sitting vs squatting) during defecation in children.

**Methods** We conducted a cross-sectional study in November 2010. Participants aged 12-15 years were selected consecutively from a junior high school in Medan. Parents and children filled questionnaires and were interviewed. Functional constipation was assessed based on the Rome III criteria.

**Results** Sixty-five students enrolled in the study. There was no statistically significant differences in subjects' characteristics. There was a significant correlation between functional constipation with posture during defecation in children (RR=0.06, 95%CI 0.02 to 0.25; P=0.0001). Functional constipation was more likely occurred in children with sitting (12/20) than squatting posture (4/45) during defecation.

**Conclusion** We found that posture in defecation is correlated to functional constipation in children. [Paediatr Indones. 2013;53:104-7.].

**Keywords:** posture, defecation, functional constipation, children.

One of the changes Western industrial development brought to developing countries was the introduction of the toilet seat. The most common posture for defecation was squatting, as used by most of the World's population.<sup>1</sup> The sitting rather than squatting posture has been reported to be a source of many health problems. Most clinicians recognize squatting as a natural and physiological posture that encourages the defecation process. Constipation, appendicitis, hemorrhoids, and diverticulitis may be attributed to the sitting posture.<sup>1,2</sup>

The anorectal angle depends on the posture while defecating. This anorectal angle becomes straighter in a squatting posture, easing the defecation process. This straighter angle reduces the pressure required for defecation and may help prevent constipation and hemorrhoids. A reduction in overall time and the number of straining episodes required for defecation have been reported in subjects using a squatting posture.<sup>1-3</sup>

Constipation is a common problem of children worldwide. While acute and chronic constipation

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may occur in children, most cases have functional constipation.<sup>4,5</sup> Constipation can occur in children of all ages, but more often in neonatal, pre-school, and school-aged children.<sup>5,6</sup> The aim of this study was to assess the relationship between functional constipation and children's posture in defecation.

## Methods

This cross-sectional study examined the relationship of functional constipation to the posture used in defecation in children aged 12-15 years. Participants were volunteers recruited by consecutive sampling from Harapan Junior High School in Medan, North Sumatera Province in November 2010.

Subjects had no physical abnormalities and were from families of higher socioeconomic status. Subjects were healthy at the time of investigation and had no chronic or acute illnesses. Students with malnourishment, gastrointestinal disorders, endocrine disorders, diarrhea, vomiting, fever, and blood in the stool were excluded. This study was approved by the Ethics Committee for Research of University of North Sumatera Medical School. Subjects' parents/guardians provided informed consent.

We used questionnaires and direct interviews to

assess the incidence of functional constipation based on the ROME III criteria. These criteria consisted of two or fewer defecations in the toilet per week, at least one episode of fecal incontinence per week, history of retentive posturing or excessive volitional stool retention, history of painful or hard bowel movements, presence of a large fecal mass in the rectum, or history of large diameter stools which may obstruct the toilet. Subjects who fulfilled criteria at least once per week for a minimum of 2 months prior to diagnosis were enrolled in the study. Subjects were divided into two groups, constipation vs not constipation. Afterwards, subjects were surveyed to determine their posture during defecation.

The relationship between gender and functional constipation, as well as the relationship between posture used in defecation and functional constipation were analyzed by chi-square test. A P value of < 0.05 was considered to be significant with a 95% confidence interval (95% CI).

## Results

Sixty-five subjects were enrolled in this study, 16 out of them were constipated. **Table 1** shows the basic characteristics of the subjects.

**Table 1.** Subjects' characteristics

Characteristics	Constipation	
	Yes (n = 16)	No (n = 49)
Mean age (SD), months	160.75 (8.76)	158.61 (7.06)
Mean weight (SD), kg	43.81 (7.05)	42.85 (2.23)
Mean height (SD), m	1.44 (0.03)	1.45 (0.01)
Mean body mass index (SD), kg/m <sup>2</sup>	21.11 (2.98)	20.39 (1.08)

**Table 2.** The relationship between gender and functional constipation

Gender	Constipation		Total	RR	95% CI	P value
	Yes (n = 16)	No (n = 49)				
Boys, n	6	21	27	0.8	- 0.25 to 2.55	0.932
Girls, n	10	28	38			

**Table 3.** The relationship between posture during defecation and functional constipation

Posture	Constipation		Total	RR	95% CI	P value
	Yes (n = 16)	No (n = 49)				
Squatting	4	41	45	0.06	0.02 to 0.25	0.0001
Sitting	12	8	20			

The relationship between gender and functional constipation was evaluated by chi-square test and shown in **Table 2**. There was no significant difference between boys and girls in the occurrence of constipation (RR=0.8, 95%CI - 0.25 to 2.55; P=0.932).

We evaluated the relationship between functional constipation and posture during defecation. Chi-square analysis revealed a significant association between the posture during defecation and functional constipation (RR=0.06, 95%CI 0.02 to 0.25; P=0.0001) as shown in **Table 3**.

## Discussion

Historically, people have squatted during defecation, and this practice continues today in developing and underdeveloped countries. The widespread use of toilet seats in Western countries began during the 19<sup>th</sup> century with the successful development of the water closet and sewage system. These technical solutions were necessary for improving sanitary conditions during the growth of cities.<sup>7</sup>

Researchers working in Africa were surprised that they rarely encountered cases of hemorrhoids, constipation, hernia, and diverticulosis in the population. These conditions were also rarely observed in other underdeveloped countries. This finding was attributed to a high fiber diet, suggesting a need to enrich their diets with edible fibers. However, the prevalence of these conditions has not changed.<sup>2,7,8</sup>

Our study revealed that functional constipation was more likely happened in children with sitting (12/20) than squatting posture (4/45) during defecation. These results may be explained by the difference in the rectoanal angle in sitting vs. squatting postures. This angle is larger (straighter) when squatting than in a sitting posture. The angle between the rectum and anal canal varies among individuals.<sup>2,7,8</sup> A study showed that the rectoanal angle is an influencing factor on constipation, as this angle straightens with fully flexed hips corresponding to a squatting posture assumed for defecation. This posture facilitates rectal emptying and the defecation process.<sup>7,8</sup>

Previous studies explained that defecation in a squatting posture requires a shorter time and

less effort compared to a sitting posture. Also, the squatting posture creates lower intraabdominal pressure than the sitting posture.<sup>1,3</sup> Sakakibara *et al* used videomanometrics to measure abdominal pressure and rectoanal angle during three postures: sitting, sitting with hip flexing at 60<sup>o</sup>, and squatting. The study indicated rectoanal angle that formed in squatting posture was 126<sup>o</sup>, sitting posture was 100<sup>o</sup>, and sitting with hip flexing at 60<sup>o</sup> was 99<sup>o</sup>. The study also indicated that the larger rectoanal angle formed with squatting posture, less straining resulted in defecation.<sup>7</sup>

The occurrence of functional constipation varies depending on children's ages, and most of it were functional constipation.<sup>9,10</sup> Loening-Baucke found constipation in 22.6% of 482 children aged 4-17 years.<sup>11</sup> In our study, the subjects with constipation mean age was 160.75 (SD 8.76) months.

A limitation of our study was that we did not measure rectoanal angles or abdominal pressure by radiological and videomanometric methods. Moreover, there are many causes of functional constipation that we did not eliminate. Further research is needed to accurately assess the relationship between functional constipation with posture in defecation in children.

In conclusion, we found that posture during defecation correlates with functional constipation in children.

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