

Functional constipation in the general population of Cotonou: influence of defecatory habits and physical activity

Abstract

Introduction: Constipation is a relatively common symptom worldwide. In its management, advice on physical activity and defecatory habits play a significant role. This work aimed to study the influence of defecatory habits and physical activity in the occurrence of constipation in the general population of Cotonou in the Republic of Benin.

Methods: This was a cross-sectional descriptive and analytical study conducted in 2017 in 7 districts of the commune of Cotonou, using cluster sampling. Constipation was defined according to Rome IV criteria. Defecatory habits of participants were collected. Physical activity was assessed using the Marshall questionnaire.

Results: A total of 1058 participants were included, including 574 men (sex ratio of 1.2), with an average age of 29.3 ± 14.7 years [15-92 years]. Constipation was functional in 256 cases (24.2%). Defecatory habits associated with functional constipation were: squatting during defecation ($p=0.015$), not going to the toilet as soon as needed ($p<0.001$), not systematically going to the toilet in the morning ($p=0.033$). Not engaging in moderate physical activity was also a factor associated with constipation ($p<0.001$).

Conclusion: Defecatory habits appear to be associated with the onset of constipation in this Cotonou study. Moderate physical activity appears to protect against constipation in the population studied.

Keywords: Functional constipation, defecatory habits, physical activity, Cotonou

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Introduction

Constipation is often defined by a symptom corresponding to dissatisfaction during defecation due to either infrequent bowel movements (less than 3 bowel movements per week), difficulty in exonerating, or both.¹ Constipation may be a symptom of a disease (e.g. colon or rectal cancer), or may itself constitute a disease (functional constipation).² The Rome IV criteria provide a precise definition of functional constipation.³ These criteria are as follows: onset of symptoms longer than 6 months, with the presence of at least two of the following symptoms over the last three months: straining or pushing (more than 25% of bowel movements), hard or fragmented stools (more than 25% of bowel movements), a sensation of incomplete evacuation (more than 25% of bowel movements), a sensation of anorectal blockage (more than 25% of bowel movements), digital maneuvers (more than 25% of bowel movements) and less than 3 spontaneous evacuations per week (more than 25% of bowel movements).³ The prevalence of constipation in the general population varies widely according to region and definition; globally, it ranges from 2.6% to 31.0% worldwide.⁴ The factors most often cited as being associated with constipation are age, gender and diet, and to a lesser extent physical activity and defecatory habits.^{4,5} Few studies have been carried out on constipation in the general population in Benin. This lack of data on the disease led us to carry out this study, the aim of which was to determine whether physical activity and defecatory habits were factors associated with the occurrence of constipation in the general population in Cotonou (Republic of Benin).

Patients and methods

This was a descriptive and analytical cross-sectional study, with prospective data collection over a two-week period from July 28 to

August 10, 2017. It took place in 7 arrondissements of the Cotonou commune, using cluster sampling. Included was anyone aged at least 15, and resident in Cotonou for at least 6 months. Subjects presenting constipation with alarm signs (hematochezia, mucus emission, asthenia or weight loss) were not included. Functional constipation was defined according to the Rome IV criteria:³ onset of symptoms longer than 6 months and presence of at least 2 of the following symptoms over the last 3 months:

- pushing effort (greater than 25% of bowel movements),
- hard or fragmented stools (more than 25% of bowel movements),
- sensation of incomplete evacuation (more than 25% of bowel movements),
- sensation of anorectal blockage (greater than 25% of bowel movements),
- digital maneuvers (greater than 25% of bowel movements),
- less than 3 spontaneous evacuations per week.

With regard to defecation habits, the following information was collected: the type of toilet used by the participant (modern or traditional); the position during defecation (sitting or squatting); whether the participant goes to the toilet as soon as he or she feels the need to defecate; whether he or she goes to the toilet in the mornings when he or she wakes up, even if he or she doesn't feel the need to. Physical activity was assessed using the Marshall questionnaire (below at the end of the article).⁶ On this basis, patients were classified as either sufficiently active (score ≥ 4) or insufficiently active (score from 0 to 3).

Data were collected by direct interview using a standardized questionnaire. Data entry, processing and analysis were carried out using Stata version 15 software. Quantitative variables were expressed as mean and standard deviation. Qualitative variables were expressed as headcount and percentage. The identification of factors associated with constipation was structured in univariable and multivariable analysis. In the univariate analysis, frequency comparisons were made using Pearson’s chi-2 test. For multivariate analysis, a top-down stepwise logistic regression model with successive iterations was used. The initial model included all variables with a significance level ≤ 0.20 in univariate analysis. The interaction between the factors finally retained as significant had been tested, and the adequacy of the final model had been tested by the Hosmer-Lemeshow test. Measures of association were estimated by Odds Ratio (OR) and their 95% confidence intervals. A p-value <0.05 was considered statistically significant.

Ethically, verbal consent was obtained from participants, and confidentiality was observed during data collection and processing.

Results

Characteristics of the study population

Of the 1058 participants included, 574 were men (54.3%), giving a sex ratio of 1.2. The mean age was 29.3 ± 14.7 years, with extremes of 15 and 92 years.

Of the 1058 participants, 12.8% (135) said they lacked toilets, and 9.6% (102) described their toilets as unhygienic.

Of these 1058 subjects, 256 (24.2%) had functional constipation.

Analysis of factors associated with constipation

In univariable analysis, age ($p=0.020$), gender ($p=0.003$), marital status ($p=0.001$), moderate physical activity ($p<0.001$), position used for bowel movements ($p<0.001$), having a bowel movement as soon as needed ($p<0.001$) and having a bowel movement in the mornings ($p=0.033$) were significantly associated with constipation (Table 1). The type of toilet used was not associated with constipation in this study ($p=0.167$). It should be noted that in the constipated population, 95.3% of those who adopted the squatting position for bowel movements used traditional toilets. After adjustment for subject characteristics, the presence of constipation was independently associated with age ($p=0.011$), gender ($p=0.021$), physical inactivity ($p=0.006$), stool position ($p=0.004$) and bowel movements on demand ($p<0.001$). With identical characteristics, subjects who did not have a moderate level of physical activity during the week were 1.6 times more prone to constipation than subjects with a moderate level of physical activity. Similarly, subjects who had bowel movements in a squatting position were also at the same risk as those who had bowel movements in a sitting position. Furthermore, not having a bowel movement when needed increased the risk of constipation by 80%, compared with those who had a bowel movement as soon as the need for relief arose.

Table 1 Factors associated with constipation, Cotonou-Benin in 2017, Univariable analysis

	Total (N)	Constipation (Rome IV)				p	OR _b [IC _{95%}]
		Yes		No			
		n	(%)	n	(%)		
Age group (in years)						0.020	
<30	671	153	(22.8)	518	(77.2)		1
30-59	325	79	(24.3)	246	(75.7)	0.718	1.1 [0.8 ; 1.5]
≥ 60	62	24	(38.7)	38	(61.3)	0.007	2.1 [1.2 ; 3.7]
Gender						0.003	
Female	484	138	(28.5)	346	(71.5)	0.003	1.5 [1.2 ; 2.1]
Male	574	118	(20.6)	456	(79.4)		1
Marital status						0.001	
Single	626	140	(22.4)	486	(77.6)		1
Divorced	26	7	(26.9)	19	(73.1)	0.587	1.3 [0.5 ; 3.1]
Couple	369	90	(24.4)	279	(75.6)	0.464	1.1 [0.8 ; 1.5]
Widowed	37	19	(51.4)	18	(48.6)	0	3.7 [1.9 ; 7.2]
Education level						0.183	
Uneducated	120	38	(31.7)	82	(68.3)	0.031	1.6 [1.1 ; 2.5]
Primary	239	60	(25.1)	179	(74.9)	0.391	1.2 [0.8 ; 1.7]
Superior	165	39	(23.6)	126	(76.4)	0.717	1.1 [0.7 ; 1.6]
Secondary	534	119	(22.3)	415	(77.7)		1
Moderate physical activity						<0.001	
Yes	816	176	(21.6)	640	(78.4)		1
No	242	80	(33.1)	162	(66.9)	<0.001	1.8 [1.3 ; 2.5]
Type of toilet used						0.167	
Modern	309	66	(21.4)	243	(78.6)		1
Traditional	749	190	(25.4)	559	(74.6)		1.3 [0.9 ; 1.7]

Table 1 Continued...

	Total (N)	Constipation (Rome IV)				p	OR _b [IC _{95%}]
		Yes		No			
		n	(%)	n	(%)		
Seat position					0.015		
Squatting	724	191	(26.4)	533	(73.6)	0.015	1.5 [1.1 ; 2.0]
Seat	334	65	(19.5)	269	(80.5)		1
Saddle as required					<0.001		
Yes	675	137	(20.3)	538	(79.7)		1
No	383	119	(31.1)	264	(68.9)	<0.001	1.8 [1.3 ; 2.4]
Morning saddle					0.033		
Yes	347	70	(20.2)	277	(79.8)		1
No	711	186	(26.2)	525	(73.8)	0.033	1.4 [1.0 ; 1.9]

Table 2 shows the factors associated with constipation in the multivariate analysis.

Table 2 Factors associated with constipation, Cotonou-Benin in 2017, Multivariate analysis

	OR adjusted	IC 95% OR adjusted	P
Age group (in years)			0.011
<30	1		
30-59	1.1	0.8 ; 1.5	0.722
≥60	2.2	1.2 ; 3.8	0.009
Gender			0.021
Male	1		
Female	1.4	1.1 ; 1.9	
Moderate physical activity			0.006
Yes	1		
No	1.6	1.1 ; 2.2	
Saddle position			0.004
Seat	1		
Squatting	1.6	1.2 ; 2.2	
Saddle as required			<0.001
Yes	1	0.4 ; 0.8	
No	1.8	1.3 ; 2.4	

Discussion

The defecatory habits studied included: type of toilet, position adopted during defecation, having a bowel movement as soon as the sensation of need arose, and systematically having a bowel movement when waking up in the morning. In this study, there was no statistically significant relationship between toilet type and constipation. We expected participants who used traditional toilets to be more constipated than others: indeed, these are often poorly ventilated and offer a low level of hygiene, hardly conducive to putting the user at ease. The time devoted to defecation could therefore be reduced to a strict minimum. With regard to bowel position, squatting was a risk factor for constipation (p=0.011), against all expectations. Indeed, to reduce the risk of constipation, it is recommended to improve the defecatory position.⁷ The use of a stool placed under the feet or a “Turkish” toilet (in which the squatting position is adopted) favours the progression of stool into the anal canal.⁸ This results from the fact that the opening of the anorectal angle is the consequence of the relaxation of the puborectal muscle, the squatting position and a certain descent of the perineum.⁹ The apparently contradictory association between constipation and squatting in our study could be explained by several factors specific to the population studied. In the constipated population, 95.3% of those who adopted the squatting

position for bowel movements used traditional toilets. These toilets are often poorly ventilated and emit unpleasant odours, which means that people who only use these toilets spend as little time in them as possible.

In addition, the elderly often suffer from arthralgia, making it difficult for them to have a bowel movement on these toilets. So they don't have a bowel movement as soon as they feel the need. However, these arguments need to be verified by further studies, especially as there is no significant association between toilet type and constipation. It should be noted that international recommendations state that advice on defecation assistance is recommended and must be individually adapted: responding to the sensation of need, maintaining a regular rhythm of defecation, respecting a sufficient duration to satisfy the need, auditory, visual and olfactory privacy whenever possible.^{7,10,11}

In addition, we noted that “Not having a bowel movement as soon as the sensation of need arises” is a risk factor for constipation (p<0.001). These results are in line with the literature. Vitton et al.⁷ mentioned that, despite the absence of studies, it is possible to recommend promoting the gastrointestinal reflex by advising patients to respond to the sensation of need, which typically occurs on waking or within 30 minutes after meals when the gastro-colic reflex is at its strongest.

The last defecatory behavior studied was “Not having a morning bowel movement systematically”, which appeared to be a factor associated with constipation (p=0.033). This result is in line with recommendations.⁷ With regard to physical activity, moderate physical activity seems to protect against constipation. Our results are contrary to those of Daniela et al.¹² in Sao Paulo, Brazil, based on a prospective study of students. Towers et al.¹³ reported in a cohort study of elderly people that there was no link between physical activity and constipation. Vitton et al.⁷ reported that, in the absence of sufficient levels of evidence, the recommendation of regular physical activity is only subject to professional agreement. However, our results were similar to those published by some authors. Müller Lissner et al.¹⁴ in 2005 noted that a lack of physical activity was a risk factor for constipation. Brown et al.¹⁵ conducted a longitudinal study of women in Australia and came to similar conclusions. Campbell et al.¹⁶ in New Zealand (prospective study in subjects aged over 70) and Nakaji¹⁷ in Japan in 1995 also reported that physical activity reduced the risk of constipation. Possible mechanisms by which physical activity modulates intestinal transit include reduced colonic transit time and hormonal changes during physical activity.¹⁸

Physical activity can modify the levels of endogenous sex hormones, known to regulate colonic transit time.¹⁹ For example, a reduction in progesterone levels could decrease gastrointestinal transit

time.²⁰ The association between physical activity and constipation is also partly explained by the fact that physical activity can stimulate appetite, and adequate food intake leads to more frequent bowel movements.²¹ More studies are needed to elucidate the underlying physiological mechanisms. This variability in results could also be explained by differences in physical activity assessment methods. In our study, we used the Marshall questionnaire. It should be noted that this questionnaire provides a summary assessment of physical activity. Finally, no mention was made of the difference between occupational and non-occupational physical activity.

Conclusion

This study, carried out in a general population in Cotonou, highlights the influence of defecatory habits on the occurrence of constipation. Moderate physical activity appears to protect against constipation in this study. It would therefore be useful to include defecatory advice and physical activity in hygienic dietary advice to reduce the frequency of constipation in the general population of Cotonou.

Marshall questionnaire

Physical activity was assessed using the Marshall questionnaire.

The participant was asked two questions:

A. How many times a week do you do 20 minutes of intense physical activity to the point of sweating or panting (being out of breath)?

(For example: jogging, carrying a heavy load, cycling at a fast pace)

- More than 3 times a week (score: 4)
- 1-2 times/week (score: 2)
- Never (score : 0)

B. How many times a week do you do 30 minutes of moderate physical activity or walking, which increases your heart rate or makes you sweat more than usual (light loads, cycling at a moderate pace, climbing stairs several times)?

- More than 5 times/week (score: 4)
- 3 to 4 times/week (score: 2)
- 1 to 2 times/week (score : 1)
- Never (score : 0)

Total score = A+B

- Score ≥ 4 : Sufficiently active
- Score 0-3 : Not active enough

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None.

Conflicts of interest

None.

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