

Functional Constipation in the General Population in Cotonou: Prevalence and Associated Socio-Demographic Factors

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Abstract

Background: Constipation is considered rare in sub-Saharan Africa because of the high fiber content of the local diet. However, certain factors could intervene in this pathology. The purpose of this study was to assess the prevalence of constipation in the general population in Cotonou and to determine the associated socio-demographic factors. **Methods:** This was a cross-sectional descriptive and analytical study conducted from July to August 2017 in 7 districts of the township of Cotonou, according to a cluster sampling. We included anyone over the age of 15 living in the city of Cotonou for at least 6 months. Constipation was either self-reported or functional (meeting the Rome IV criteria). **Results:** A total of 1058 participants were included: 574 men (sex ratio of 1.2), mean age of 29 years [range 15 - 92]. Self-reported constipation was noted in 512 patients (48.5%). It was functional in 256 cases (24.2%). In the latter category, there was a predominance of women (138, 53.9%), of secondary education (46.5%), of self-employed professionals (50.4%), from the Ouémé-Plateau (41.8%). Were associated with the occurrence of functional constipation (univariate analysis), age ≥ 60 years ($p = 0.049$), female gender ($p = 0.003$), and subjects living alone (166, 64.8%) vs. those living in a relationship (90, 35.2%, $p = 0.001$). **Conclusion:** Constipation was not as rare in Cotonou. It was more common in women, subjects over 60 years old or living alone.

Keywords

Constipation, General Population, Prevalence, Associated Factors, Cotonou

1. Introduction

Constipation is often defined as a symptom of dissatisfaction with defecation due to either uncommon stools (less than 3 stools a week), difficulty exonerating, or both [1]. It can be acute or chronic.

Constipation can sometimes take acute pseudo-surgical forms in rare cases. Most often it is chronic. It can be secondary to muscular or endocrine neurological diseases. Most often it is primitive. Constipation can be self-reported or meet criteria. A more recent definition, that according to the Rome IV criteria is more precise. These criteria are as follows: an onset of symptoms greater than 6 months with the presence of at least two of the following symptoms over the last three months: flare-ups (greater than 25% of defecations), hard or fragmented stools (greater than 25% of defecations), an incomplete sensation of evacuation (greater than 25% of defecations), an anorectal blocking sensation (greater than 25% of defecations), digital maneuvers (greater than 25% of defecations) and less than 3 spontaneous evacuations per week (greater than 25% of defecations) [2].

Its pathogenesis is multifactorial: it involves intrinsic factors (genetic predispositions, low level of parental education, intestinal motility disorders, hormonal imbalances, psychological disorders and depression) [3], and also involves behavioral factors (low fiber consumption, food and drinking water, low level of physical activity, failure to respond to the need for defecation) and environmental factors (life events, drug side effects, or socio-economic factors) [4].

Data on the disease in Africa, however, remain limited and findings remain contradictory. For some, while the Western has an average transit of 70 hours with 100 g of stool, the average African has a transit of 36 hours on average with a stool weight of 450 g [5]. For others, constipation is poorly quantified in Africa, but studies in urban hospital settings report its high frequency. We also know its place in traditional medicine which has a therapeutic arsenal based on decoctions and enemas drastic [6].

In Benin, several studies have been conducted on digestive disorders. However, to our knowledge, none has focused on constipation in the general population or more specifically on socio-demographic aspects. This lack of information about the disease in Benin led us to do this study. The objective was to assess the prevalence of constipation in the general population in Cotonou and to determine the associated sociodemographic factors.

2. Methods

It was a descriptive and analytical cross-sectional study, with a prospective collection of data over a two-week period from July 28 to August 10, 2017. The study took place in 7 districts of the township of Cotonou, according to a cluster sampling. We included anyone aged at least 15 years old and living in Cotonou for at least 6 months. People who have undergone colon surgery or hospitalization during the inclusion period were not included. Pregnant people and people with mental disabilities were not also in the study. The sampling

method was a probabilistic method with a 4-stage cluster sampling technique (first degree: borough, second degree: neighborhoods, third degree: dwelling, fourth degree: individuals). In each dwelling, the list of all target subjects is established to allow the selection of a single person. Only one subject is chosen by simple random draw on this list. The verbal consent of the chosen subjects was obtained. The sample size calculated using Schwartz's formula was 784 subjects. We recruited a total of 1058 people.

The dependent variable was constipation. Constipation was either self-reported or functional (meeting the Rome IV criteria as outlined above). Subjects with constipation and warning signs (hematochezia, weight loss, chronic constipation recently aggravated...) were not taken into account in the definition of functional constipation. The independent variables studied were: age, sex, occupation, level of education, ethnicity, marital status, monthly income, patient's residence during the study.

Data collection was done in a direct interview, based on a standardized questionnaire. The questionnaire used in the interview (see **Appendix** at the end of this manuscript) was designed by us. A test was conducted on the investigators to verify the validity and reliability of the questionnaire. Data capture, processing and analysis were performed using SPSS 21 software. Continuous variables were expressed on average with their standard deviation. Percentages were calculated on categorical variables. Comparisons were made between averages using Student's test, between the proportions using Pearson's Chi Square test or Fisher's exact test. The univariate analysis strategy was used to identify significant associations. The statistical significance level was 5%.

3. Results

3.1. Characteristics of the Study Population

Among the 1058 participants included, there were 574 men (54.3%), *i.e.* a male predominance with a sex-ratio of 1.2. The average age was 29 years old with extremes of 15 years and 92 years. The other characteristics are presented in **Table 1**.

3.2. Prevalence of Constipation

Among the 1058 participants, self-reported constipation was noted in 512 subjects, *i.e.* a prevalence of 48.4%.

Functional constipation, defined according to the Rome IV criteria, was noted in 256 participants, *i.e.* a prevalence of 20.4%.

3.3. Sociodemographic Factors Associated with Functional Constipation

As shown in **Table 2**, among the 256 participants constipated according to the Rome IV criteria, there was a female predominance (138 women or 53.9%) with a sex-ratio of 0.85 and a statistically significant relationship between sex and constipation ($p = 0.003$).

Table 1. Distribution of respondents by other socio-demographic characteristics (other than sex and age).

| | Numbers (N) | Percentage (%) |
|-------------------------|-------------|----------------|
| Marital status | | |
| Single | 626 | 59.2 |
| In a relationship | 369 | 34.9 |
| Divorced | 26 | 2.5 |
| Widower | 37 | 3.5 |
| Profession | | |
| Crafts/traders | 514 | 48.6 |
| Executives/Intellectual | 14 | 1.3 |
| Professions | | |
| Intermediate | 80 | 7.6 |
| Professions | | |
| Pupils/Students | 416 | 39.3 |
| Pensioners | 10 | 0.9 |
| Workers | 17 | 1.6 |
| Unemployed | 7 | 0.7 |
| Level of study | | |
| Not educated | 120 | 11.3 |
| Primary | 239 | 22.6 |
| Secondary | 534 | 50.5 |
| Superior | 165 | 15.6 |
| Total | 1058 | 100 |

Table 2. Distribution of constipated by sex and average monthly income.

| | Functional constipation | | Univariate analysis | | |
|---------------------------------------|-------------------------|-------------|---------------------|------------------|---------|
| | Yes | No | OR | CI (95%) | p-value |
| Sex | | | | | |
| Woman | 138 (53.9%) | 346 (43.1%) | 1.54 | 1.16 - 2.04 | 0.003 |
| Man | 118 (46.1%) | 456 (56.9%) | 1 | | |
| Average monthly income in FCFA | | | | | |
| | 21,569 | 21,494 | - | 17,784 to 17,624 | 0.985 |

The most affected age group was 60 years and older (99 cases, 38.7%) with a statistically significant age-constipation link ($p = 0.049$). The age distribution is shown in **Figure 1**.

Sociodemographic factors studied other than age and sex, and their association or non-association with functional constipation was presented in **Table 3**.

It revealed that there is a statistically significant relationship between marital status and constipation ($p = 0.001$): single people were the most affected (54.7%).

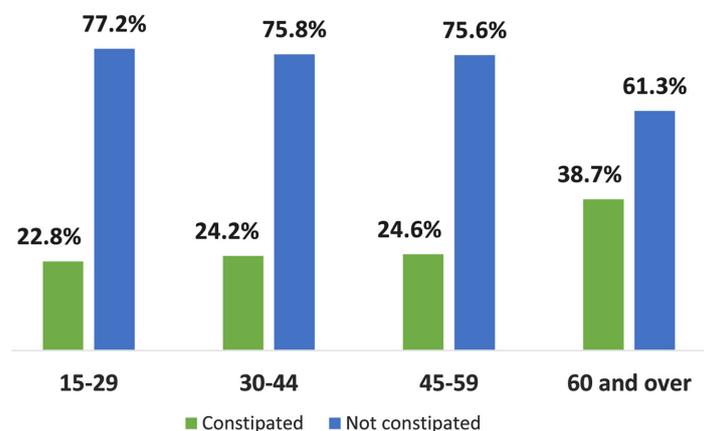


Figure 1. Distribution of constipation according to the Rome IV criteria according to age; $p = 0.049$.

Table 3. Distribution of functional constipation by marital status, level of education and occupation.

| | Functional constipation | | Univariate analysis | | |
|-------------------------------------|-------------------------|-------------|---------------------|----------|---------|
| | Yes | No | OR | CI (95%) | p-value |
| Marital status | | | | | |
| Single | 140 (54.7%) | 486 (60.6%) | - | - | 0.001 |
| In a relationship | 90 (35.2%) | 279 (34.8%) | | | |
| Divorced | 7 (2.7%) | 19 (2.4%) | | | |
| Widower | 19 (7.4%) | 18 (2.2%) | | | |
| Profession | | | | | |
| Non educated | 38 (14.8%) | 82 (10.2%) | - | - | 0.183 |
| Primary | 60 (23.4%) | 179 (22.3%) | | | |
| Secondary | 119 (46.5%) | 415 (51.7%) | | | |
| Superior | 39 (15.2%) | 126 (15.7%) | | | |
| Professional status | | | | | |
| Crafts/traders | 129 (50.4%) | 385 (48%) | - | - | 0.84 |
| Executives/Intellectual professions | 4 (1.4%) | 10 (1.2%) | | | |
| Intermediate professions | 18 (7%) | 62 (7.7%) | | | |
| Pupils/Students | 100 (39.1%) | 316 (39.4%) | | | |
| Pensioners | 2 (0.8%) | 8 (1%) | | | |
| Workers | 3 (1.2%) | 14 (1.7%) | | | |
| Unemployed | - | 7 (0.9%) | | | |

Monthly income, level of education and occupation were not statistically associated with constipation (as shown in **Table 2** and **Table 3**).

4. Discussion

The prevalence of constipation varies according to the diagnostic criteria used. Based on the Rome IV criteria defining functional constipation, the prevalence

of constipation in Cotonou was 24.2%. It is relatively high. Comparing this prevalence with those cited in the literature can be difficult, due to the recent update (May 2016) of the Rome criteria. We did not find any studies that used the Rome IV criteria to determine the prevalence of constipation. Our prevalence of constipation noted in Cotonou is close to that of 24% found in Italy by Cottone C *et al.* in a prospective study in 2014 (Criteria of Rome II) [7]. On the other hand, it exceeds the 16.7% rate found by Pare *et al.* in Canada following a questionnaire survey (Rome I Criteria) [8]. This variability in the prevalence of constipation could be explained not only by different diagnostic criteria but also by the collection techniques used. The prevalence of self-reported constipation we found in Cotonou was 48.4%. This result is above those found by Frexinos in 1998 in France which was 35% [9], and Haug TT in 2002 in Norway which was 20.2% [10]. However, it is within the range of 0.7% to 81% found by George Peppas *et al.* according to a survey of 21 studies of constipation in different parts of the world [11]. This variability in prevalence rates could be explained by the subjective nature of this definition of constipation. The perception of constipation varies from one individual to another. The variability in the prevalence of constipation is therefore easily understood.

Regarding the associated factors, there is a statistically significant relationship between age and constipation ($p = 0.049$), with a peak of the constipated population in the age group of 60 and over. These results are similar to those reported by Chu H *et al.* in China in 2014 [12], and also similar to those of Higgins and Johanson in North America who noted that constipation most often occurred after age of 65 [13]. All authors agree on the relation between high age and constipation. Changes in the enteric nervous system (with decreased normal bowel movements) and large parietal fibrosis observed in the elderly would be responsible for this [14]. In addition, with age, water consumption decreases, the diet is often inappropriate (low fiber content), physical activity decreases and co-morbidities increase, with iatrogenic consequences [4]. Age greater than 65 years is also associated with dentition that is more often incomplete, wearing dentures, and difficulty chewing food, forcing subjects to choose low-fiber foods [4]. All this can explain this increase in the frequency of constipation with age.

The female sex was predominant (53.9%) with a sex ratio of 0.85 among the constipated. These results are similar to those reported by Miele E *et al.* in Italy in 2004 [15], and close to 0.89 of Bommelaer *et al.* in France in 1986 (questionnaire survey) [16]. On the other hand, the female predominance in our study is less important than in the study of Garrigues V *et al.* in Spain in 2004 (questionnaire survey sent by mail); their sex ratio was 0.45 [17]. There is a difference in the estimates of the sex-ratio. However, the average value remains below 1 in almost all studies. These differences could be explained by a variability in the choice of the diagnostic method. This predominance of women has been attributed to hormonal factors leading to a higher risk of constipation during the luteal phase of the menstrual cycle under the effect of progesterone, and to the effects of delivery on pelvic floor muscles [18].

From our study, it was found that there is a statistically significant relation between marital status and constipation ($p = 0.001$), singles were the most affected (54.7%). A study by Perveen I *et al.* found marital status and constipation to be related, but married people were the most affected [19]. Chang JY *et al.* had found rather that there was no link between marital status and constipation [20]. These differences in outcomes could be explained in several ways: the diagnostic method used, the technique of collection, and the fact that some singles living in concubinage, their habits could therefore be closer to those of married people. On the other hand, one could assume that single people were more likely to suffer from psychological disorders such as anxiety, depression or that they were more stressed than people living in a relationship. Haug T reported that these disorders would promote constipation [10]. The mechanisms explaining this association could however not be elucidated.

From our study it appeared that there was no connection between the profession and the occurrence of constipation. We did not find authors in the literature who reported a relation between occupation and constipation.

Similarly, we did not find a link between level of education and constipation. Our results are identical to those reported by Chang JY *et al.* in the United States [20]; they are contrary to those of Higgins PD and Johanson JF in North America who reported that a low level of education was a risk factor for constipation [14]. These results could be explained by the fact that educated people have easier access to information via the media and the internet. The results we obtained, however, prove that constipation is not necessarily related to the level of study but to other cofactors.

In our study, we found no link between income and constipation. These results are contrary to those reported by Johanson JF in the United States [14], and Schmidt FM and Santos VL [21] in Brazil who noted that a low socio-economic level was a risk factor for constipation. This could be explained by the fact that for people and households with low incomes, food choices are regularly moving towards a diet of low nutritional quality, likely to favor chronic diseases related to insufficiencies of contributions in essential nutrients [22]. These data suggest that the rich would have better sanitation, better nutrition (since they have access to information through the media, books and the internet) or better health in general. It should be noted that the average monthly income per patient appears quite low in our study (21,569 FCFA), compared to the guaranteed minimum wage in Benin which was 40,000 FCFA. This is due to the fact that we mainly included students/pupils and craftsmen/traders, because they were the ones who were mostly available during our survey.

The limits of this study concern essentially some information biases:

- Some respondents did not know their exact date of birth; therefore their age could be biased.
- Some respondents were reluctant to report their income. It is possible that some of the reported revenues are not accurate.

- The period during which the collection was made corresponded to the long holidays, that is why the age group most represented among the respondents was 15 to 29 years old; this also explains the marital status and level of education of most of them. It is therefore possible that the prevalence of constipation is actually greater than that found in this study.

5. Conclusion

Constipation was relatively common in Cotonou. Socio-demographic factors associated with it are high age, female gender, and marital status. Socio-economic factors were of modest importance in this study.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

Constipation and associated factors in cotonou general population.....

Survey Sheet.....

Check the correct answer and specify the constants

Fill date.....

Criteria of non-inclusion

Do not include if the patient answers Yes to any of these questions:

Age < 15 years: Yes No ; Living in Cotonou for less than 6 months: Yes No ; Current pregnancy: Yes No ; Mental disabilities: Yes No ; Current hospitalization: Yes No ; History of colonic surgery: Yes No

General Information

Investigation Sheet No.....

Initials and surnames (first two letters of each).....

Phone.....

Neighborhoods.....

Sociodemographic data

Age..... Sex: Man Woman

Marital status: Single In a relationship Divorced Widower

Profession: Trader Teacher Artisan Health worker Household Pupils Student Engineer Accountant Secretary Religious Other.....

Level of study: Not educated Primary Secondary Superior

Departement of origin: Littoral Atlantique Atacora Donga Couffo Mono Zou Collines Ouémé Plateau Alibori Borgou

Approximate monthly income (FCFA).....

Alarm signs

Alarm sign: Yes No ; If yes, specify: hematochezia weight loss chronic constipation recently aggravated Anemia Personal or family history of colon or rectal cancer

Diagnosis retained

By the participant: Do you feel constipated? Yes No

By the practitioner: Constipation: Yes No

Functional constipation according to the Rome IV criteria: Yes No

[Rome IV criteria for constipation: an onset of symptoms greater than 6 months with the presence of at least two of the following symptoms over the last three months: flare-ups (greater than 25% of defecations), hard or fragmented stools (greater than 25% of defecations), an incomplete sensation of evacuation (greater than 25% of defecations), an anorectal blocking sensation (greater than 25% of defecations), digital maneuvers (greater than 25% of defecations) and less than 3 spontaneous evacuations per week (greater than 25% of defecations)].

Irritable bowel syndrome with constipation: Yes No

[Rome IV criteria for irritable bowel syndrome: Chronic abdominal pain or

discomfort occurring one day per week in the last 3 months associated with the following 2 points: 1) In relation with the defecation, 2) Associated with a change in the frequency or appearance of stool. The symptoms must have started for at least 6 months].