






# Is Constipation Associated with Worse Functioning in Adult Women? A Cross-Sectional Study

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Amanda Almeida Gomes Dantas <sup>1</sup>  
Alianny Raphaely Rodrigues Pereira<sup>2</sup>  
Shamyr Sulyvan de Castro <sup>3</sup>  
Thaissa Hamana de Macedo Dantas<sup>1</sup>  
Caroline Wanderley Souto Ferreira <sup>1,2</sup>  
Isabelle Ribeiro Barbosa<sup>1,2</sup>  
Saionara Maria Aires da Câmara <sup>1,2</sup>  
Diego de Sousa Dantas <sup>1,2</sup>

<sup>1</sup>Faculdade de Ciências da Saúde do Trairi, Universidade Federal do Rio Grande do Norte, Santa Cruz, Rio Grande do Norte, Brazil; <sup>2</sup>Physiotherapy Department, Universidade Federal de Pernambuco, Recife, Pernambuco, Brazil; <sup>3</sup>Physiotherapy Department, Universidade Federal do Ceará, Fortaleza, Ceará, Brazil

**Objective:** The aim of this study is to analyze the relationship between intestinal constipation and functioning in adult women living in a municipality in the interior of northeast Brazil.

**Materials and Methods:** This is a cross-sectional study conducted with 195 adult women in the city of Santa Cruz-RN. Constipation was diagnosed using the Rome III criteria. Functioning was measured through WHODAS 2.0. Social conditions, habits and lifestyle were also investigated. Inferential analysis was performed using the chi-squared test and the Mann–Whitney *U*-test, and the effect size was determined by eta squared ( $\eta^2$ ). Multivariate analysis was performed using multiple linear regression to analyze the relationship between the WHODAS total score and constipation, being adjusted by covariates with  $p \leq 0.20$  in the bivariate. A statistical significance level of  $p < 0.05$  was considered.

**Results:** Most of the participants in this study were aged 19 to 39 years (69.7%) and had an income of up to 1 minimum monthly salary (79.5%). WHODAS scores showed that women with constipation had more disability in the cognitive ( $p < 0.001$ ), mobility ( $p < 0.002$ ), self-care ( $p < 0.001$ ), and participation ( $p < 0.001$ ) domains, as well as the total score ( $p < 0.001$ ). After multiple linear regression analysis, the total WHODAS score remained associated with constipation ( $p < 0.001$ ), in which this condition increases the score by nine points.

**Conclusion:** The results of this study show that there is a reduction in functioning associated with the presence of constipation in adult women, mainly affecting the cognition, mobility, self-care and participation domains, in addition to the total score.

**Keywords:** constipation, functioning classification, disability and health

## Introduction

Constipation is a common and costly condition which ultimately results in social and economic burden as it affects work performance and activities of daily living.<sup>1</sup> Constipation affecting many patients worldwide, estimated prevalence range of 1% to 80%,<sup>2</sup> and evidence points out that the prevalence is higher among women than men.<sup>3–5</sup> There are no studies on the prevalence of constipation with national representativeness for the Brazilian population.<sup>6</sup> However, community-based studies show that its prevalence among women varies from 16% to 36.9%.<sup>4–6</sup>

The higher prevalence in women can be explained by biological issues related to estrogen and progesterone that directly interfere with gastrointestinal motility.<sup>7</sup> Thus, women of reproductive age, with the presence of menstrual cycles may face a significant prevalence of constipation. Other factors related to the prevalence

Correspondence: Diego de Sousa Dantas  
Faculdade de Ciências da Saúde do Trairi,  
Universidade Federal do Rio Grande do  
Norte, Street Teodorico Bezerra, Santa  
Cruz, RN 59200-000, Brazil  
Tel +55 8432912411  
Email diegodantas1@gmail.com

of constipation include the role of the female pelvic floor in the biomechanics of gastrointestinal emptying.<sup>8</sup>

Constipation is characterized by a constant difficulty to evacuate, a feeling of incomplete evacuation, as well as the presence of infrequent bowel movements, which are present every 3 or 4 days a week, or less frequently, in the absence of alarming symptoms or secondary factors.<sup>9</sup> The presence of these symptoms has been shown to have a negative effect on the development of activities related to people's health and functioning, such as daily activities, physical, emotional, social and personal well-being, work/school productivity, lifestyle, and quality of life (QoL) of individuals who live with this condition.<sup>10,11</sup>

Functioning is a broad and complex word because it brings together the structures and their bodily functions, the ability to perform certain activities and participation in daily life situations, being influenced by health conditions and environmental and personal factors.<sup>12</sup> Maintaining and/or achieving a high level of functioning is therefore a major public health goal.<sup>13</sup>

For an evaluation of functioning from a biopsychosocial perspective, the World Health Organization (WHO) recommends the use of the World Health Organization Disability Assessment Schedule 2.0 that express the functioning and disability of each person by six domains: cognition, mobility, self-care, interpersonal relationships, life activities and participation.<sup>14</sup>

Thus, based on the functioning model proposed by WHO, knowing how autonomous an individual is to perform their daily activities and participate socially is as significant as diagnosing a chronic disease or condition, because functioning is a unique and singular feature of each individual, constituting their adaptive response beyond biological factors and being influenced by the context, whether personal or environmental.<sup>5</sup> Thus, this study aims to analyze the relationship between intestinal constipation and functioning in adult women living in northeastern Brazil.

## Materials and Methods

### Research Design

This is a cross-sectional study conducted in the urban territory of Santa Cruz-RN from December 2015 to November 2016. Santa Cruz is a small municipality located in the interior of northeastern Brazil.

A prevalence of 36.9% of constipation in women was considered for the sample calculation,<sup>5</sup> as well as a relative

error of 20% and a non-response rate of 15%, resulting in a required sample of 194 women. Participants were recruited through an active search, and the sample composition was performed by proportional stratified sampling based on the city's family health territories, in which it has a health coverage of 97.83% by the Family Health Program (PSF).<sup>15</sup>

The study included women aged 19 to 49 years, non-pregnant, premenopausal and who agreed to participate in the study by signing the Informed Consent Form. Pregnant women were not included, as it is known that the risk of constipation during pregnancy is high due to the significant increase in sex hormones, reduced movement and bowel emptying due to mechanical compression caused by the gravid uterus.<sup>6</sup> Exclusion criteria:

- Women with cognitive impairment which prevented applying the questionnaires
- Women who did not complete the research protocol

### Data Collection

Women were invited to participate in the study while waiting for their usual health consultation at the health service. They were interviewed in a private location by previously trained interviewers. Data collection required an average of 40 minutes and it was performed through applying clinical questionnaire, the Rome III Criteria, International Physical Activity Questionnaire and World Health Organization Disability Assessment Schedule 2.0.

### Questionnaires

The dependent variable of this study is functioning as measured by the World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0).<sup>16</sup> WHODAS has been translated for use in Brazil<sup>16</sup> and it was created on the basis of the International Classification of Functioning, Disability and Health (ICF) model and its most recent version was published in 2010.<sup>14</sup> It provides the level of functioning from an analysis of six life domains, namely: 1) Cognition – comprehension and communication; 2) Mobility – movement and locomotion; 3) Self-care - dealing with one's own hygiene, dressing, eating and being alone; 4) Interpersonal relationships – interactions with other people; 5) Life activities – domestic responsibilities, leisure, work and school; and 6) Participation – participating in community and society activities. It provides a common base system for the purpose of any health condition in terms of functioning.<sup>14,16</sup>

WHODAS records the level of difficulty experienced in the last 30 days and it generating domain-weighted and general scores ranging from 0 (no disability or full functioning) to 100 (complete disability or no functioning).<sup>14,16</sup>

The constipation diagnosis was made using the Rome III criteria, which is considered the gold standard diagnose tool.<sup>17</sup> According to these criteria for diagnosing constipation, the symptoms must start six months before the evaluation, must be active for at least three months in at least one quarter of the bowel movements, and the individual must have two or more symptoms. This consists of six symptoms: a) less than three bowel movements per week, b) straining when evacuating, c) presence of hard or broken stools, d) a feeling of incomplete bowel movement, e) anorectal blocking sensation, and f) manual maneuvers to facilitate the bowel movements.<sup>18</sup>

Physical inactivity was assessed by the IPAQ-International Physical Activity Questionnaire to estimate the level of physical activity by quantifying energy expenditure in METs-minutes/week, being classified as <600 and >600 METs.<sup>19</sup> The question “How do you evaluate your health at this time?” Was used, which analyzed the self-perception of health, and the answers were captured using a Likert scale ranging from bad, very bad, normal, good to very good.<sup>20</sup>

Besides that, we collected other variables by our own questionnaire: a) aspects related to the characterization of the population: age, which was grouped according to life cycle: young adult/adult (19 to 39 years) and middle aged (40 to 49 years); marital status dichotomized as single and with a partner; race grouped into white, brown/black/yellow; education which was categorized in primary school and high school or higher; and income which was grouped into up to 1 minimum monthly salary and >1 minimum monthly salary. The following independent variables were also included: physical activity and self-rated health, being grouped as normal, good and bad.

## Data Analysis

Data were tabulated and analyzed using the Statistical Package for Social Sciences (SPSS) version 22.0 software. Descriptive and inferential statistics were used for data analysis. Categorical variables were presented as absolute and relative frequency and continuous variables were presented as median, interquartile range and confidence interval. The Kolmogorov–Smirnov test tested the normality of continuous data. Women were divided into two groups for comparative analysis: constipated and non-constipated

according to the Rome III criteria. The Chi-squared test was performed to analyze the association of independent categorical variables according to the groups. The Mann–Whitney *U*-test was used to compare medians between groups. The effect size was calculated by eta squared ( $\eta^2$ ) and the value of  $\eta^2$  interpreted as small ( $\geq 0.01$ ), medium ( $\geq 0.06$ ), or high ( $\geq 0.14$ ).<sup>21</sup> Then, a multiple linear regression analysis was performed for the total WHODAS score being adjusted by covariates, which presented  $p \leq 0.20$  in the bivariate analysis. A 95% CI and  $p$ -value < 0.05 were used to assess statistical significance.

## Ethical Considerations

This study was developed in accordance with the Declaration of Helsinki and the research protocol was submitted to and approved by the Research Ethics Committee of the Federal University of Rio Grande do Norte, under the number 49,237,315.9.0000.5568. Informed consent was obtained from all individual participants involved in the study.

## Results

We invited and included 195 women in the study. No participant was excluded from the study. The constipation prevalence was 35.4% and the characterization of the sample is shown in Table 1. Most of the participants were between 19 and 39 years old (69.7%), were brown and black (70.3%), and had high school or higher education (52.3%). Regarding monthly income, the vast majority of women have a monthly family income of up to one minimum salary (79.5%). The association of categorical variables between groups (constipation and without constipation) was performed. There was no statistically significant difference between groups by categorical variables analyzed. Results are shown in Table 1.

When the total and domain WHODAS scores were compared among women, there were worse scores for women with constipation in the domains of cognition ( $p < 0.001$ ), mobility ( $p < 0.002$ ), self-care ( $p < 0.001$ ), participation ( $p < 0.001$ ) and total WHODAS score ( $p < 0.001$ ) (Table 2).

Using bivariate and multiple linear regression models, it was shown that constipation is associated with an increase of approximately nine points in the total WHODAS score, which represents a detriment to the functioning of these women (Table 3).

**Table 1** Bivariate Analysis of Sociodemographic Characteristics, Habits and Lifestyle of Adult Women with and without Constipation. Santa Cruz/RN, Brazil, 2016

	Overall (n=195)		Constipation				p-value
			Yes (n=69)		No (n=126)		
	N	%	N	%	N	%	
Age							
Young adult/Adult (19 to 39 years)	136	69.7	44	63.8	92	73.0	0.18
Middle aged (40 to 49 years)	59	30.3	25	36.2	34	27.0	
Race							
White	58	29.7	20	29.0	38	30.2	0.86
Brown and Black	137	70.3	49	71.0	88	69.8	
Education							
Primary School	93	47.7	32	46.4	61	48.4	0.79
High School or Higher	102	52.3	37	53.6	65	51.6	
Income							
Up to 1 minimum monthly salary	155	79.5	57	82.6	98	77.8	0.42
>1 minimum salary	40	20.5	12	17.4	28	22.2	
Civil Status							
Single	91	46.7	27	39.1	64	50.8	0.12
With partner	104	53.3	42	60.9	62	49.2	
Physical activity							
Yes	39	20.0	10	14.5	29	23.0	0.16
No	156	80.0	59	85.5	97	77.0	
Health perception							
Normal	63	32.3	26	37.7	37	29.4	0.37
Good	86	44.1	26	37.7	60	47.6	
Bad	46	23.6	17	24.6	29	23.0	

Note: P-value was determined by Chi-squared test.

**Table 2** Comparison of WHODAS Scores Between Adult Women with and without Constipation. Santa Cruz/RN, Brazil, 2016

Variables	Constipation (Yes=69)		Constipation (No=126)		Effect Size $\eta^2$	p-value
	Median	Interquartile Range	Median	Interquartile Range		
WHODAS 2.0						
Total score	19.6	24.5	10.3	17.4	0.076	<0.001
Cognition	20.0	27.5	12.5	20.0	0.054	<0.001
Mobility	18.7	34.3	6.2	25.0	0.051	<0.002
Self-care	0.0	10.0	0.0	0.0	0.062	<0.001
Interpersonal relations	8.3	25.0	8.3	16.7	0.016	0.076
Activity of daily life	10.0	40.0	0.0	20.0	0.017	0.072
Participation	25.0	37.5	12.5	25.0	0.085	<0.001

Notes: P-value calculated by the Mann-Whitney U-Test. Effect size calculated by Eta squared.

## Discussion

This is a pioneer study based on the biopsychosocial and holistic model for understanding health conditions, seeking to learn about the impacts that constipation causes on

women's functioning by an ICF-based measure. The WHODAS is a practical and generic health and disability assessment tool which can be used at an individual and population level, and has been developed based on the

**Table 3** Analysis of the Association Between Constipation and WHODAS 2.0 Total Score by Linear Regression. Santa Cruz/RN, Brazil, 2016

<b>Model I - Unadjusted</b>				
	<b>Constant</b>	<b><math>\beta</math></b>	<b>95% CI</b>	<b>P-value</b>
Constipation	13.34	9.10	5.04 to 13.15	<0.001
<b>Model II – Adjusted by age, civil status and physical activity.</b>				
	<b>Constant</b>	<b><math>\beta</math></b>	<b>95% CI</b>	<b>P-value</b>
Constipation	17.33	9.24	5.14 to 13.34	<0.001

International Classification of Functioning, Disability and Health from various clinical measures relevant to the rehabilitation area.<sup>14,16</sup>

Our findings showed that constipation is associated with higher WHODAS 2.0 scores with an increment of nine points, which represents impairments in the functioning of the studied women, being more affected in the domains of self-care, cognition, mobility, as well as participation restriction.

From the conducted analyzes it was possible to learn more details about the activities which are limited or have restricted participation in the daily lives of women living with constipation. Identifying the nature of the activities in which women with this condition have more difficulty opens space for further discussions regarding the impact of constipation on people's lives, as well as the perspectives and therapeutic targets in managing this condition.

In our study it was found that women with constipation generally have more difficulties in performing communication and thinking activities, involving issues related to concentration, memory, problem solving, learning and communication.<sup>14</sup> This finding corroborates a previous study which demonstrated a negative impact of gastrointestinal diseases, including constipation, on different elements of quality of life in Brazilian women such as mood, concentration and sexuality.<sup>22</sup>

Mobility with respect to activities such as standing, moving indoors, going out and walking a long distance<sup>14</sup> has also been affected in women who have constipation with a significant clinical effect. This fact may be associated with abdominal pain and discomfort which are some of the symptoms caused by this condition, causing some impairment in developing this type of activity by these women.<sup>1,23</sup>

Self-care is also affected by the presence of constipation, affecting elements related to self-hygiene, dressing, eating and being alone.<sup>14</sup> It is known that one of the

factors which is related to developing intestinal constipation is a low fiber and fluid diet, and this is also one of the treatment items which is directed to those who are diagnosed with this condition, and this factor is linked to the act of eating.<sup>24,25</sup>

Women with constipation have more difficulty in community activities, maintaining personal dignity and facing barriers and obstacles in the world around those interviewed. A possible explanation for this finding would be that psychological disorders have shown statistically positive associations with constipation. Anxiety and depression have been found to be related to this condition.<sup>25–27</sup> In addition, studies have found an association between constipation with insomnia,<sup>28,29</sup> so these factors can dynamically interfere with the social participation of these women.

Although the study found important associations, these data should be generalized cautiously as they were investigated through a cross-sectional study and therefore no cause and effect relationship should be applied. Further longitudinal design research using WHODAS to assess the impact of constipation on the functioning of different populations and age groups is recommended in order to better assess the relationships between the variables described herein. However, even with the limitation mentioned above, given its pioneering character, this study may guide other studies on the relationship between constipation and functioning. In addition, clinical strategies and health policies can be designed to decrease losses in functioning domains once constipation is diagnosed.

## Conclusion

The results of this study show that there is a reduction in functioning associated with the presence of constipation in adult women, mainly affecting the cognition, mobility, self-care and participation domains, in addition to the total score.

These data may be useful for the design of intervention strategies directed to managing intestinal constipation, seeking to mitigate the effects that this condition has on the different elements of functioning.

## Data Sharing Statement

All relevant data are within the paper.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors report no conflicts of interest for this work.

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