Prevalence of fecal incontinence in the urban population of Pouso Alegre - Minas Gerais - Brazil[*]

PREVALÊNCIA DA INCONTINÊNCIA ANAL NA POPULAÇÃO URBANA DE POUSO ALEGRE - MINAS GERAIS

PREVALENCIA DE LA INCONTINENCIA ANAL EN LA POBLACIÓN URBANA DE POUSO ALEGRE - MINAS GERAIS - BRASIL

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ABSTRACT

The objectives of this study were to analyze the fecal incontinence (FI) in adults living in Pouso Alegre (Minas Gerais, Brazil) and the associated demographic and clinical variables. This epidemiological study developed sing stratified sampling by conglomerates. The final sample consisted of 519 individuals, of age $\geq$18 years, with adequate mental and physical conditions, living in 341 homes, which were randomly selected. Prevalence rates were standardized by gender and age, and revealed 7.0% of FI, overall and for men and women. In the final model of logistical regression, the number of children (OR=5.1; p<0.001), hemorrhoids (OR=4.4; p<0.001) and cystocele (OR=3.0; p<0.001) were statistically correlated to FI. This study identified the epidemiology of fecal incontinence in a small town in Brazil and may contribute to establish public policies and programs for primary and secondary prevention and treatment of FI, starting at the local level.

RESUMO

Os objetivos deste estudo foram conhecer a prevalência da incontinência anal (IA) em adultos da cidade de Pouso Alegre (Minas Gerais) e verificar os fatores demográficos e clínicos preditores de sua presença. Estudo epidemiológico desenvolvido por meio de amostragem estratificada por conglomerado, tendo amostra final composta de 519 indivíduos, com idade $\geq$18 anos, em condições físicas e mentais adequadas, residentes em 341 domicílios da área urbana e sorteados aleatoriamente. As prevalências foram padronizadas por sexo e idade, resultando em 7,0% para IA, tanto geral como para homens e mulheres. No modelo final de regressão logística, número de filhos (OR=5,1; p<0,001), doença hemorroidária (OR=4,4; p<0,001) e cistocele (OR=3,0; p<0,001) estavam associados à presença de IA. O estudo permitiu conhecer a epidemiologia da IA e pode contribuir para o desenvolvimento de políticas públicas visando à prevenção primária e secundária, e ao tratamento, ainda que inicialmente em nível municipal.

RESUMEN

Los objetivos de este estudio fueron conocer la prevalencia de la incontinencia anal (IA) en adultos de la ciudad de Pouso Alegre (Minas Gerais), y verificar los factores demográficos y clínicos predictores de su presencia. Estudio epidemiológico desarrollado a través de muestreo estratificado por conglomerado, estando la muestra final compuesta por 519 individuos con edad $\geq$18 años, en condiciones físicas y mentales adecuadas, residentes en 341 domicilios del área urbana y sorteados aleatoriamente. Las prevalencias fueron estandarizadas por sexo y edad, resultando en 7,0% para IA, tanto general como para hombres y mujeres. En el modelo final de regresión logística, el número de hijos (OR-5,1; p<0,001), enfermedad hemorroidal (OR-4,4; p<0,001) y cistosele (OR-3,0; p<0,001) estaban asociados a la presencia de IA. El estudio permitió conocer la epidemiología de la IA y puede contribuir con el desarrollo de políticas públicas para su prevención primaria y secundaria y su tratamiento, así sea inicialmente a nivel municipal.

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INTRODUCTION

The International Continence Society[1] defines Anal Incontinence (AI) as the "loss of feces and/or gases." There is not a consensus in regard to its classification and the most frequently used classifications are those related to symptoms, the character of losses, groups of patients, or groups of supposed causes[2]. In Brazil, the classification based on the Fecal Incontinence Index (FII) is used. It includes characteristics and frequency of losses, the use of external incontinence devices and the impact on quality of life. Scores vary from zero (perfect continence) to 20 (total incontinence) and its ranges 0 to 7, 8 to 13 and 14 to 20 correspond to the categories mild, moderate and severe, respectively[3].

Studies addressing AI are scarce and some of them are limited to restricted groups related to gender (especially females), old age[4], obstetrical aspects[5], and chronic diseases such as diabetes mellitus[6], which justifies the need for and relevance of this study in the general population.

OBJECTIVES

This study identifies and analyzes the prevalence of AI and verifies demographic factors (age, ethnicity, gender, schooling, family income) and clinical factors (pregnancy/multiple births, urogynecological and rectal surgery, Pelvic Organ Prolapse (POP), medication, menopause, diabetes mellitus and hypertension), which are predictors of AI, in adults living in the urban area of Pouso Alegre, MG, Brazil.

LITERATURE REVIEW

It is estimated that fecal incontinence affects up to one in every 10 people at some point in their lives. It may manifest through one's inability to get to the bathroom rapidly enough or experience soiling or leakage of feces without being aware of it[2].

A total of 8,500 questionnaires were sent to investigate the prevalence of fecal incontinence (FI) in relation to health complaints in a population older than 75 years of age and the 4,277 (61.6%) that returned revealed that FI was associated with diarrhea, fatigue and pain of gastric origin among other health problems[4].

To estimate the obstetric FI risk factors in middle-aged women, 3,114 questionnaires were sent to women between 50 and 61 years old. The results from the 2,640 (85%) questionnaires that were returned showed a prevalence of 9.5% for FI and associated factors such as depression, being overweight or obesity, previous surgeries to correct UI and FI. Obstetric variables such as multiple births, type of delivery, episiotomy, birth weight, and third-degree perineal laceration were not significant[7].

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A study to evaluate the frequency and criteria used to indicate episiotomy was carried out at the university hospital of the University of São Paulo with 12 physicians and 12 nurses directly involved with care delivered to parturient women. It revealed that the most reported type of episiotomy was the mid-lateral right (92%). The explanation for such an indication was related to its lower chance of causing a lesion in the anal sphincter[8].

In order to study the effects of hyperglycemia on motor and sensory anorectal function with patients with diabetes mellitus (DM), 18 individuals (eight with type 1 DM and ten with type 2 DM) underwent systematized blood glucose testing, and sensorial and motor anorectal assessment. The results revealed that acute hyperglycemia inhibits the external anal sphincter's function and diminishes rectal compliance, potentially increasing the risk of fecal incontinence[9].

METHOD

This is an epidemiological, exploratory, descriptive, cross-sectional population-based study in which correlations are tested. This study was carried out in Pouso Alegre, MG, Brazil. The target population was composed of people 18 years old or older, residing in the urban area of Pouso Alegre. For sampling computation, the population was estimated at 120,467 inhabitants in 2007, according to the Brazilian Institute of Geography and Statistics (IBGE).

The sample was selected through single-stage stratified cluster sampling. Samples of 341 households distributed over five regions were established with a level of precision at 5%. To compose the probabilistic sample, the households were randomly drawn. Individuals had to meet the following criteria in order to be included in the sample: being physically and mentally able to answer the interview questions and consenting to participate in the study. In the end, 519 people composed the sample. About 30.3% of the men refused to participate. The study was limited to the urban area due to difficulties in obtaining addresses in the rural area.

The Project was approved by the Research Ethics Committee at the University of São Paulo, Nursing School, Process 673/2007/CEP/EEUSP, and complied with Resolution nº 196/96, National Health Council.

Data were collected using two instruments. The first refers to socio-demographic data (gender, ethnicity, schooling, marital status, occupation and family income) and clinical data (previous urogynecological surgery, births [number and type], anal and genital alterations, medication, menopause, hypertension, diabetes mellitus and AI). The item occupation was characterized as: manual workers (farmer or fisherman, skilled and unskilled handyman) and non-manual (high professional level, high official of government or business, mid-level professional, administrative officer or employee, commercial employee)[10].

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The second identified the prevalence and characteristics of fecal leakage, the use of medication to prevent fecal leakage, time and leakage conditions, use of and circumstances in which external incontinence devices are changed, importance of having a bathroom nearby, frequency, quantity and aspects of feces, perception of leakages and discriminating between feces and gas leakages.

The prevalence of anal incontinence was adjusted by gender and age group, using the population of Pouso Alegre as the standard. Hence, the *standardized prevalence of AI* was obtained in this study.

The analysis of AI predictive factors was developed through univariate logistic regression (identification of association between each of the independent variables and the dependent variable – presence or absence of AI) and multivariate logistic regression. Five models were developed in the multivariate analysis to establish the relations between the socioeconomic and clinical variables, reproductive life, and characteristics of anal loss and between all the significant variables that remained in models 1 to 4. The Chi-square and Hosmer Lemeshow tests were used in the regression analysis to verify the models' goodness of fit. The adopted level of significance was 5%.

RESULTS

The sample was predominantly composed of women (342/ 65.9%), aged between 40 and 59 years old (197/ 38.0%), Caucasians (436/84.0%), with primary school and illiterate (321/61.8%), non-paid work (263/ 50.7%), married (298/57.4%) and with an income of up to three times the minimum wage (321/61.8%). Hypertension (192/ 37.0%) and hypotensive medication (185/35.6%) were the most reported medical conditions. In regard to clinical conditions, cystocele (29/8.5%) and perineoplasty (26/ 7.6%) in women, and hemorrhoids (7/4.0%) and hemorrhoidectomy (5/2.9 %) in men were the most frequent co-morbidities and previous surgeries respectively. In relation to reproductive life, 237 (69.3%) women had between one and four children and 149 (42.3%) between one and four normal childbirths.

Standardized AI prevalence by gender and age was 7.0% in the population in general, which was the same for both genders. In relation to the type of loss, 3.5% for fecal leakages, while 3.1% for men and 4.2% for women. Losses of gas were the same for the population in general and for both genders (4%).

In relation to the characteristics of fecal losses, the majority occurred between 3 and 4 years (9/47.4%) and when people are awake (14/73.7%); only four (21.0%) wear some kind of external device, two of them while awake. Having a bathroom nearby is important for 15 (79.0%) people; 14 (73.7%) present loose or watery feces; 15 (79.0%) lose them in small quantity; six (31.6%) know when the loss is about to happen; and five (26.3%) know when losses are occurring; ten (52.6%) people perceive the difference between feces and gases.

Data in Table 1 present very similar OR and shows that separated women (p<0.001) have a 3.1 times greater chance to develop AI compared to the other marital categories. The model of logistic regression shows a 16.3% variation of AI occurrence in this population.

Table 1 - Multivariate logistic regression for AI and socio-demographic factors (Model 1) - Pouso Alegre, MG, Brazil , 2008

Multiple regression	B	Odds Ratio (95%)	IC (95%)		p
			Lower	Upper	
Idade					
$\geq$ 40 years old	0.310	1.363	1.353	1.373	0.000
Gender					
Female	0.123	1.130	1.123	1.138	0.000
Ethnicity					
Caucasian	0.388	1.474	1.460	1.488	0.000
Manual work					
Non-manual work	-1.132	0.323	0.319	0.326	0.000
Non-paid work	-0.069	0.934	0.925	0.942	0.000
Marital Status					
Married	0.444	1.559	1.546	1.572	0.000
Separate	1.121	3.065	1.320	4.332	0.000
Widowed	0.176	1.192	1.174	1.211	0.000
Income up to 3X MW	0.178	1.195	1.183	1.208	0.000

$R^2 = 0.163$

Data in table 2, also with very similar OR values, indicate that individuals with previous urogynecological and rectal surgeries (p<0.001) and women with cystocele (p<0.001) are more likely to develop AI than the remaining population. Model 2 for logistic regression explains 83% of the variance of AI occurrence.

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Table 2 - Multivariate logistic regression for AI and clinical factors (Model 2) - Pouso Alegre, MG, Brazil - 2008

Multiple Regression	β	Odds Ratio (95%)	IC (95%)		p
			Lower	Upper	
Disease					
Hypertension	0.088	1.092	1.027	1.209	0.008
Clinical alterations					
Cystocele	0.748	2.113	1.663	2.685	0.000
Uterine Prolapse	0.675	1.963	1.365	2.825	0.000
Hemorrhoid	0.502	1.652	1.415	1.930	0.000
Surgery					
Urogynecological and rectal	0.933	2.542	2.272	2.844	0.000

$R^2 = 0.83$

Table 3 shows that women with a higher number of childbirths are also three times more likely to develop AI. This model explains 25.7% of variation of AI occurrence.

Table 3 - Multivariate logistic regression for AI and reproductive life factors (Model 3) Pouso Alegre, MG - Brazil, 2008

Multiple Regression	B	Odds Ratio (95%)	IC (95%)		p
			Lower	Upper	
Nº of children					
5 to 8	0.320	1.377	1.176	1.614	0.000
9 to 18	1.124	3.077	2.546	3.719	0.000

$R^2 = 0.257$

In the **model 4 of the logistic regression** in which AI was associated with anal leakage characteristics, the variables **did not converge** to acceptable values (â=0/infinite), **showing the model did not fit**. The overlap of the categories of some questions (e.g. Q7, Q8 and Q9) may explain the model's lack of fit.

Data from Table 4 (Final model) show that a higher the number of children (p<0.001), the presence of hemorrhoids (p<0.001) and cystocele (p<0.001) are significantly associated with the occurrence of anal leakage, that is, they are predictors of AI.

Table 4 - Multivariate logistic regression for AI and previous clinical factors, diseases, characteristics of leakage, uro-rectal-gynecological alterations and demographic factors (Final Model) - Pouso Alegre, MG, Brazil - 2008

Multiple Regression	B	Odds Ratio (95%)	IC (95%)		p
			Lower	Upper	
Caucasian	0.528	1.696	1.319	2.181	0.000
Manual labor					
Non-manual labor	-0.584	0.558	0.430	0.724	0.000
Non-paid labor	-0.610	0.543	0.448	0.659	0.000
Up to 3 times the minimum wage	0.659	1.933	1.322	2.826	0.001
Diseases					
Hypertension	0.974	2.648	2.209	3.174	0.000
Clinical alterations					
Cystocele	1.131	3.099	2.237	4.439	0.000
Uterine prolapse	0.751	2.120	1.350	3.328	0.001
Hemorrhoid	1.490	4.437	3.499	5.627	0.000
Number of children					
5 to 8 children	0.383	1.467	1.329	2.879	0.003
9 to 18 children	1.633	5.118	3.893	6.729	0.000

$R^2 = 0.475$ *Adjusted by gender and age*

It is worth noting that even though gynecological surgeries were significantly associated with anal leakages in the univariate regression (OR=3.0 and p<0.001), they did not remain in the final model of multivariate regression. These factors explain 47.5% of the variation of AI occurrence.

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DISCUSSION

AI is frequently acknowledged as a normal situation, but it is a problem experienced by older people and its epidemiology is not well described in the literature. It has been associated with leakage of feces, gases or both, and few studies explore it in the general population. The rate of standardized prevalence for feces and gases, isolated and associated, presented similar values (3.5% for feces leakage; 4.0% gas leakage and 7.0% for both). The female gender obtained a higher index only for isolated leakage of feces, with a standardized prevalence equal to that obtained among men in relation to the isolated leakage of gases and combined with feces. These data agree with that obtained in recent literature review, in which the prevalence of anal incontinence varied from 2% to 24% and the estimated prevalence of fecal incontinence varied from 0.4% to 18%[11].

Studies have shown a high prevalence of up to 23% for anal incontinence[12], a problem currently more common and that begins after childbirth and is aggravated with multiple births and advanced age (above 65 years of age)[13].

Between 1999 and 2001, 1,000 people with an average age of 75 years, in three rural locations and two urban areas in Alabama, USA were investigated concerning the prevalence of AI showing a total index of 12%: 12.4% for men and 11.6% for women. Logistic regression analysis indicated that UI, hysterectomy with ovary removal, and chronic diarrhea were associated with AI in women. Setting aside chronic diarrhea, prostatic disease and low perception of health were both factors associated with the occurrence of AI among men[14]. Given the age of the studied individuals, both indices are not only higher than those found in this study but predictors are also different.

Another study conducted in a Japanese community with 1,473 people = 65 years old investigated the presence of UI and AI in a follow-up covering 38 months (1325/94.3% completed the study). AI was identified in 3.4% of the elderly individuals who experienced it daily. Being older than 75 years of age and some daily activities were significantly associated with some kind of incontinence[15].

A higher prevalence was found by other authors who verified the presence of FI in 9.5% (250) of 2,640 women (ages between 50 and 61 years), significantly associated with secondary education, depression and previous surgeries and without association with any obstetrical variable[7]. Among the 1,253 women in Taiwan, 2.8% experienced fecal leakages and 8.6% leakage of gases[16].

In a sample of 5,904 of people from the general population, 40 years old or older (n=10.116), 1.4% reported AI, which was associated with old age[17]. In a German study, 4.8% of 500 studied people were incapable of controlling solid stools[18]. Among the 248 elderly individuals 75 years old or older with difficulty controlling the elimination of feces, FI was identified in 56.4%, mainly in women, while the majority did not reach the bathroom in time and were not able to completely empty the intestine; less than half presented hard feces and discomfort due to anal moisture[4]. The fact they do not reach the bathroom in time shows the need to have one close by, which was well characterized in our study by most of the individuals with incontinence.

Even though the variable *vaginal birth* was not significant in this study, it was frequently reported[5]. Laceration or rupture of sphincters due to obstetrical factors has caused changes in anal continence that varies from lower to higher frequency. A clinical assessment was not performed in this study; individuals were only questioned about the occurrence of anal laceration during birth with surgical correction, which obtained at a minimal frequency and was not maintained in the logistic regression analyses. Even though it is a frequent cause, the motives reported here might have contributed to their not being maintained in the analysis.

Cystocele and uterine prolapse were also important predictors for AI in this study and presented 3.1 and 2.1 times more chance of causing anal leakages, respectively. Some other publications corroborate these findings. AI was present in 49 (15.9%) women among the 320 of those cared for in an urodynamic clinic: 11 (3.6%) experienced liquid or solid fecal leakage and 38 (12.3%) gas leakage; women with uterine prolapse had a five times more chance of developing AI[19]. POP is mentioned in another study, in which it was significantly associated with AI[16].

Even though the presence of a hemorrhoidal disease was maintained in the final model of the logistic regression with 4.4 times more chance of experiencing anal leakages, it is having had a hemorrhoidectomy that has appeared as a factor associated with AI in a study conducted in Sweden[20]. Similarly, even though hypertension remained as a final predictive factor for the occurrence of AI with a 2.6 times greater chance, only diabetes mellitus has been reported in some studies[6,10].

The visits to households addressing anal leakage caused horror, shame and embarrassment to some people because issues of intimacy and aspects that not even the individuals' spouses knew about were being addressed. Men were more afraid than women to answer the questions and most of them did not feel comfortable talking about the subject, a factor that led to the low adherence to the interviews (30% refused), which should be considered a limitation in this study. Another limitation is that the sample was concentrated in an urban area. The authors initially intended to include rural areas in the study, however, after unsuccessful attempts to obtain addresses from the city hall (real estate registration and the Family Health Program) and from the Energy Company of Minas Gerais, we decided to restrict the study to the population living in an urban area. The scarcity of studies, especially national studies addressing AI should be considered another limitation because it hinders the discussion of findings. In addition, authors who study specific groups in the general population have not

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included adjustments or standardized their findings in relation to gender and age in their statistical analyses, presenting occurrences rather than prevalence indexes *per se*.

In the studies discussed here, the most frequent and heavier leakages are associated with gases more than feces. Milder leakages are signs that indicate the integrity of the internal anal sphincter is compromised and it seems to be an important indicator in investigations of eliminations aiming to prevent the worsening of incontinence, and promote early diagnosis and the implementation of secondary prophylactic interventions.

In regard to health programs directed to AI treatment, even though there are centers focused on elderly care and these have the means to evaluate urinary and fecal leakages, they are scarce, which results in limited access of the population to the benefits of treatment[21]. The Pharmaceutical Care Guideline in Minas Gerais, Brazil states that dietary guidance is needed so the individuals avoid bulky meals, rich in fat or overly abundant in fibers, and that pharmacological treatment should include the use of antiperistaltics[22].

There are no programs focused on anal incontinence at the local and regional levels. However, the Stomatherapy

Outpatient Clinic of the City Health Department in Pouso Alegre, restricted to people with lesions and intestinal and urinary stoma, aims to expand its activities in the field of incontinence by the end of 2010. It initiated a campaign to clarify the issue to the population through speeches by professionals and individuals cared for in Family Health Program in the basic health units in neighborhood and seniors' associations and in the city's senior center.

Additionally, the Brazilian Association of Stomatherapy (SOBEST): ostomy, wound and continence and the specialized courses in the field, in different universities of 10 Brazilian states have contributed to its development in Brazil through its scientific activities that include international, national and regional events and scientific research published in national and international journals[23].

CONCLUSION

The found prevalence standardized by gender and age for AI was 7.0% of the total population for both genders. The predictive factors most strongly associated with AI were: number of children (OR=5.1; p<0.001), hemorrhoids (OR=4.4; p<0.001) and cystocele (OR= 3.1; p<0.001).

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