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ORIGINAL ARTICLE

Effect of urinary incontinence on the quality of life of asthmatic women

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Abstract

Objectives: Urinary incontinence (UI) has been associated with chronic respiratory symptoms, and it affects quality of life. This study evaluated the quality of life of asthmatic patients from the Assistance Program for Asthmatic Patients (PAPA) with and without UI. **Methods:** This is an analytical descriptive cross-sectional study using a sample of 358 women with asthma. Data were collected via the International Consultation Incontinence Questionnaire-Simplified Form (ICIQ-SF), Quality of Life in Asthma Questionnaire (QLAQ-ASTHMA) and Short Form 36 Health Survey (SF-36). **Results:** We found a general prevalence of UI of 55.3%. Overall quality of life scores in the SF-36 and QLAQ-ASTHMA were not related to the presence of UI. However, the amount of urine lost was significantly correlated with the subdomains physical aspects, general health, social functioning and mental health of the SF-36 and with socioeconomic and psychosocial domains of the QLAQ-ASTHMA. **Conclusions:** Urinary incontinence may affect a large proportion of older women with asthma. This study demonstrates the importance of routinely evaluating the occurrence of UI in order to improve the quality of life of asthmatic patients.

Keywords

Asthma, quality of life, urinary incontinence

History

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Introduction

The International Society of Incontinence (ISO) defines urinary incontinence (UI) as any condition in which there is an involuntary loss of urine that is objectively demonstrable, causing social or hygienic problems for women in particular [1]. Recently, UI has been classified as a specific symptom reported by patients. UI can be further subdivided into involuntary leakage of urine; stress urinary incontinence (SUI), the complaint of involuntary leakage of urine at the time of effort or exertion, like sneezing or coughing; urgent UI (UII), the involuntary loss of urine that is associated with or immediately preceded by urgency; and mixed UI (MUI), which is the involuntary loss of urine associated with both urgency and exertion [2].

In the literature, the prevalence of UI ranges from 2.5% to 60%. The reasons for these differences lie in the range of definitions for UI in different population samples and differences in its formulations [3]. Although UI is unanimously considered a global problem, it has been considered as an epidemic of the twenty-first century that is exacerbated by the continuous increase in life expectancy, most often

affecting women. The prevalence of UI in adult women is estimated to range from 10% to 58%, whereas the incidence in men is between 3% and 11% [4]. Empirical research on the prevalence and incidence of UI among women has shown that one in three women will have symptoms of UI during their lives [5]. Approximately half of all incontinent women have SUI, 30–40% have MUI and 20% have UI [6].

In Brazil, the study called “Health, Welfare and Aging Study” (SABE Study) was carried out in São Paulo in 2000 with 2143 elderly adults and showed a self-reported prevalence of 11.8% of UI for men and 26.2% among women [7]. Few studies in Brazil have examined the prevalence and incidence of UI. Most medical research on UI is related to diagnostic, therapeutic and surgical methods. However, Silva and Santos found that the prevalence of UI in adults was 38% in a 2005 study conducted at the University Hospital, University of São Paulo [8].

The literature suggests that several factors are associated with the occurrence of UI. The following are considered the most important: advanced age, obesity, pregnancy, parity, delivery type, weight of newborns, menopause, undergoing treatment for prostate cancer, physical and mental disabilities, chronic diseases and some diseases that are prevalent in the elderly as stroke and Parkinson’s disease. These are in addition to surgery and medications that may reduce pelvic muscle tone or generate nerve damage. The findings of these

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studies are mixed and show that there are diverse risk factors [9–11]. In chronic respiratory diseases such as asthma, chronic obstructive pulmonary disease, cystic fibrosis and bronchiectasis, chronic cough has been implicated as a trigger of episodes of involuntary urine loss caused by successive increases in intra-abdominal pressure. In the UK, a study conducted at the Asthma Service Record Hospital, Manchester, found that the prevalence of UI was 45.3% in female patients with bronchiectasis and severe asthma [12]. In Brazil, few studies have examined the prevalence of UI and none have assessed its prevalence in asthmatic patients and their quality of life.

There is a consensus in the literature that chronic diseases such as asthma often cause considerable physical, emotional and social restrictions, affecting the quality of life of patients. However, the impact of such diseases differs by patient characteristics and lifestyle. Hence, quality of life is often not correlated with the severity and prognosis of the disease. Researchers believe that patients themselves are the best judges of their quality of life [13].

The Assistance Program for Asthmatic Patients (PAPA) is a structured asthma education program. It has been successful in both clinical asthma control as well as quality of life improvement [14]. As described above, no Brazil-specific study has examined UI in patients with asthma, so the objectives of this study were to examine the prevalence of UI in women with asthma and compare the quality of life of women with asthma with and without UI.

Materials and methods

Ethical considerations

The project complied with Resolution 466/12 of the National Health Council and its corollaries. The project was approved by the Ethics Committee of the Federal University of Maranhão (CEP/UFMA; 696.837/2014). Participants were given an explanation of the study, and then, they signed informed consent forms.

Study location

This study was conducted in the outpatient PAPA, University Hospital Presidente Dutra (HUPD), located in the city of São Luís, MA. The core of this program is the use of a multidisciplinary approach in the treatment of respiratory disorders. Data were collected from July to December 2014.

Type of study

This is an analytical, observational and case–control study. Group I consists of patients with urinary incontinence and the control group of patients without UI.

Population

This study population comprises 700 asthmatic patients seen at PAPA. In the literature, the prevalence of UI in women has been found to be 53%. Using this value along with a maximum estimation error of 5% and a confidence level of 95%, we conducted power analysis and found that the desired sample size would be 248. Our final sample consisted of 358 patients.

Inclusion and exclusion criteria

We included female patients aged above 18 years, with a clinical diagnosis of asthma, who had been monitored by PAPA for over 1 year and who gave written informed consent. We excluded patients presenting any neurological or cognitive disorders (e.g. Alzheimer's disease, Parkinson's disease, stroke sequelae or hearing loss) that made it difficult or impossible to complete the questionnaire. We also excluded patients with respiratory diseases other than asthma, such as bronchiectasis and cystic fibrosis.

Study design and measures

Participants of the PAPA met three times a week (Mondays, Wednesdays and Fridays) from ~07:30 to 12:30. Women who accepted the invitation to participate in the study, met the inclusion criteria and gave written informed consent were included. Questionnaires were completed in the following sequence: the International Consultation Questionnaire Incontinence-Simplified Way (ICIQ-SF), the Quality of Life in Asthma Questionnaire (QLAQ-ASTHMA) and finally the Short Form 36 Health Survey (SF-36), a general measure of quality of life. There was a 5-min interval between each questionnaire. During this break, researchers engaged in relaxed dialogue to make the patients feel comfortable. The total time taken per instrument was 20 min.

The Portuguese version of the ICIQ-SF has been validated by Tamanini et al. [15]. It is used to assess the impact of the symptoms of UI on quality of life. It consists of four items that determine the frequency of UI, the amount of urine lost, overall impact of incontinence and a self-diagnosis of the type of incontinence. Total scores range from 0 to 21 and higher scores indicate more severe urinary loss and greater impact on quality of life. The internal consistency was high (0.88), as measured by the Cronbach alpha coefficient.

The SF-36 (from the Medical Outcomes Study) is a generic measure of quality of life, which is easy to administer and to understand. It is a multidimensional questionnaire consisting of 36 items encompassing eight scales or components: role-physical, physical functioning, bodily pain, general health, vitality, social functioning, role-emotional and mental health. The total score ranges from 0 to 100, where 100 indicates the best health status [16]. Cronbach's alpha was 0.868 for SF-36.

The QLAQ-ASTHMA was developed and validated by Fernandes and Oliveira [17] at the asthma clinic of UNIFESP-EPM and it is based on domain areas investigated by Juniper and Guyatt [18]. The domain areas include QVPL (physical limitations), QVFG (frequency and gravity), QVA (adherence to treatment), QVSA (socioeconomic) and QVPS (psycho-social). Cronbach's alpha was 0.43.

Physical limitations were assessed through three questions on each of five activities, rated on the following scale: 1 = mild, 2 = moderate and 3 = severe. The maximum total score was 33 points. Frequency and severity was assessed with two questions, with a maximum total score of six points. The other domains were evaluated by presenting the patients with statements in response to which they had to indicate whether the problem exists (weight of 1 point), sometimes exists (0.5 points) or rarely exists (0 points). The total possible

scores on QVA, QVSA and QVPS were 6, 11 and 7 points, respectively.

In addition, the patients completed a questionnaire on sociodemographic and clinical data. The classification of asthma severity was based on the Brazilian Guidelines for Asthma Management of the Brazilian Society of Thoracic [19].

Statistical analysis

The Student *t*-test was used to compare parametric variables (age and BMI) between the two groups. The chi-square test and Fisher’s exact test were used to compare non-parametric and categorical or nominal variables (summarized as frequencies) between the two groups. We used the Kruskal–Wallis test to compare ICIQ and SF-36 scores. The analysis was performed using SPSS version 13 (SPSS, Inc., Chicago, IL). The significance threshold was 0.05.

Results

Data from a total of 358 patients with bronchial asthma were analyzed. The overall prevalence of UI was 55.3%. The mean age was 52.6 years in women with UI and 52.1 years in women without UI (*p* = 0.777). Most women with UI and semi-incontinence had primary education (104/196, 52.5%; 84/162, 52.5%), but this finding was not statistically significant (*p* = 0.881). The two groups did not significantly differ in terms of smoking status, BMI and alcohol consumption (Table 1). They also did not significantly differ in terms of gynecological/obstetric characteristics, such as pregnancy, mode of delivery, episiotomy and perineoplasty (Table 2).

It was observed that 117 (60%) lost urine once a week, 46 (23%) twice a week, 5 (2.5%) once daily, 27 (14%) several

times a day and 1 (0.5%) all the time. Regarding the amount of urine lost, 164 (84%) lost a small quantity, 30 (15%) lost a moderate amount and 2 (1%) lost a large amount.

Furthermore, 76 (21%) had mild asthma, 177 (49%) had moderate asthma and 105 (29%) had severe asthma. In terms of control, 237 (66%) patients had controlled asthma, 69 (19%) had partially controlled asthma and 52 (15%) had uncontrolled asthma.

When applied the quality of life questionnaires (SF-36 and QLAQ-ASTHMA) among asthmatic women with and without IU, there was no statistically significant difference in total scores of the two questionnaires. The patients showed good quality of life, with an average score of 108.11 and 15.63, respectively, to these questionnaires.

The group with UI had lower scores than the non-UI group on the physical aspects (*p* = 0.034), general health (*p* = 0.05), social aspects (*p* = 0.053) and mental health (*p* = 0.037) domains of the SF-36 (Table 3). The Kruskal–Wallis test showed that QVPS scores significantly differed by amount of urine lost, χ^2 (3) = 9.869, *p* = 0.020. Similarly, the UI group had poorer scores than the non-UI group on the QVFG (*p* = 0.028), QVSA (*p* = 0.023) and QVPS (*p* = 0.020) domains of the QLAQ-ASTHMA (Table 4). Loss of urine

Table 2. Gynecological and obstetric characteristics of asthmatic women with and without urinary incontinence treated at the PAPA.

Variables	Urinary incontinence		<i>p</i>
	Yes <i>n</i> (%)	No <i>n</i> (%)	
Pregnancy			
0	17 (8.6)	18 (11.3)	0.381
1–2	54 (27.3)	53 (33.1)	
3 or 4	27 (13.6)	16 (10.0)	
>4	100 (50.5)	73 (45.6)	
Type of delivery			
0	24 (12.1)	23 (14.4)	0.745
Normal delivery	123 (63.1)	95 (59.4)	
Cesarean	24 (12.1)	24 (15.0)	
Normal/Cesarean	25 (12.6)	18 (11.3)	
Episiotomy			
Yes	72 (36.4)	52 (32.5)	0.445
No	126 (63.6)	108 (67.5)	
Perineoplasty			
Yes	35 (17.7)	35 (21.9)	0.319
No	163 (82.3)	125 (78.1)	

Table 1. Sociodemographic characteristics of asthmatic women with and without urinary incontinence treated at the PAPA.

Variables	With urinary incontinence		Without urinary incontinence		<i>p</i>
	<i>(n = 198) (55.3%)</i>		<i>(n = 160) (44.7%)</i>		
	Medium	SD	Medium	SD	
Age (SD)	52.6	14	52.1	15.3	0.777
BMI (DP)	28.3	6.1	28.2	5.8	0.893
Level of education	<i>n</i>	%	<i>n</i>	%	0.881
Elementary school	104	52.5	84	52.5	
High school	67	33.8	51	31.9	
University	13	6.6	14	8.8	
Illiterate	14	7.1	11	6.9	
Race					0.466
White	53	26.8	34	21.3	
Brown	101	51.0	86	53.8	
Black	44	22.2	40	25	
Alcohol consumption					0.520
Yes	20	10.1	13	8.1	
No	178	89.9	147	91.9	
Comorbidities					0.911
Diabetes					
Yes	18	9.1	14	8.8	
No	180	90.9	146	91.3	
Hypertension					0.472
Yes	69	34.8	50	31.3	
No	129	63.2	110	68.8	

Table 3. Differences between subdomains of the asthma-specific questionnaire on quality of life by the quantity of urine lost in asthmatic women with and without urinary incontinence treated at the PAPA (Kruskal–Wallis test, average scores).

Quantity of urine loss	0	Mild	Moderate	Severe	<i>p</i>
Functional capacity	178.98	181.53	181.09	81.83	0.428
Physical aspects	186.80	177.94	160.48	45.50	0.034*
Pain	182.82	184.63	137.59	109.83	0.079
Health state	183.40	184.12	141.75	67.33	0.050*
Vitality	176.19	186.26	169.50	83.33	0.290
Social aspects	185.59	178.61	162.80	53.17	0.053*
Emotional aspects	181.33	182.70	157.55	110.17	0.243
Mental health	184.01	183.20	145.82	46.33	0.037*

*The group with UI had lower scores than the non-UI group on this subdomains (*p* < 0.05).

Table 4. Differences between subdomains of the asthma-specific questionnaire on quality of life by the quantity of urine lost in asthmatic women with and without urinary incontinence, treated at the PAPA (Kruskal-Wallis test, average scores).

Domains	0	Quantity of urinary loss			<i>p</i>
		Mild	Moderate	Severe	
QLPL	176.12	181.01	179.98	276.00	0.389
QLFG	175.03	179.95	216.95	248.50	0.028*
QLA	179.93	171.71	213.21	267.00	0.093
QLSA	170.73	178.70	224.16	283.00	0.023*
QLPS	168.61	180.48	230.02	245.83	0.020*
QLGS	173.09	178.63	211.48	276.83	0.113

QLPL: quality of life – physical limitations; QLFG: quality of life – frequency and gravity; QLA: quality of life – adherence to treatment; QLSA: quality of life – socioeconomic aspects; QLPS: quality of life – psychosocial aspects; QLGS: quality of life – global score.

was not significantly related to scores on the physical functioning, bodily pain, vitality and role-emotional domains of the SF-36 and leakage of urine scores on the ICIQ-SF questionnaire. Scores on the SF-36, ICIQ-SF and QLAQ-ASTHMA were not significantly correlated in patients with and without UI.

Discussion

This research is the first study on the prevalence of urinary incontinence and asthma in Brazil. We analyzed data from 358 asthmatic women and found a UI prevalence of 55.3%. The results showed a high prevalence of urinary incontinence in asthmatic patients.

Studies on the prevalence of UI are not unanimous. Some studies indicate values of 8.2% [20] and 18% [21]. In the literature, the prevalence of UI ranges from 2.5% to 60% [3]. Studies on older women in the US report prevalences ranging from 42% to 57% [22,23].

In Brazil, there are few studies on the prevalence of UI and no Brazil-specific study has evaluated its prevalence in asthmatic women. Although UI can occur in all age groups, its incidence increases with age. It is estimated that 8–34% of people over 65 have some degrees of UI [24]. The prevalence of UI was found to be 26.2% in elderly women in São Paulo [7]. In a study on the Norwegian population of women aged 20 or older, the prevalence of UI was 25%, whereas it was 46% in women between 80 and 89 years [25]. A study of patients in nursing homes and hospitals in Belo Horizonte with an average age of 72.2 years found that the prevalence of UI was 48.2% [26].

Urinary incontinence (UI) may be comorbid with asthma because of variations in intrathoracic pressure due to respiratory symptoms, and UI may also be a side effect of asthma medication. Finkelstein (2002) showed that drugs, such as those that stimulate alpha and beta receptors, can cause or exacerbate incontinence [27]. Beta-adrenergic receptors may stimulate relaxation of the detrusor muscle by stimulating adenylate cyclase production and the accumulation of cyclic AMP [28]. Therefore, beta-adrenergic agonists used in the treatment of asthma, especially in critical patients, may predispose them to UI.

In addition to asthma severity and control of disease, other factors recognized as associated with UI were not statistically significant in the current study: BMI, diabetes mellitus, hypertension, pregnancy, mode of delivery, episiotomy and perineoplasty.

Overweight or obese asthmatic women are more likely to report problems such as gastric reflux, severe asthma and UI [29]. Excess weight is believed to increase abdominal pressure during daily activities, which increases bladder pressure and mobility of the urethra and bladder neck, ultimately leading to UI [10].

Patients with diabetes may have a comparatively more vulnerable pelvic floor because of changes in the biological tissue, pelvic floor nerve injury, neuropathic bladder or increased urinary frequency because of increased urinary volume due to hyperglycemia [30]. Hypertension has been shown to be associated with UI [31]. Systemic hypertension and lung disease can lead to UI in older women because of high consumption of diuretic antihypertensive drugs and chronic cough, which is associated with a gradual decrease in muscle strength of the pelvic floor, respectively [32].

In the analysis of gynecological and obstetric characteristics, the number of pregnancies and type of delivery were not significantly associated with UI. Parity is reported in the literature as one of the factors associated with UI because of the high prevalence of UI during pregnancy; this prevalence rises with the number of births [31,33]. However, a study in China of women more than 20 years old showed a higher incidence of UI in women who have had more vaginal deliveries [34].

Women with UI had lower SF-36 scores in the physical functioning, general health, social functioning and mental health domains. They also had significantly lower quality of life in the analysis of the asthma-specific questionnaire, particularly in the areas related to frequency and severity of symptoms, socioeconomic condition and psychosocial condition. This finding suggests that greater quantities of urine lost adversely affect quality of life, especially its psychosocial aspects. However, quality of life scores did not significantly differ by the presence or absence of UI.

The literature points out that the severity of UI influences quality of life in women; that is, more severe UI has more detrimental effects [31]. Several articles describe the impact of UI on the lives of women with this condition. Their quality of life is compromised in regard to social and sexual lives, psycho-emotional status and quality of sleep/rest [34,35]. The present findings support these results.

Some limitations should be considered in this study. The study population was accompanied by an education program on asthma, with more intensive monitoring of respiratory symptoms, which contributed to that there were analyzed a few patients with severe asthma and without control and it reduced the impact of urinary incontinence on quality of life of these women. Confirmation of urinary incontinence by urodynamic study was not performed, either the characterization of the type of UI, which limits conclusions about specific treatment of these patients needs, as well as infer that better treatment of asthma could result in the control of the UI.

Conclusions

This study showed a high prevalence of UI in asthmatic patients. Patients with UI scored poorly on the SF-36 domains pertaining to physical functioning, general health, social functioning and mental health. Further, scores on these domains were correlated with UI severity (measured in terms of amount of urine lost). QLAQ-ASTHMA scores, particularly those on the frequency, severity, socioeconomic and psychosocial aspects, significantly differed by UI severity. The findings suggest that more severe UI negatively affects the quality of life of these patients.

This study thus demonstrates the importance of routinely evaluating the occurrence of UI in order to improve the quality of life of asthmatic patients. Although quality of life was not directly related to the existence of UI in women with asthma, the overall prevalence of UI in this study was high. This reinforces the need to develop public health interventions, as UI has been shown to be a fairly common condition in women. The effects of UI on women with asthma and their implications need to be examined further in studies including other populations of asthma patients, especially those with more severe and difficult to control asthma.

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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