

CONSUMPTION OF BLADDER IRRITANT LIQUIDS AND FOODS BY INCONTINENT WOMEN¹

CONSUMO DE LÍQUIDOS E ALIMENTOS IRRITANTES DA BEXIGA EM MULHERES INCONTINENTES

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ABSTRACT

Excessive fluid intake has a significant impact on lower urinary tract symptoms, and studies have lately questioned whether the amount of caffeine-based beverages ingested as well as acidic foods worsen symptoms of UI. A bibliographic review of national and international literature was carried out. The scientific articles selected were published in the last ten years, until October 2017, indexed in the databases of Scielo, Pubmed and Lilacs. The descriptors were: female urinary incontinence, urinary incontinence symptoms and food, which were typed associated with each other. Through the selection, only 11 articles presented the inclusion criteria. It was therefore possible to observe that moderate consumption of citrus fruits and caffeinated liquids does not worsen the symptoms of urinary incontinence and is not considered a primary factor to develop incontinence. However, further studies for a better understanding of this association are suggested, as well as for more precise guidelines on the prevention of urinary incontinence.

Keywords: urinary incontinence, caffeine, beverages, acidic foods.

RESUMO

O consumo excessivo de líquidos tem um impacto significativo sobre os sintomas do trato urinário inferior e, ultimamente, estudos questionam se a quantidade ingerida de bebidas à base de cafeína, bem como alimentos ácidos, pioram os sintomas da IU. Foi realizada uma revisão bibliográfica de literatura nacional e internacional, cujos artigos científicos selecionados foram publicados nos últimos dez anos, até outubro de 2017, indexados nas bases de dados Scielo, Pubmed e Lilacs. Utilizaram-se como descritores: Incontinência urinária feminina (urinary incontinence women), sintomas da incontinência urinária (incontinence urinary symptoms) e comida (food), os quais foram digitados associados. Por meio da seleção, apenas 11 artigos contemplaram os critérios de inclusão. Portanto, foi possível observar que o consumo moderado de frutas cítricas e líquidos cafeinados não piora os sintomas da incontinência urinária e não são considerados fator primário para desenvolver a incontinência. No entanto, sugere-se mais estudos a respeito dessa associação, para que haja um melhor entendimento da mesma, bem como para que sejam formuladas orientações mais precisas a respeito da prevenção da incontinência urinária.

Palavras-chaves: incontinência urinária, cafeína, bebidas, alimentos ácidos.

¹ Bibliographic review elaborated in the discipline of Elaboration of dissertation II.

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INTRODUCTION

Urinary incontinence (UI) is defined by the International Continence Society (ICS) as the involuntary loss of urine, classified by factors such as: type, frequency, severity, social impact, effects on quality of life and hygiene. The three main types are: UI by Stress (UIE), Urgent UI (UUI), Mixed UI (MUI). The most commonly identified signs and symptoms are: urgency, pollakiuria, nocturia, urge incontinence and leakage on stress (ABRAMS *et al.*, 2002). In general population studies from the *International Consultation on Incontinence* (ICI), gross estimates of prevalence for different UI definitions, considering urine loss (“never”, “any” or “at least once” in the last 12 months) varied between 5% and 69%. Approximately 10% of adult women report urine “leakage” in the last week. Occasional urine loss is very common and ranges from 25-45% (ABRAMS *et al.*, 2013)

According to the Brazilian Guidelines on Urology (2014), urine loss is a condition that normally causes a great impact on the quality of life (QoL) of women, with episodes of incontinence causing social embarrassment, sexual dysfunction and low professional performance. Currently, diet and lifestyle have an important impact factor on UI, standing out from some factors already identified as parity, smoking, vaginal delivery, among others. In general, it has been recognized that nutritional and metabolic mechanisms interfere with all body systems, including the urinary tract (INAMURA *et al.*, 2015).

The consumption of liquids is known to have a significant impact on lower urinary tract symptoms, although most studies have suggested that overall fluid intake is no different in UI patients when compared to asymptomatic participants in the control group (ROBINSON; GIARENIS; CARDOZO, 2014). Caffeine is among the most consumed liquids in the world. It is found not only in coffee but also in tea, green tea, carbonated drinks, soft drinks, chocolate and in numerous medications, including appetite suppressants, diuretics, analgesics and decongestants (ROBINSON *et al.*, 2017). Caffeine has a diuretic effect and can also irritate the bladder, increasing pressure and promoting the excitability of the detrusor muscle (GLEASON *et al.*, 2013).

A systematic review highlights the lack of randomized trials for lifestyle factors that are believed to increase incontinence, such as ingestion of alcoholic beverages, caffeinated and carbonated beverages. Therefore, the widespread use of guidelines to restrict these fluids, in the hope of reducing UI, are still inconclusive (INAMURA *et al.*, 2015).

In a study with 24 adult participants, they were instructed to increase or decrease their fluid intake. The results showed that there was a significant reduction in the frequency, urgency and nocturia in those who reduced fluid consumption by 25%, while those who increased the amount of liquids by 25% and 50% presented worsening of the diurnal urinary frequency (HASHIM; ABRAMS, 2008). As studies show, the recommendation for the consumption or restriction of certain liquids is still not well understood in the literature (INAMURA *et al.*, 2015) (SWITHINBANK; HASHIM; ABRAMS, 2005) (TOWNSEND *et al.*, 2011).

Therefore, the purpose of this study was to carry out a literature review in order to verify the association of fluid consumption and bladder irritant foods in women with UI.

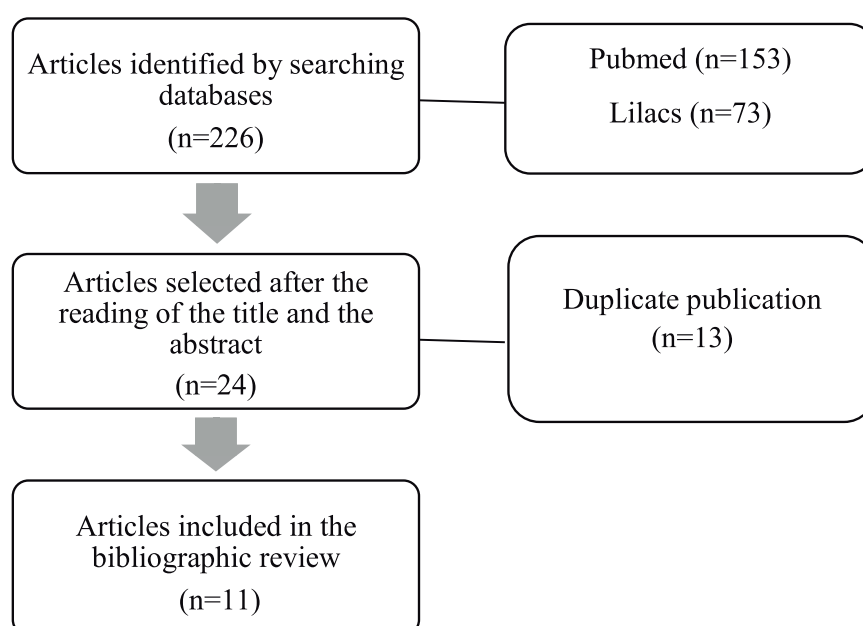
MATERIAL AND METHODS

It is a bibliographical review of national and international literature, whose scientific articles were published in the last ten years, until October 2017, indexed in the databases of Scielo, Pubmed and Lilacs. The descriptors were: female urinary incontinence, urinary incontinence symptoms and food, which were typed associated with each other.

As inclusion criteria, the articles that correlated women’s food intake with symptoms of urine loss or urinary incontinence were selected. The exclusion criteria were articles that addressed male urinary incontinence, abstracts, dissertations, theses, case studies and literature reviews.

For the selection of the articles, all the titles were read and those that were related to the purpose of the study were selected. Then, the abstracts were analyzed and only the articles that were related to the subject under study were selected for full reading. In summary, 226 articles were read, 153 found in Pubmed, 73 in Lilacs and 0 (zero) in Scielo, according to Figure 1. Eleven answered the question of the study and fit the inclusion criteria of the review. The articles found were sequenced according to the year of publication, besides being identified and presented according to the bibliographic reference standards. The material selected was organized in a table, which provided an initial contact with the subject. Subsequently, the articles were re-read, with the purpose of performing an interpretative analysis, guided by the conducting question.

Figure 1 - Selection of the articles.



RESULTS

The objective of this research was to present and discuss literature findings regarding the consumption of liquids and bladder irritant foods in women with UI, through original studies.

The articles found are presented in Table 1, containing the relevant information of each study.

Table 1 - Overview of the articles selected.

Author/Year	Design	Methods of Intervention	Results	Conclusion
Lee, Lee 2017	Cohort	Questionnaire based on the Korea National Health and Nutrition Examination Survey (KNHANES) IV. 24 hour food recall.	There was no significant difference in the intake of water, fat, protein, calcium, phosphorus, iron, sodium, potassium, vitamin A, carotene, riboflavin, niacin and vitamin C. Carbohydrate intake was significantly higher in the UI group than in the control group.	In conclusion, high carbohydrate intake is significantly related to female UI. Further studies will be needed to confirm the current results.
Baek <i>et al.</i> 2016	Cohort	Data from the KNHANES IV and EuroQoL-5 Dimension (EQ-5D) questionnaire were used to assess quality of life.	Higher levels of caffeine consumption were related to age, parity and presence of hypertension. Increased caffeine intake led to a significantly higher prevalence of clinically diagnosed UI and self-reported UI.	In conclusion, postmenopausal Korean women had a higher prevalence of UI as caffeine consumption increased.
Gleason <i>et al.</i> 2013	Transversal	The National Health and Nutrition Examination Survey 2005-2006 and 2007-08 (NHANES) and 24-hour food recall were used in two moments (during the interview and 3 to 10 days after the telephone interview)	The prevalence of UI represented 41% of the sample. UI was significantly associated with several factors, including: age, race / ethnicity, lower schooling, low poverty-income index, and obesity. Caffeine intake ≥ 204 mg/day - the equivalent to a cup - was associated with any type of UI.	Caffeine intake was associated with any type of UI, but not with increasing UI severity in US women.
Townsend <i>et al.</i> 2013	Cohort	Analysis using a food frequency questionnaire (FFQ) and health and lifestyle questionnaire. Follow up of 2 years.	No evident association between increased acid fruit intake and risk of incidence of frequency of incontinence in NHS I or NHS II was also not statistically significant in the results between the two cohorts.	There was no evidence in the study to suggest an association of acid fruit intake with the incidence or progression of UI.

Lee, Hirayama, 2012	Transversal	Analysis using the Food Frequency Questionnaire (FFQ) and the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF).	The prevalence of UI was of 27.5%, urinary incontinence by effort 70.7%, urgency 14.6% and mixed urinary incontinence and other UI 3.7%. BMI appeared to be the only significant covariant that affects the risk of UI (P <0.01).	The present study suggested a low association between UI and habitual alcohol consumption in Japanese women. There is evidence of high risk, however it was not significant, and the authors suggested that the study be repeated.
Townsend, Resnick, Grodstein, 2012	Cohort	Nurses' Health Study (NHSII 2003-2005), Nurses' Health Study II (NHS 2002-2004), baseline questionnaires, semi-quantitative food frequency questionnaire (FFQ) and Short-Form 36 Health Status Survey (SF-36).	Comparing the caffeine intake categories higher <i>versus</i> lower, there was no indication of increased significant probabilities of urgency UI.	There is no association between increased and decreased caffeine intake and long-term UI worsening.
Hirayama, Lee 2011	Transversal	International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF), food frequency questionnaire (FFQ) and International Physical Activity Questionnaire.	Incontinent women had significantly higher BMI and prevalence of comorbidity than those without UI. Women with UI tend to drink less green tea than those without UI.	The findings suggested an inverse association between UI and habitual consumption of green tea in Japanese women, and it is recommended that other drinks be substituted for green tea.
Jura <i>et al.</i> 2011	Cohort	Nurses' Health Study (NHSII 2000-2002), Nurses' Health Study II (NHS 2001-2003), baseline questionnaires, semi-quantitative food frequency questionnaire (FFQ) and health and lifestyle questionnaire.	A study conducted with women without UI and incident incontinence was followed up in the questionnaires for 4 years. The highest caffeine intake rate versus the lowest caffeine intake rate was associated with a significant increase in the risk of urgency UI. There was also a significant trend to increase the risk of urgency UI with increased caffeine intake.	The findings suggest that high caffeine intake is associated with an increased incidence of urgency UI.
Maserejian <i>et al.</i> 2011	Transversal	Data from the Boston Area Community Health (BACH) research, food frequency questionnaire SWAN/Block FFQ (1995), lifestyle questionnaire and American Urological Association Symptom Index (AUASI).	17.6% of the sample had moderate to severe lower urinary tract symptoms (LUTS). No consistent associations were found for β -carotene, lycopene, α -carotene, lutein, total carotenoids or vitamin A.	The findings suggest that for some women the symptoms of frequency and urgency of overactive bladder can be improved by higher doses of vitamin C and, among smokers, higher doses of β -carotene. Very high doses (> 250mg/day) of vitamin C bring health benefits, although they may be irritating the bladder.

Townsend <i>et al.</i> 2011	Cohort	Nurses' Health Study (NHSII 2000-2002), Nurses' Health Study II (NHS 2001-2003), baseline questionnaires, semi-quantitative food frequency questionnaire (FFQ) and health and lifestyle questionnaire.	There were no statistically significant associations between an increase of 240 mL in the intake of any of the beverages (milk, juice, water, etc.) and UI risk.	There was no association between total fluid intake and risk of UI. It is suggested that women without UI should not worry about restricting their fluid intake, for fear of increasing the risk of UI.
Maserejian <i>et al.</i> 2010	Transversal	Data from the Boston Area Community Health (BACH) research, food frequency questionnaire SWAN/Block FFQ (1995).	Out of the 2,060 women included in this analysis, 257 (12.5%) had a severity score of 3 or more and therefore had moderate to severe UI. There were no consistent or statistically significant associations between carbohydrate, protein or total fat intake and urinary incontinence in any of the analyses.	The results suggest that dietary changes, in particular the decrease in saturated fat in relation to polyunsaturated fat and the decrease in total calories may explain some of the benefits of weight loss in women with UI.

DISCUSSION

UI is a pathology that has been affecting the population considerably, especially women. The onset of incontinence, urgency and urinary frequency is commonly reported after consumption of caffeine, alcohol, carbonated drinks and acidic foods. However, there is still a lack of results confirming such food association *versus* urinary incontinence. In one study, the total amount of fluid ingested by women was investigated and it was concluded that women without UI should not bother to restrict their fluid intake for fear of developing UI (TOWNSEND *et al.*, 2011) Restricting or drastically reducing fluid consumption, especially water, can lead to health damage, fatigue, premature aging, and compromise the elimination of toxins and residues from the body. Therefore, other alternatives should be sought to ameliorate UI symptoms.

In another study, in which two cohorts were compared, the association of UI with acid fruit intake was investigated through questionnaires sent to nurses in the United States, with tomato and orange juice being the most consumed ones; however, no results confirming this association were observed. In addition, acid fruit intake was not related to the risk of symptom progression among women who had already been diagnosed with incontinence (TOWNSEND *et al.*, 2013).

In the study by Maserejian *et al.* (2011), the supplementation of vitamin C, β -carotene, calcium and zinc, which possibly irritate the bladder, was investigated. Women who consumed high doses of vitamin C (> 250 g/day) through diet and/or supplements reported a greater likelihood of storage symptoms, particularly frequency and urgency.¹⁸ This may have been due to high doses of vitamin C, which are excreted in the urine, making the pH more acidic, and thus increasing urination. Also in this study, β -carotene was associated with the same symptoms only in smoking women,

while calcium, through supplementation, was associated with an increased chance of developing UI. Besides, there were no consistent associations between zinc and women with voiding symptoms. In general, these women were more senile, overweight and sedentary, with evidence in the literature that being overweight worsens UI symptoms (MASEREJIAN *et al.*, 2011).

There are numerous risk factors for UI: increased age, vaginal delivery, multiparity, race, smoking, and sedentary lifestyle. However, inadequate eating habits often lead to obesity, which is a predictor of the development and/or worsening of UI symptoms. Therefore, the results of the study by Maserejian *et al.* (2010) suggest that changes in diet, in particular the reduction of saturated fat in relation to polyunsaturated fat and the reduction of total calories, may help in weight loss, improving QoL and UI symptoms, since, through loss, intra-abdominal pressure is reduced, consequently decreasing the pressure in the bladder and pelvic floor. Improved eating habits, followed by weight loss and physical activity are still the most appropriate alternatives to reduce UI symptoms. These results are in agreement with another study, a cohort based on the National Health and Nutrition Examination Survey of Korea IV, which concluded that high carbohydrate consumption predisposes to obesity, being significantly related to the female UI (LEE; LEE, 2017)

Another factor that may influence the onset of chronic diseases, being predictive of UI, is the consumption of sugary and alcoholic beverages, which have a high glycemic index and worsen the control of diabetes mellitus and related neuromuscular functions. However, in Lee; Hirayama, there was little association between UI and habitual alcohol consumption in Japanese women, with the body mass index (BMI) as the only significant covariate that predisposes to incontinence (LEE; HIRAYAMA, 2012).

Other widely consumed liquids are those containing caffeine, being considered the most ingested worldwide and also the most reported in the association with UI. It is known that caffeine is stimulant and because it has a diuretic effect, it is extremely associated with incontinence, as it can also affect the bladder, increasing pressure and promoting the excitability of the detrusor muscle. However, in the study by Gleason *et al.* (2013), UI was related to several factors, including age, obesity and race. The ingestion of caffeinated liquids was associated with predisposition to any type of UI, but there was no association with the increased severity of incontinence. In another study with postmenopausal women, it was observed that the higher the age, parity, presence of arterial hypertension and smoking, the higher the caffeine intake and the prevalence of UI (BAEK *et al.*, 2016).

There are several types of incontinence, stress, urgency, mixed, overflow, among others. Jura *et al.* (2011) investigated the frequency and amount of participants consuming the following products: tea, coffee, soft drinks and chocolate, all with caffeine, and the total consumption of these foods was calculated. The results showed a significant trend to increase the risk of urinary urgency with the intake of high doses of caffeine, since caffeine has a diuretic factor and may cause detrusor overactivity, increasing the likelihood of involuntary loss of urine.

In contrast, another study compared caffeine intake categories with high doses *versus* low doses not showing significant data linking caffeine consumption with the increase in urgency UI. Also, study limitations were emphasized because caffeine intake and the UI data were self-reported and, therefore, absolute caffeine consumption and the prevalence of incontinence progression may have been underestimated or overestimated (TOWNSEND; RESNICK; GRODSTEIN, 2012). In most studies investigating UI, questionnaires are used in which participants report whether or not they have the symptoms of incontinence, in addition to mentioning eating habits, daily life activities, and, although they are validated questionnaires, they become a source of bias, impairing the reliability and validity of the study.

It is known that coffee and water are the most consumed liquids worldwide, however, tea, which contains caffeine, is also a drink of common consumption, and the incontinent women were also questioned about its consumption. Hirayama; Lee (2011) suggest an inverse association between UI and habitual consumption of green tea in Japanese women, and replacing other drinks with green tea is recommended, because it contains some chemical constituents such as polyphenols, catechins, flavonoids and phenolic acids which have proven to have health benefits and do not aggravate incontinence symptoms.

In that same study, an analysis of the cumulative capacity of the bladder was performed, which revealed that the consumption of tea does not produce a diuretic effect, unless the amount consumed contains more than 300 mg of caffeine, equivalent to 5 to 8 cups. In addition, unlike what people in Western countries do, the Japanese prepare teas by fermenting their dried leaves in a teapot using hot water without adding milk, which would be ideal because scientific evidence shows that adding milk to this beverage inhibits its antioxidant activity (HIRAYAMA; LEE, 2011). Therefore, it should be emphasized that before including or excluding any beverage or foods from the diet of incontinent people, further studies are required to prove the theory that caffeine, soda, and acidic fruits negatively influence UI symptoms.

The results show that the moderate consumption of citrus fruits rich in vitamin C and caffeinated liquids does not worsen the symptoms of women with UI. It is known that excess of vitamin C in the form of supplements and any drink ingested in large amount will irritate the bladder, increasing the urge to urinate, the frequency and urgency. However, stating that foods rich in vitamin C or caffeinated beverages worsen the symptoms of incontinence appears to have no proven association except when ingested in large amounts. Although the current studies have a large population sample, this issue still does not have concrete answers and, therefore, caution should be exercised in restricting these foods from incontinent people, since they somehow have beneficial properties for populations with IU, such as the presence of antioxidants.

CONCLUSION

It was observed that moderate consumption of citrus fruits and caffeinated liquids did not worsen the symptoms of urinary incontinence and were not considered a primary factor to develop UI. It is also

known that factors such as overweight and obesity, consumption of foods rich in sugars and poor fats, sedentary lifestyle, parity and smoking are associated with UI and the progression of this disease. Therefore, it should be highlighted that healthy life habits like a balanced diet, practice of physical activity and smoking cessation are important measures to prevent the onset of UI and the worsening of its symptoms.

Therefore, it is extremely important to carry out more studies on this subject, so that there is a better understanding of it, as well as formulating more concise guidelines regarding the prevention of urinary incontinence.

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