



Prevalence of stress urinary incontinence in women presenting for evaluation of chronic cough

To the Editor:

Cough is the most common symptom for which patients in the USA seek medical attention [1]. Chronic cough, defined as cough of >8 weeks' duration, often remains refractory to medical intervention, despite adherence to published guidelines [2]. Chronic cough is associated with quality of life disruption, including physical discomfort, depression, anxiety and social isolation [2]. It is known that urinary incontinence (UI) is frequently associated with cough in women; however, little information is available in the medical literature regarding the actual prevalence of this condition among women suffering chronic cough [3–5].

Adult women presenting to a specialty cough centre (Montefiore Cough Center, Bronx, New York, USA) for evaluation of chronic cough (>8 weeks duration) comprised the study population. Stress UI was defined as the unintentional loss of urine during or immediately following an episode of coughing or other physical movement or activity. Baseline characteristics of age, duration of cough and body mass index (BMI) were determined to have a non-normal distribution by Shapiro–Wilks test and were subsequently compared between subjects with and without cough-induced stress UI using the Mann–Whitney U test. A multivariable model composed of these three characteristics was constructed in a forward-stepwise manner to evaluate independent associations with stress UI. Receiver operating characteristic (ROC) curve analyses were employed to generate areas under the curve (AUC) and associated predictive values of age and BMI for stress UI. Statistical significance was considered $p < 0.05$. All analyses were performed using IBM SPSS Statistics Version 26 (IBM Corp., Armonk, NY, USA). This study was approved by the Institutional Review Board of the Albert Einstein College of Medicine (IRB#2018-9452).

Of 210 consecutively recruited women with chronic cough presenting from March 2018 through to September 2020, 133 (63.3%) reported stress UI induced by cough episodes. Of these 133 women, 123 (92.5%) reported that UI developed after the onset of chronic cough, and that stress UI occurred exclusively related to, and during or immediately after coughing.

Data regarding the frequency of the occurrence of cough-induced stress UI are available for 112 of the 133 (84.2%) women in our cohort. Among these subjects, 47.3% reported that they experienced the problem at least once daily, 37.5% at least once weekly, and 15.2% less than once per week. Women with stress UI did not differ on the basis of age or duration of chronic cough, but those with UI had a greater median (interquartile range) BMI (28 (25–34) versus 26 (23–31); $p = 0.002$) (table 1). In this study we did not capture objective or subjective data on cough frequency or severity, but these factors are likely relevant to the occurrence of episodes of stress UI. Anecdotally, women were more likely to report the occurrence of stress UI immediately following an episode or bout of relatively severe coughing, rather than after a single cough.

In a multivariable model composed of baseline characteristics (table 1), age (OR=1.02, 95% CI 1.00–1.04; $p = 0.028$) and BMI (OR=1.08, 95% CI 1.03 to 1.14; $p = 0.002$) were independently associated with



@ERSpublications

Cough is among the most common symptoms for which individuals seek medical attention. The majority of women seeking evaluation of chronic cough report the presence of cough-induced stress urinary incontinence. <https://bit.ly/3iAr9rh>

Cite this article as: Dicipinigaitis PV. Prevalence of stress urinary incontinence in women presenting for evaluation of chronic cough. *ERJ Open Res* 2021; 7: 00012-2021 [<https://doi.org/10.1183/23120541.00012-2021>].

©The authors 2021. This version is distributed under the terms of the Creative Commons Attribution Non-Commercial Licence 4.0. For commercial reproduction rights and permissions contact permissions@ersnet.org



TABLE 1 Female chronic cough patients with and without urinary stress incontinence

Baseline characteristics				
Characteristic	Total cohort	Patients with stress incontinence	Patients without stress incontinence	p-value
Subjects n	210	133	77	
Age	61 (49–70)	61 (51–71)	61 (40–69)	0.112
Duration of chronic cough months	18 (8–60)	18 (8–60)	16 (8–60)	0.959
Body mass index	28 (24–32)	28 (25–34)	26 (23–31)	0.002 [¶]
Multivariable analysis: significant predictors of urinary stress incontinence [#]				
Characteristic		AUC (95% CI)	OR (95% CI)	p-value
Age		0.57 (0.48–0.65)	1.02 (1.00–1.04)	0.028 [¶]
Body mass index		0.63 (0.55–0.71)	1.08 (1.03–1.14)	0.002 [¶]

Data are presented as median [interquartile ranges] and compared using Mann-Whitney U test for non-normally distributed data, unless otherwise stated. #: variables entered into the model were age, body mass index and duration of chronic cough (months); ¶: denotes statistical significance at p<0.05.

cough-induced stress UI, while duration of cough was not (table 1). BMI and age had an AUC of 0.63 (95% CI 0.55–0.71) and 0.57 (95% CI 0.48–0.65), respectively, for predictability of UI.

We have demonstrated that 63.3% of women presenting for evaluation of chronic cough reported the presence of stress UI. To provide perspective, stress UI has been reported to occur in ~3.5% of community-dwelling women of a similar age as the subject population reported herein [6]. Previous studies investigating the prevalence of UI in women with chronic cough employed questionnaires [3, 4] to obtain their data. One of those studies reported a prevalence of UI (not specifically stress UI) of 39% [3], and another reported a prevalence of stress UI of 24% [4]. Another questionnaire study described stress UI in 14 out of 28 (50%) women with chronic cough due to interstitial lung disease [5]. In the present study, the author obtained all information personally during the consultation visit. Often, patients would not volunteer the presence of stress UI unless specifically asked by the investigator. This may explain the higher prevalence of cough-induced stress UI observed in this study compared with previous questionnaire studies, since the establishment of an environment of trust between patient and physician may have rendered a patient more likely to disclose such information. Furthermore, having all data obtained personally during the consultation visit allowed us to confirm whether UI episodes were indeed related solely to cough episodes, and whether UI of any type existed before the onset of chronic cough.

In this study, increasing age and weight (BMI) were associated with an increased likelihood of cough-induced stress UI. Interestingly, in a large epidemiological study of community-dwelling women over the age of 50 years, the prevalence of urgency UI and mixed UI increased with age, whereas the prevalence of stress UI did not [6]. Obesity is believed to be associated with stress UI because of increased intravesical pressure, which increases demand on the continence system [7].

In summary, we have documented the presence of cough-induced stress UI in the majority of women presenting to a specialty centre for evaluation of chronic cough. Stress UI is a significant contributor to the overall quality of life disruption caused by chronic cough. Most women will not volunteer a history of cough-induced stress UI unless specifically asked. Once a discussion of the problem ensues, most patients are relieved to learn that this is a common problem faced by women with chronic cough. Further studies required in this subject population include a prospective evaluation of the effect of improvement or resolution of chronic cough, and the effect of weight loss, on stress UI.

Peter V. Dicipinigitis

Albert Einstein College of Medicine and Montefiore Medical Center, Bronx, NY, USA.

Correspondence: Peter Dicipinigitis, Einstein Division/Montefiore Medical Center, 1825 Eastchester Road, Bronx, NY 10461, USA. E-mail: pdicipin@gmail.com

Received: 7 Jan 2021 | Accepted after revision: 13 Jan 2021

Acknowledgement: These data were previously presented in a Poster Discussion session at the International Congress of the European Respiratory Society in September, 2020.

Support statement: Supported in part by a research grant from the Investigator-Initiated Studies Program of Merck, Sharp and Dohme Corp. The opinions expressed in this paper are those of the author and do not necessarily represent those of Merck, Sharp and Dohme Corp. Funding information for this article has been deposited with the Crossref Funder Registry.

Conflict of interest: P.V. Dicipinigaitis reports an investigator-initiated grant from Merck during the conduct of the study and personal fees for consultancy from Merck outside the submitted work.

References

- 1 Hsiao C-J, Cherry DK, Beatty PC, *et al.* National Ambulatory Medical Care Survey: 2007 Summary. National Health Statistics Reports No. 27. Hyatsville, National Center for Health Statistics, 2010.
- 2 Morice AH, Millqvist E, Bieksiene K, *et al.* ERS guidelines on the diagnosis and treatment of chronic cough in adults and children. *Eur Respir J* 2020; 55: 1901136.
- 3 Irwin RS, Curley FJ. The treatment of cough. A comprehensive review. *Chest* 1991; 99: 1477–1484.
- 4 Shariat SF, Zimmern PE, Hilton K, *et al.* Prospective questionnaire-based evaluation of the prevalence of urinary incontinence in women with chronic cough. *Urol Int* 2009; 83: 181–186.
- 5 Bradaia F, Lazor R, Khouatra C, *et al.* [Urinary incontinence due to chronic cough in interstitial lung disease]. *Rev Mal Respir* 2009; 26: 499–504.
- 6 Komesu YM, Schrader RM, Ketai LH, *et al.* Epidemiology of mixed, stress, and urgency urinary incontinence in middle-aged/older women: the importance of incontinence history. *Int Urogynecol J* 2016; 27: 763–772.
- 7 Swenson CW, Kolenic GE, Trowbridge ER, *et al.* Obesity and stress urinary incontinence in women: compromised continence mechanism or excess bladder pressure during cough? *Int Urogynecol J* 2017; 28: 1377–1385.