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Perspective

Urinary Incontinence in People Referred for Pulmonary Rehabilitation: An Undisclosed Issue but a Real Problem

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Abstract

Pulmonary rehabilitation (PR) is an evidence-based intervention to manage symptoms related to chronic obstructive respiratory diseases (CORD). Paradoxically, few people with CORD actually engage in PR, and of those, up to one-third do not complete the program. Additionally, some of those who complete the program do not achieve worthwhile benefits. Therefore, the main challenge for the next decades is to offer PR to as many people (that would potentially benefit from it) as possible. This raises questions about factors influencing participation, completion, and responsiveness to PR programs. Among these factors, urinary incontinence (UI) is highly prevalent among people with CORD (much more than in the general population) and may worsen during PR exercise sessions. Paradoxically, UI is poorly explored in routine and scarcely assessed in research, and none of the actual guidelines about PR mention it. However, its potential influence on engagement, completion, and response to PR is of real concern. Therefore, the aim of this perspective is to describe the mechanisms of UI, particularly in the context of CORD, as well as to highlight its prevalence among people with CORD, their burden, and how it could affect a PR approach based on sustained and regular physical activity.

Keywords: Chronic Obstructive Pulmonary Disease, Pulmonary Rehabilitation, Urinary Incontinence, Exercise

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Introduction

Chronic obstructive respiratory disease (CORD) is a group of health conditions associated with a high level of disease burden.[1] Progressive physical inactivity is common with CORD, and it is associated with a worsening of dyspnea and muscle deconditioning.[2] Pulmonary rehabilitation (PR) is largely recognized to improve clinical outcomes and respiratory symptoms in most, but not all people with CORD.[3] Unfortunately, research has indicated that only a small proportion of those offered PR actually engage in PR, and of those, up to one-third do not complete the program.[4] Therefore, 2 important issues surround the use of PR for people with CORD. Firstly, data are needed to determine which people would benefit from PR. Secondly, the factors that facilitate and determine both attendance and participation in PR need to be clarified. Addressing these issues would ensure that resources are not wasted by offering PR programs to people for whom there would be no clinical benefit, and it could also help to adapt PR programs to support those who have difficulty engaging and participating.[5,6]

It seems reasonable to assume that important factors in a patient's motivation to participate in PR are likely to be systemic side effects commonly associated with CORD.

One such side effect, which is considered in this paper, is urinary incontinence (UI). UI is defined by the International Continence Society as an involuntary loss of urine.[7] It is highly prevalent among people with CORD,[8] and the resulting symptoms may be aggravated during PR exercise sessions.[9] Despite this potentially significant impact on people's engagement and participation, no current international PR guidelines mention UI as comorbidity to be managed.[10] In this point of view, therefore, we aim to describe UI mechanisms, UI prevalence, and its impact on people with CORD. We also aim to discuss how it could affect a PR approach based on sustained and regular physical activity.

Mechanisms of UI in People With and Without CORD

UI is defined as an involuntary loss of urine[7] and is classified according to the mechanism of loss.[9] Stress UI, for example, occurs during physical exertion (including coughing) (see Fig. 1 for details of the underlying mechanism) while urge UI precedes or occurs in association with a voiding that has occurred urgently. UI can also be of a mixed etiology, involving both stress and urge UI.[9] Although the recorded prevalence varies across studies, it has been estimated to occur as frequently as 1 in 4 women and 1 in 10 men in the general population.[11] Furthermore, we believe these are probably underestimates due to the social stigma and shame frequently associated with UI and also because of popular urban myths such as the fallacy that UI is inevitably associated with physiological aging, particularly in women. As a result of its prevalence and negative impact on patients' psychological and physical well-being, UI is a major public health issue that generates large direct and indirect costs in terms of both its treatment and management.[12]

Several general factors are associated with an increased incidence of UI, such as advancing age, (female) sex, the presence of obesity, and the strength and function of the pelvic floor muscles as well as an individual's surgical and obstetric or prostatic history.[13] Other factors related to CORD may, in addition, further increase the likelihood of developing UI.[14] In terms of people with CORD, a loss of effectiveness or change in mechanics of deep stabilizing muscles, such as the diaphragm or expiratory muscles, may contribute to UI by altering both the lumbopelvic stability system and the normal mechanisms of intra-abdominal pressure regulation.[13]

Thus, impaired lung tissue elasticity, such as in cases of emphysema, for example, increase intra-abdominal pressure due to associated lung hyperinflation, which concomitantly flattens the diaphragm and thus reduces its mechanical efficiency (ie, according to the Laplace's law, the mechanical efficiency of the diaphragm is inversely proportional to its radius of curvature). People with CORD may also show excessive recruitment of the expiratory muscles. This, in turn, results in a chronic increase of intra-abdominal pressure, acutely overloading the perineal muscles and, over the longer term, contributing to the development of UI.[9,14] Similarly, chronic coughing has been shown to cause frequent increases in intra-abdominal pressure, increasing the stress applied to the pelvic floor.[15]

Another potential trigger for UI associated with CORD is systemic inflammation. This has been identified as a contributor to lower limb muscle dysfunction in people with COPD[16]; the dysfunction is caused by systematic inflammation that leads to increased proteolysis of lower extremity muscles and damage caused by the associated inflammatory-induced oxidative stress.[17] This inflammation leads to both structural and histological changes, including a reduction in muscle mass,[18] mitochondrial dysfunction, a decrease in the number of capillaries, and a shift in the ratio between oxidative and glycolytic muscle-type fibers (to favor glycolytic fibers),[17] and impaired muscle function in terms of both strength and endurance.[19] It would seem reasonable to consider that such deteriorative changes could also apply to the perineal muscles. This is further extended by increased UI symptoms observed during acute exacerbation of CORD; as such, episodes are characterized by an increase in both cough and inflammation.[20,21]

Finally, a third important, potential cause of UI disorders in patients with CORD are the side effects of medication prescribed for common comorbidities on urine production or micturition control. For example, people with induced COPD may require cardiac medication, such as diuretics, beta receptor agonists, or angiotensin II receptor blockers.[22]

Prevalence and Screening of UI in People With CORD

As a result of the factors described above, the prevalence of UI is higher among people with CORD than in the general population. Within 1 large cohort of 14,828 people (which included 995 people with COPD), the prevalence of UI was significantly higher among people with COPD than in the general population (34.9% vs 27.3%, respectively, $P = .048$).[8,23] Because CORD commonly induces symptoms such as dyspnea that cause fear and acute stress as well as severe pulmonary and functional impairments, UI can be easily overlooked and so remains unexplored during routine care.[9] In addition to these medical factors, the social stigma associated with UI probably explains why up to 75% of people with COPD and UI never consult a physician specifically for this problem.[24]

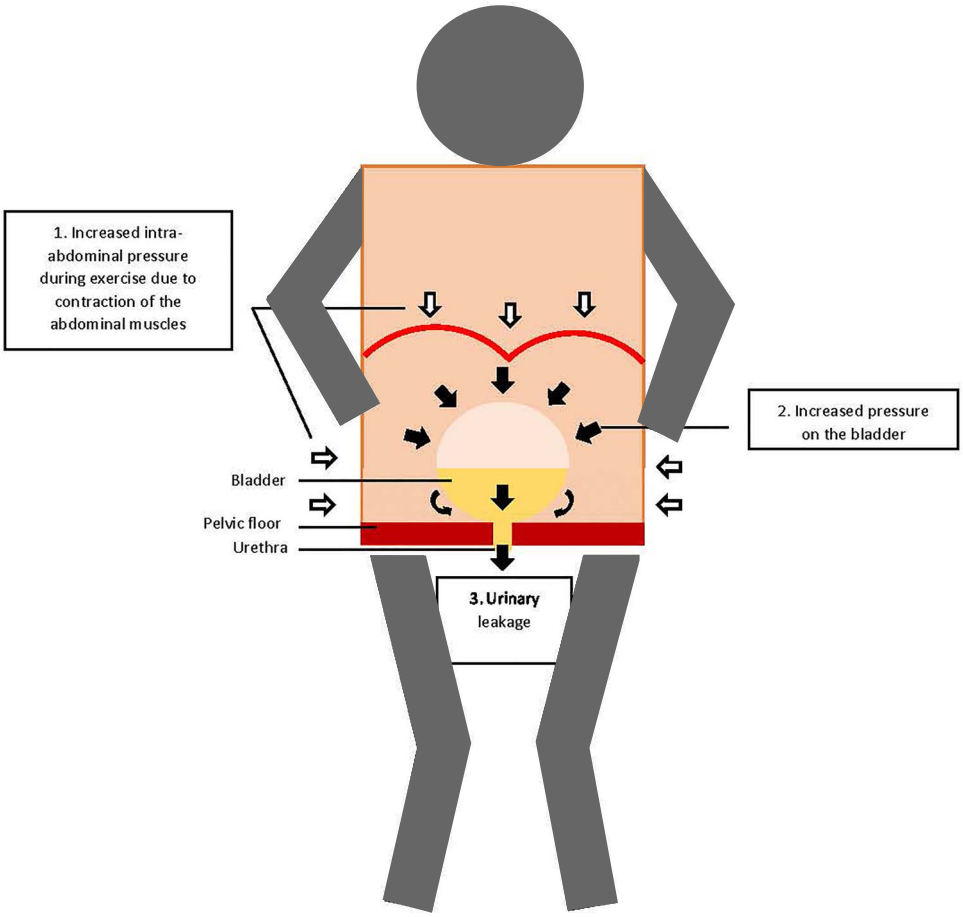

Figure 1. Mechanism of stress UI.

According to the World Health Organization, health care professionals, and particularly physical therapists, should consider using the International Classification of Functioning, Disability and Health. The use of this classification would ensure people receive a comprehensive assessment as part of their CORD management and ensure that all important problems, such as UI, are acknowledged. We also believe that health care professionals should routinely and specifically question all people with CORD about any urinary symptoms they may have. This would ensure that this important issue is given its due consideration.

Consequences of UI in People With CORD

The concurrent presence of UI amplifies the negative impact of CORD on a person's quality of life[20]: UI causes psychological distress, reduces social life, lowers mood, and negatively affects sleep.[20,25] The latter is particularly relevant since sleep disturbance has been shown to be involved in the pathophysiology of chronic hypercapnic respiratory failure. In 2013, researchers found that people with CORD reported UI to be the comorbidity that had the greatest impact on their health status,[26] and yet, despite these findings, the latest update of the Global Initiative for Chronic Obstructive Lung Disease in 2020 did not even mention UI as a potential comorbidity.

Additionally, CORD is characterized by a progressive decline in physical activity,[2] which, in turn, is associated with increased rates of hospitalization and mortality.[27] Physical activity is therefore an essential element in the management of people with CORD. As we have shown, stress UI could further reinforce the avoidance of physical activity. This increase in urinary symptoms thus contributes to the spiral of events that ultimately lead people with CORD to have worsening dyspnea.

Nevertheless, despite the potentially considerable impact of UI on the lives of people with CORD, a recent, large, systematic review of the determinants and outcomes of physical activity in people with COPD in 2014, which included 86 studies and more than 8000 people, did not even consider UI as an issue.[28] Furthermore, the authors concluded that in these 86 studies there was poor evidence regarding the determinants of physical activity. In our opinion, it is concerning that none of the studies included in the systematic review addressed the relationship between UI and physical activity despite the clearly negative influence that UI could have on the physical activity patterns of anyone, let alone someone with a serious health condition such as CORD. Reassuringly, a more recent study in 2020 did investigate the effect of UI on physical activity in a large cohort of 601 people with COPD; the authors found that UI was a significant, independent predictor of lower levels of physical activity in this group (OR = 2.179; 95% CI = 1.251 to 3.796).[29] Therefore, more research is urgently needed to highlight the importance of a concurrent UI co-morbidity in people with CORD, and research aiming to assess the determinants of physical activity in those people should no longer ignore it.

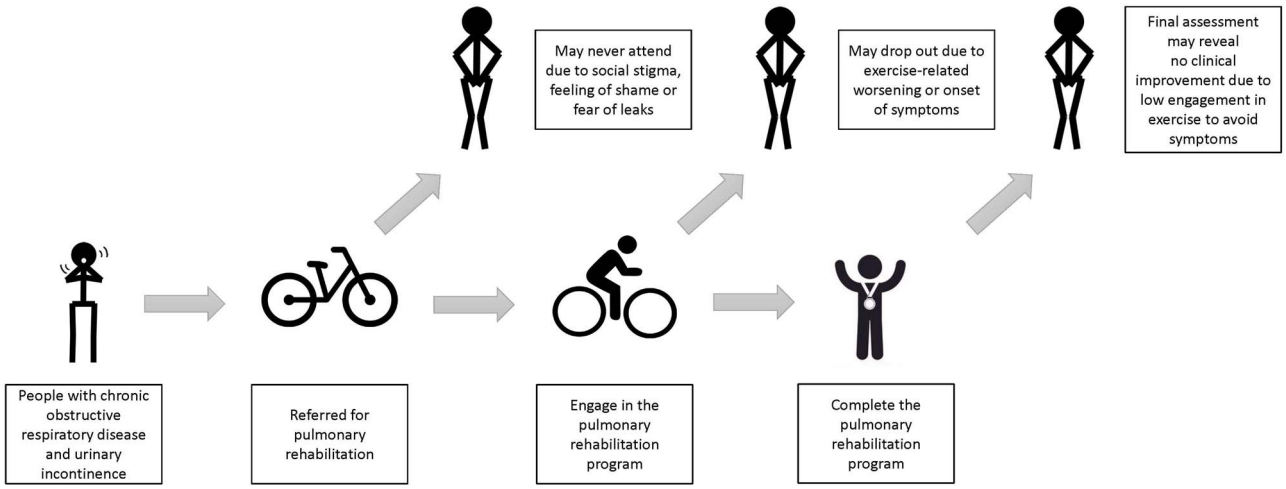

Figure 2. Possible consequences of UI from referral to completion of a PR program.

Potential Influence of UI on PR

PR is a key intervention that reverses the progressive deconditioning associated with CORD. Despite its efficacy, however, research indicates that attendance at PR sessions and completion of programs is poor, with participation sometimes as low as 5%.[30] The main reason for this poor record seems likely to be the very low referral rates (<15%).[4,30] Nevertheless, it should also be noted that in studies of people with CORD who had all been offered PR treatment, up to one-half of the people studied did not even attend the first session.[31] Furthermore, it was reported that one-third of those who did attend the first session did not complete the program.[4,31] Many high-quality studies have investigated the reasons for non-attendance or non-completion of PR,[4,31,32] but to date no study has mentioned UI. Due to the social stigma associated with UI symptoms, respondents to open or non-directed interviews; non-specific, non-anonymous surveys; or qualitative studies may not wish to discuss their UI or identify it as an issue. It is reasonable to hypothesize that people with UI would avoid PR due to a reasonable fear of leakage,[33] and that any UI symptoms that were either initiated or aggravated by PR in individuals who previously had low levels of physical activity and so may have been unaware that any urinary problems existed would cause these people to drop out of future sessions.

It has previously been noted that only a proportion of people who attend and complete a PR program experience clinical benefits.[6] Many studies have sought to identify those patients who will clinically benefit from PR to both improve the cost effectiveness of this treatment as well as to be able to offer clinically relevant health care.[5,6,34,35] Again, it is striking that in this era of multidimensional profiling, UI is still not being considered as a key factor.[5] Even for those individuals who might otherwise expect to benefit from PR rehabilitation, it would be reasonable to expect them to voluntarily decrease the intensity of their exertions or their commitment in the program if they experienced UI during exercise sessions simply to avoid further symptoms. The result of this reduction in efforts is that since the physiological effect of PR is related to the intensity of exercise training, people may not benefit fully and could be erroneously considered as unresponsive to PR. Figure 2 illustrates how UI may negatively interfere with PR.

At present, these considerations remain speculative. Nevertheless, we believe that the impact of UI on PR has been overlooked and that UI should be routinely screened in people with CORD to improve both quality of life and effectiveness of interventions such as PR.

UI is highly prevalent among people with CORD. It is an important negative factor that not only impacts on a person's quality of life, but it may also accelerate the development of physical, deleterious symptoms like dyspnea. UI may also be the real and underlying (although undeclared) cause for a person's attrition from PR programs; even people who complete PR programs may reduce their exercise intensity to avoid triggering or worsening their urinary symptoms, thus reducing the clinical benefits of the physical rehabilitation.

Therefore, early consideration, recognition, and identification of UI symptoms by health care providers are essential to allow the condition to be managed and to facilitate the implementation of personalized support for each patient. This early intervention would not only promote overall patient well-being but would also hopefully increase the success of PR programs. Health professionals and researchers should no longer ignore this often undisclosed issue and its consequences.

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