



## Toileting behaviours and lower urinary tract symptoms among female nurses: A cross-sectional questionnaire survey



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### ABSTRACT

**Background:** Unhealthy toileting behaviours exist among women, and lower urinary tract symptoms have a high prevalence and significant effects on quality of life. However, the relationship between toileting behaviours and lower urinary tract symptoms is unclear.

**Objectives:** This study aimed to investigate the prevalence of lower urinary tract symptoms among female nurses, and the association between toileting behaviours and lower urinary tract symptoms.

**Design:** A cross-sectional stratified cluster sampling study.

**Participants:** A total of 636 female clinical nurses from tertiary hospitals in Jinan (the capital city of Shandong Province, China).

**Methods:** The Toileting Behaviour-Women's Elimination Behaviours and the International Consultation on Incontinence Questionnaire-Female Lower Urinary Tract Symptoms scales were used to assess the participants' toileting behaviours and lower urinary tract symptoms, respectively. Multiple linear regression analysis was used to evaluate the association between toileting behaviours and lower urinary tract symptoms.

**Results:** Unhealthy toileting behaviours were common among the female nurses, with delayed voiding being the unhealthiest toileting behaviour, which was followed by place and position preference for voiding. Nearly 68% of the female nurses had at least one lower urinary tract symptom, nearly 50% had incontinence symptoms, 40% had filling symptoms, and 18% had voiding symptoms. Unhealthy toileting behaviours (premature voiding, delayed voiding, and straining to void) were positively associated with lower urinary tract symptoms. However, lower urinary tract symptoms were not significantly associated with voiding place or position preference. Among the control variables, being married or having a history of a urinary tract infection was associated with lower urinary tract symptoms. Having a higher income and regular menstrual period were negatively associated with lower urinary tract symptoms. Compared with vaginal delivery, caesarean delivery had a protective association with lower urinary tract symptoms. **Conclusion:** Lower urinary tract symptoms among female nurses should not be overlooked, because their prevalence among female clinical nurses exceeded that among the general population of women. These findings highlight the importance of avoiding unhealthy toileting behaviours (especially premature voiding, delayed voiding, and straining to void), as these unhealthy toileting behaviours were significantly associated with susceptibility to lower urinary tract symptoms.

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### What is already known about the topic

- Nurses experience higher occupational stress and psychological strain (vs. the general population), and the prevalence of lower urinary tract symptoms may be higher among nurses.

- Toileting behaviours, such as delayed voiding and voiding position, may be related to the occurrence of lower urinary tract symptoms.
- Unhealthy toileting behaviours exist among all women.

### What this paper adds

- The unhealthiest toileting behaviour was delayed voiding, which was followed by place and position preference for voiding.

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- Female nurses exhibited a high prevalence (68%) of lower urinary tract symptoms. Nearly half of the female nurses had incontinence symptoms and 40% had filling symptoms.
- Unhealthy toileting behaviours (straining to void, premature voiding, and delayed voiding) were associated with lower urinary tract symptoms.

## 1. Introduction

Lower urinary tract symptoms describe to a group of symptoms that can be categorized as storage, voiding, or post-voiding symptoms (Abrams et al., 2002; Haylen et al., 2010). Lower urinary tract symptoms have attracted substantial attention, which is mainly related to their high prevalence and accompanying burden. An estimated 45.2% adults of the 2008 worldwide population (4.3 billion) have experienced at least one type of lower urinary tract symptoms, and this number is anticipated to increase to 2.3 billion adults by 2018 (a 18.4% increase), although women are more likely to experience lower urinary tract symptoms, compared to men (Irwin et al., 2011). A study of six Chinese regions indicated that >50% of adult women had experienced lower urinary tract symptoms (Zhang et al., 2015). Unfortunately, women with lower urinary tract symptoms experience various negative effects on their quality of life, such as decreased sexual activity (Tannenbaum, 2015) and emotional disturbances (e.g., anxiety, depression, and stress symptoms) (Choi et al., 2016). Furthermore, lower urinary tract symptoms can interfere with social activities, because of embarrassment, frustration, disappointment, and reduced sleep quality (Perera et al., 2014). Moreover, lower urinary tract symptoms are associated with a substantial economic burden that is related to treatment and routine care (Chong et al., 2011; Milsom et al., 2014).

Despite the high prevalence and negative effects of lower urinary tract symptoms, their pathogenesis remains incompletely understood, although the consensus is that lower urinary tract symptoms have a multifactorial aetiology. The available evidence suggests that many factors are related to lower urinary tract symptoms, including age (Chapple et al., 2008; Zhang et al., 2005), race (Coyne et al., 2013), education (Fowke et al., 2011; Wang et al., 2011), marital status (Wang et al., 2011), income (Choi et al., 2014; Fowke et al., 2011), body mass index (Zhang et al., 2005), menstrual status (Lugo Salcedo et al., 2013; Zhang et al., 2005), delivery method (Timur-Tashan et al., 2012; Zhang et al., 2005), working experience (Zhang et al., 2013), working hours (Zhang et al., 2013), fluid intake (Elstad et al., 2011), previous urinary tract infection (Timur-Tashan et al., 2012), and chronic constipation (Zhang et al., 2005). Toileting behaviours have also recently attracted considerable attention. A typical voiding positions, such as crouching over a public toilet, are reported by 85% of adult women, and these positions can make it difficult to relax the pelvic floor, interfere with the voiding process, and lead to lower urinary tract symptoms (Bauer and Huebner, 2013; Yang et al., 2010). Furthermore, delayed voiding combined with the Valsalva manoeuvre (a breathing technique) can aggravate the bladder neck's descent in women, which is a predictor of lower urinary tract symptoms (Yang and Huang, 2002). Nevertheless, the studies regarding the correlations between toileting behaviours and lower urinary tract symptoms subjectively assumed that toileting behaviours were a one-dimensional factor. However, toileting behaviours are defined as a series of voluntary actions that are related to the physiological emptying of the bladder, which include selecting the voiding place, time, position, and style (Wang and Palmer, 2010). Moreover, given that many modifiable behaviours (e.g., smoking and physical inactivity) are critical to improving population health (Higgins, 2015), we speculated that interventions to prevent unhealthy

toileting behaviours might help prevent and ameliorate lower urinary tract symptoms. Therefore, studies are needed to evaluate the association between toileting behaviours and lower urinary tract symptoms, and their findings may help develop comprehensive intervention strategies that can prevent and ameliorate lower urinary tract symptoms.

Female nurses are more vulnerable to lower urinary tract symptoms (vs. the general population), and deserve considerable attention. Liao et al. (2009) have reported that approximately 65% of female nurses in Taiwan have experienced at least one type of lower urinary tract symptoms, which is much higher than the global estimates. The higher prevalence of lower urinary tract symptoms among female nurses is likely attributable to various factors, such as exposure to common risk factors for lower urinary tract symptoms, a heavy workload, and high levels of job strain, which can increase abnormal toileting behaviours (Zhang et al., 2013). For example, female nurses often repress their desire to void while at work, because of inadequate bathroom breaks, a limited number of toilets, and poor toilet sanitation (Wu et al., 2015). However, there is very little information regarding the relationship between toileting behaviours and lower urinary tract symptoms among female nurses. Therefore, the present study was designed to evaluate the occurrence of lower urinary tract symptoms among female nurses, as well as the relationship between toileting behaviours and lower urinary tract symptoms.

## 2. Methods

### 2.1. Study design and participants

This cross-sectional descriptive study used a stratified cluster sampling strategy to recruit 636 clinical nurses from tertiary hospitals in Jinan (the capital city of Shandong Province, China). First, three hospitals were randomly selected from the seven tertiary hospitals in Jinan, and the selected hospitals were stratified according to department. Each hospital had eight departments: a medical department, a surgical department, a gynaecology and obstetrics department, a paediatrics department, an emergency room, an operating room, an intensive care unit, and an outpatient department. Furthermore, each department had different units (e.g., the medical department has a cardiovascular unit, a respiratory unit, and a gastroenterological unit et al.), and we randomly selected one to three units from each department. All eligible female nurses from the selected units were invited to participate in the survey. The inclusion criteria were: 1) age of  $\geq 18$  years, 2) working in the hospital for at least one year, and 3) willing to participate in the study. The exclusion criteria were: 1) nurses who were currently pregnant and 2) nurses who had a urinary tract infection within the last month.

### 2.2. Measures

#### 2.2.1. Participant characteristics

The participant characteristics included age, ethnicity, education level, marital status, monthly income, body mass index, menstrual status, delivery mode, fluid intake, urinary tract infection history, and chronic constipation. Data were also collected regarding years in practice and working hours per week.

#### 2.2.2. Toileting behaviour

Toileting behaviours were assessed using the Chinese version of the Toileting Behaviour-Women's Elimination Behaviours scale, which is a satisfactory psychometric test for clinical nurses that has a Cronbach's alpha value of 0.80 (Wan et al., 2014). Confirmatory factor analysis confirmed that the scale had good construct validity (Wan et al., 2014). This 17-item scale contains five domains: place

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