

CONCEPT ANALYSIS

Women's toileting behaviour related to urinary elimination: concept analysis

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Abstract

Aim. This paper is a report of analysis of the concept of women's toileting behaviour related to urinary elimination.

Background. Behaviours related to emptying urine from the bladder can contribute to bladder health problems. Evidence exists that clinical interventions focusing on specific behaviours that promote urine storage and controlled emptying are effective in reducing lower urinary tract symptoms. The concept of women's toileting behaviour related to urinary elimination has not been well-developed to guide nursing research and intervention.

Data sources. The CINAHL, Medline, PsycInfo and ISI Citation databases were searched for publications between January, 1960 and May, 2009, using combinations of keywords related to women's toileting behaviour. Additional publications were identified by examining the reference lists in the papers identified.

Review methods. Johnson's behavioural system model provided the conceptual framework to identify the concept. Walker and Avant's method was used for this concept analysis.

Results. Women's toileting behaviour related to urinary elimination can be defined as voluntary actions related to the physiological event of emptying the bladder, which is comprised of specific attributes including voiding place, voiding time, voiding position and voiding style. This behaviour is also influenced by the physical and social environments.

Conclusion. An explicit definition of women's toileting behaviour can offer a basis for nurses to understand the factors involved in women's toileting behaviour. It also facilitates the development of an instrument to assess women's toileting behaviour better, and to facilitate development of behavioural interventions designed to prevent, eliminate, reduce and manage female lower urinary tract symptoms.

Keywords: concept analysis, Johnson's behavioural system model, nursing, toileting behaviour, urinary elimination, women

Introduction

Urinary storage and elimination are the main functions of bladder. Human infants are born without voluntary control over bladder emptying, but most children develop this control between the ages of 2 and 4 years (Largo *et al.* 1999). The term urinary continence incorporates social norms and individual behaviours related to the physiological process of storing and emptying urine (Palmer 1996).

Because bladder emptying eliminates toxins and wastes from the body, it is an essential function. Johnson's behavioural system model (Lobo 2002) addresses the eliminative subsystem and the behaviours related to the excretion of waste products from the body. According to this conceptual model, behaviours related to urinary excretion are defined by cultures, and these behaviours may override physiological needs. For example, a person may ignore the physiological need to empty urine if a social situation makes it impossible or objectionable to seek toilet facilities. Hence, it is crucial for nurses to use research evidence to understand: (1) when, how, and under what conditions women seek and use toilet facilities; and (2) how toileting behaviours influence female bladder health.

Background

Studies in different populations and geographical regions (e.g. USA, Europe, Korea, Japan and China) show that urinary incontinence (UI) and other lower urinary tract symptoms (LUTS), are prevalent in women, and that the prevalence tends to increase with age (Milsom *et al.* 2001, Stewart *et al.* 2003, Norby *et al.* 2005, Homma *et al.* 2006, Irwin *et al.* 2006, Coyne *et al.* 2009, Zhu *et al.* 2009). Several behaviours associated with LUTS have been identified. For example, infrequent voiding and low fluid intake may predispose to urinary tract infections (UTIs) (Nygaard & Linder 1997). Voiding while crouching or hovering over the toilet does not relax the pelvic floor and may lead to incomplete bladder emptying with residual urine (Moore *et al.* 1991). Studies have demonstrated that behavioural treatments are effective for reducing female incontinence, including pelvic floor muscle training (Glazener *et al.* 2001, Reilly *et al.* 2002, Hay-Smith *et al.* 2008), bladder training (Wyman *et al.* 1998, Roe *et al.* 2007), and lifestyle modifications such as decreasing dietary caffeine and increasing fluid intake (Brown *et al.* 2006, Tomlinson *et al.* 1999).

In many studies investigating female urinary incontinence, different terms for toileting behaviour have been used in multiple disciplines and a single scientifically based definition of toileting behaviour in women is lacking. Without a

standardized definition, communication among researchers and clinical practitioners across and within disciplines is difficult. The concept of women's toileting behaviour needs to be clearly described, and its attributes identified. In addition, toileting behaviour related to urinary elimination cannot be assessed adequately if the concept remains vague, ambiguous, or arbitrarily defined.

Johnson's behavioural system model guided this concept analysis (Lobo 2002). Johnson described the eliminative subsystem in terms of behaviour employed for the excretion of waste products from the body. Socially acceptable behaviours for urinary elimination include those related to time, place and manner of excretion of wastes. According to Johnson, social and psychological factors influence the biological aspects of this subsystem and these factors may be, at times, in conflict with the eliminative subsystem.

The Walker and Avant method (2005) was chosen for this analysis. Concept analysis is a process that identifies unique attributes of a concept, provides a precise operational definition of the concept, and improves communication regarding the concept. The main steps are: (1) selecting a concept; (2) determining the analysis purpose; (3) identifying all possible uses of the concept; (4) creating the defining attributes; (5) identifying a model case; and (6) identifying the antecedents and consequences.

The aim of the study was to analyse the concept of women's toileting behaviour related to urinary elimination in order to enhance communication across and within disciplines.

Data sources

In order to produce an explicit concept analysis, we conducted a comprehensive literature search. The literature reviewed for this included book chapters and published papers from January 1960 to May 2009, since exploration of toileting behaviours and their relation to bladder emptying started appearing in the literature in the 1960s. The inclusion criteria for the literature were: (1) written in English, (2) toileting and micturition behaviours were defined or described and (3) characteristics for defining toileting behaviours were suggested. The concept of toileting behaviour related to urinary elimination was limited to adult women. Four electronic databases (CINAHL, Medline, PsycInfo and ISI Citation) were searched and the reference lists in the resulting papers were searched for other relevant papers. Combinations of keywords were used. Examples of terms included toileting habit, toileting behaviour, micturition habit, micturition behaviour, bladder habit, bladder

behaviour, voiding habit, voiding behaviour, voiding pattern, urinating habit and bladder control.

Results

The concept of toileting behaviour is discussed in the research and clinical literature using more than ten different terms (Table 1), such as voiding pattern, toilet habit or bladder habits. Rarely are definitions provided and often the same authors use different terms in their papers. Researchers have also used different outcomes of toileting behaviour, such as frequency of emptying and the volume of urine emptied. The essential characteristics for the concept of toileting behaviour were not explicitly defined. Based on the literature reviewed, key components of women's toileting behaviour were extracted. These included the defining attributes, antecedents, and consequences (Figure 1).

Defining attributes

Defining attributes are regarded as the most frequent characteristics of a concept which make a specific concept different from other similar or related concepts (Walker & Avant 2005). The review of the literature resulted in the identification of many characteristics associated with women's toileting behaviour. Four essential attributes of

women's toileting behaviours present in the literature (Table 2) are: behaviours related to voiding place, behaviours related to voiding time, behaviours related to voiding position and behaviours related to voiding style.

Behaviours related to voiding place include seeking places of preference for the purpose of urinating. The storage and voluntary emptying of urine are not just physiological processes, but are also influenced by psychological and socio-cultural factors (Palmer 1994). Children are taught that wetting their pants and voiding in an improper place are socially unacceptable actions. Hence, adult women are trained to urinate in a social acceptable place when they are very young. Some women may not want or like to void in any other place than their homes because of concern about unsafe or unsanitary toilet facilities (Lundblad & Hellstrom 2005). Thus, using a toilet away from home can create psychological stress. Being away from the home may also result in suppression of the desire to void, and therefore infrequent voiding. Moreover, some women are unwilling or unable to urinate in public toilets because of insufficient privacy, and they may develop psychogenic urinary retention (Vythilingum *et al.* 2002, Soifer *et al.* 2009).

Behaviours related to voiding time can be inferred from the number of times, and the time of day or night, when women empty urine. Determining the appropriate time for voiding may vary across individuals. Under normal condition, voiding is initiated by the sensation of bladder fullness (Abrams *et al.* 2003). The first desire to void leads women to seek out an appropriate location to empty urine at a convenient and socially acceptable time. Studies with healthy women have shown that the first desire to void usually occurs at 260–270 mL bladder volume (Wyndaele & De Wachter 2002, Boy *et al.* 2007). However, voiding after the first desire can be delayed if necessary (Abrams *et al.* 2002). Some employed women have reported that they do not want to urinate while at their workplace, cannot go to the toilet as they wish because of limited work breaks (Fitzgerald *et al.* 2002a), or have decreased opportunity to leave their work (Nygaard & Linder 1997). As a result, they may develop a habit of premature voiding at volumes less than 260 mL in case they cannot void later, or they may engage in infrequent voiding. For example, in a survey with 32 middle-aged women (age range 38–62 years) without reported voiding dysfunctions, 69% of their voids occurred at a time when no desire to void was present (Pauwels *et al.* 2004). In another study Naoemova *et al.* (2008) compared 224 women with incontinence with 27 women who were continent by analysing 3-day sensation-related bladder diaries. Those with incontinence voided statistically more frequently than those who were continent. The mean 24-hour voiding frequency was eight to ten times

Table 1 Terms used in literature describing toileting behaviour related to urinary elimination

Terms	Author/date
Voiding habit	Lukacz <i>et al.</i> (2009); Uluocak <i>et al.</i> (2008); Fitzgerald <i>et al.</i> (2002a); Yang and Huang (2002); Nygaard and Linder (1997)
Voiding pattern	Ostaszkiwicz <i>et al.</i> (2005); Jansson <i>et al.</i> (2005)
Voiding behaviour	Moore <i>et al.</i> (1991)
Infrequent voiding syndrome	Bendtsen <i>et al.</i> (1991)
Micturition behaviour	Karsenty <i>et al.</i> (2008); Pauwels <i>et al.</i> (2006)
Micturition habit	Lundblad and Hellstrom (2005)
Toilet habit	Roe <i>et al.</i> (2007); Lundblad and Hellstrom (2005); Nygaard and Linder (1997)
Toileting pattern	Roe <i>et al.</i> (2006)
Habits toward toilet usage	Cai and You (1998)
Bladder habit	Lundblad and Hellstrom (2005)
Bladder behaviour	Naoemova <i>et al.</i> (2008)
Urinary habit	Fitzgerald <i>et al.</i> (2002a, 2002b)

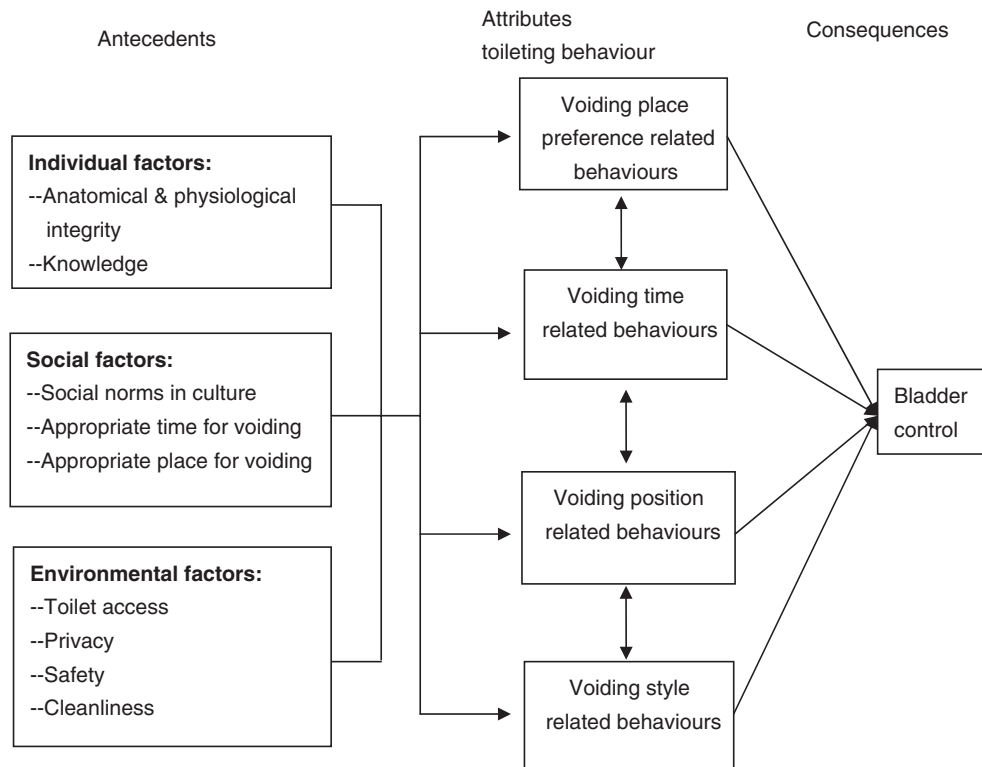


Figure 1 Theoretical framework of women's toileting behaviour.

among incontinent women as compared to seven times in continent women. Those with incontinence reported that they thought that less urine in the bladder reduced the risk of an incontinent event. While in the short term this may work, too frequent voiding over the long term may make the bladder more sensitive to smaller volumes of urine and may lead to frequency urgency (Sampsel 2003a). Other women restrain their desire to micturate until they cannot hold their urine any longer (Bendtsen *et al.* 1991). Many make a conscious effort to drink less fluid when they are at work in order to delay or avoid the need to use toilet (Nygaard & Linder 1997). Over time, an infrequent voiding habit emerges (Bendtsen *et al.* 1991). For example, in a study of 105 female nurses (range 23–54 years), 3–17% were considered to be infrequent voiders, and 57–80% inhibited the urge to void while at work because of busyness, poor toilet facilities, or 'indolence', that is, they just did not use the toilet (Bendtsen *et al.* 1991). Over-distension of the bladder may occur as a result of this behaviour (Webster *et al.* 1984, van Gool 1995). An animal model using rats with acute urinary retention has revealed that over-distension of the bladder causes contractile dysfunction by decreasing blood flow to bladder tissue (Saito & Miyagawa 2001).

Frequency of micturition is important to bladder health. Urinary frequency is usually defined as voiding eight times or

more in a 24-hour period. This concept is widely used in North America to define high-frequency micturition (Atan *et al.* 1999). The International Continence Society (ICS) defines increased daytime frequency as the complaint that an individual voids too often by day, and nocturia as the complaint that the individual wakes one or more times at night to void (Abrams *et al.* 2003). Patients' complaints about frequency of urination are highly variable, according to a study with 200 female patients (age range 23–93 years) in a urogynaecology centre; even in women who voided less than eight times in 24 hours, 76% reported bother with urinary frequency (FitzGerald *et al.* 2002b). Based on a survey conducted in the USA with 4061 community-dwelling women (aged 25–84 years), the median day-time frequency of voiding was every 3–4 hours. Voiding frequency was diagnosed when daytime voiding occurred at less than 2-hourly intervals and more than one voiding during night sleeping hours (Lukacz *et al.* 2009). Women are more likely to maintain urinary continence when they maintain an average voiding interval of 3 hours or longer (Sampsel 2003b).

Behaviours related to voiding position refer to the posture used to empty urine. The preferred voiding position also differs by cultures or by health status. Squatting (Figure 2) is the norm in traditional Asian and African cultures, where the

Table 2 Selected studies addressing women's toileting behaviour related to urinary elimination

Behaviour related to	Author/date	Research design	Participants	Main findings
Voiding place	Lundblad and Hellstrom (2005)	Survey	385 school boys and girls (6–16 years)	16% of schoolchildren never urinate in the school toilets
	Vythilingum <i>et al.</i> (2002)	Survey	63 Paruresis patients (38 ± 12 years)	Most patients have the difficult to urinate in public toilets, especially in a busy bathroom
Voiding time	Lukacz <i>et al.</i> (2009)	Survey	4061 community-dwelling women (25–84 years)	51% women's daytime frequency of voiding is every 3–4 hours
	Naoemova <i>et al.</i> (2008)	Descriptive	224 incontinent women and 27 continent women	Incontinent women have a significantly higher voiding frequency.
	Pauwels <i>et al.</i> (2004)	Survey	32 normal women (43 ± 10 years)	69% of voids were done without the desire to void
	Saito and Miyagawa (2001)	Experimental	Urinary retention rat model	Acute urinary retention significantly increases vesical pressure and decreases blood flow of bladder
Voiding position	Bendtsen <i>et al.</i> (1991)	Descriptive	72 female nurses (23–54 years)	3–17% were infrequent voiders; 57–80% suppress the desire to void
	Rane and Corstiaans (2008)	Experimental	51 women (18–62 years)	No major difference from the lean forward sitting and squatting positions on micturition uroflowmetric parameters
	Uluocak <i>et al.</i> (2008)	Quasi-experimental	29 non-neurogenic overactive bladder (19 girls) (6–16 years)	In girls, only intra-abdominal pressure at maximal flow is significantly lower in the squatting position
Voiding style	Moore <i>et al.</i> (1991)	Survey and Quasi-experimental	528 Women (11–81 years)	85% of women generally crouched instead of sitting on the seats when using public toilets, and 149% increase of residual urine volume in the crouching position compared with sitting position
	Thompson <i>et al.</i> (2007)	Quasi-experimental	120 Women (43 ± 7 years)	There is a significant bladder neck decent in incontinent women compared with continent women when they use Valsalva manoeuvre
	Pauwels <i>et al.</i> (2006)	Survey	32 Healthy women (49 ± 6 years)	42% of healthy women use abdominal straining to void as their usual voiding style even when they were at home
	Yang and Huang (2002)	Quasi-experimental	180 LUTS women	Straining at voiding is significantly associated with the urodynamic parameters, indicates there is a problem of urethral obstruction
	Devreese <i>et al.</i> (2000)	Quasi-experimental	21 healthy women (33.6 ± 8.6 years)	Abdominal straining significantly increased peak flow
	Iglesia <i>et al.</i> (1998)	Quasi-experimental	50 stress incontinent women (64 ± 11 years)	Straining patients experienced a significant higher objective failure rate and long durations of postoperative catheterization
	Shafik (1991)	Quasi-experimental	17 healthy adults (7 females, 26–58 years)	A sudden short straining at the beginning of voiding can cause the external urethral sphincter contract, while slow sustained straining could not evoke the reflex response

squat toilet is widely used. The sitting position, however, has been more frequently used by western women since the flush toilet was invented and gained widespread use (Horan 1997). Women using the flush toilet may alter the seated position, especially when they have hygiene concerns. For example, studies have shown that 50–85% of women generally crouch

over or hover rather than sit on the seats of public toilets (Moore *et al.* 1991, Cai & You 1998). This posture may result in a constant contraction of the pelvic floor and urinary sphincter, which in turn does not allow the pelvic floor to relax sufficiently during micturition (Moore *et al.* 1991). Moore *et al.* (1991) also showed that there is a 149%



Figure 2 Squatting position.

increase of residual urine volume when comparing the crouching position to the sitting position. To address hygiene issues in public toilets, some women urinate in a standing position with the help of a special device, such as urethral extender. Even though there are no differences in voided volume, maximal flow and post-void residual when comparing sitting and standing position in women, the standing voiding position is not widely used due to cultural norms and inconvenience in using the device (Karsenty *et al.* 2008). A study with 54 women (range 18–62 years) revealed no major differences between the lean-forward sitting and squatting positions in micturition uroflowmetric parameters (Rane & Corstiaans 2008). In another study the voiding dynamics changes between sitting and squatting position were compared among 19 girls (age range 6–16 years) with non-neurogenic overactive bladder. Only intra-abdominal pressure at maximal flow was statistically significantly lower in the squatting position, indicating that for girls squatting maybe a better physiological voiding position than sitting for relaxing the pelvic floor (Uluocak *et al.* 2008). The long-term habit of sitting on the toilet in western countries, however, has rendered most women incapable of prolonged squatting. Nearly 50% of western women cannot squat for more than 30 seconds with their feet flat on the floor (Rane & Corstiaans 2008). It appears that adopting a squatting toilet posture would not be feasible for most western women.

Behaviours related to voiding style can be defined as the manner women use to empty their bladders. Some try to shorten the time spent near or sitting on toilet seats, especially when using public toilets. Research has revealed that 42% of healthy women (average age: 49 ± 6 years) use abdominal straining to void, and such straining is their usual voiding

style even when voiding at home (Pauwels *et al.* 2006). The impact of abdominal straining on the voiding mechanism and pelvic floor function in women is unclear (Iglesia *et al.* 1998, Devreese *et al.* 2000, Yang & Huang 2002). One reason for this may be the different definitions used for straining. Pauwels and her colleagues, for example, defined abdominal straining as 'an increase in abdominal pressure of at least 10 cm H₂O greater than baseline during the entire voiding phase' (Pauwels *et al.* 2006, p. 1404). Yang and Huang defined abdominal straining as 'an increase in abdominal pressure of at least 10 cm H₂O greater than baseline, regardless of duration and patterns' (Yang & Huang 2002, p. 428). Shafik did not provide an explicit definition of abdominal straining, but used women's self-reports of straining (Shafik 1991). The Valsalva manoeuvre is defined as straining downwards with maximal effort by a forced expiration against a closed glottis, according to Thompson *et al.* (2007). They assessed its effect on bladder neck movement in asymptomatic and incontinent women. Incontinent women showed statistically significant bladder neck descent compared with continent women (Thompson *et al.* 2007). Increased bladder neck descent has a strong association with stress urinary incontinence (Dietz *et al.* 2002). In another study (Shafik 1991), the sphincter response to two types of straining was compared in healthy women. Sudden short-lasting straining at the beginning of voiding caused the external urethral sphincter to contract. This contraction disappeared when straining continued for more than 5–10 seconds. Slow sustained straining, however, did not evoke this reflex response. Straining is also regarded as a risk factor of incontinence surgery failure. Women with incontinence whose voiding preoperatively was caused by the Valsalva manoeuvre have shown a statistically significant higher failure rate when comparing to non-Valsalva incontinent women after incontinence surgery (Iglesia *et al.* 1998).

Straining may be a habit women use to increase the urine stream and shorten the flow time (Devreese *et al.* 2000). Continent women are more likely to void by urethral relaxation with a stronger detrusor contraction compared with women with incontinence (Karram *et al.* 1997). Extra abdominal straining may not be necessary during micturition, and 'straining at voiding implies an occult manifestation of urethral obstruction' (Yang & Huang 2002, p. 433).

Toileting behaviours women use to empty their bladders are rarely defined in the literature and, when discussed, myriad of different terms are used (Table 1). Analysis of the literature reveals that healthy women's toileting behaviour can be regarded as voiding every 3–4 hours during waking hours (Lukacz *et al.* 2009), emptying urine volume as less than 400 mL (Bendtsen *et al.* 1991) without straining

(Karram *et al.* 1997), and taking a sitting or squatting position to empty the bladder (Rane & Corstiaans 2008).

A case of healthy micturition behaviour

A 55-year-old woman goes shopping with her friend in a large mall. She has not restricted her fluid intake before going shopping. She has already spent 2 hours walking around, but is determined to find a dress to wear for a special occasion. After another 45 minutes, she feels the desire to empty her bladder. She begins to look for a toilet in the mall and reaches it in 5 minutes. She finds that it is an unpleasant environment, with soiled paper towels flowing out the rubbish bins and stained toilet seats in all of the stalls.

She decides to empty her bladder anyway because she knows that a further delay is not good for her bladder health and increases the risk of a urinary leakage accident. She places some toilet paper on the seat and sits on it. She empties her bladder. Even though she wants to leave the restroom as soon as possible, she does not strain to speed emptying her urine; instead, she relaxes her pelvic muscle. After emptying her bladder, she thoroughly washes her hands and continues her shopping.

In this case, the woman reacts correctly to the desire to void. The protective layer of toilet paper on the seat allows her to sit on the toilet rather than hovering over it, and without abdominal straining to micturate even when the toileting environment is unpleasant to her. She demonstrates healthy toileting behaviour.

Antecedents

Toileting behaviour has both biological and behavioural bases. Therefore, antecedents of toileting behaviours that reduce or eliminate the risk of LUTS also include physiological, social and environmental factors.

Normal anatomy, physiology and adequate neuromuscular control are important antecedents to micturition. Voiding is a complex action based on the coordinated work of the brain, autonomic nervous system, bladder, pelvic floor muscles and sphincters. Under normal conditions, women voluntarily expel urine at several intervals as needed during the day. Discoordination or failure of any component involved in micturition, however, can result in urinary incontinence or other LUTS (Chandra 1995). Awareness of bladder fullness is the prerequisite of conscious bladder control (Wyndaele & De Wachter 2008). When the bladder is filled with 260–270 mL of urine, the first desire to void should be perceived (Wyndaele & De Wachter 2002, Boy *et al.* 2007). This desire initiates toilet-seeking behaviour. If a woman cannot discern

the sensation of bladder fullness, desire to void, or discerns bladder fullness too late to access a toilet, then leakage could occur (Wyndaele & De Wachter 2008).

Using physiological principles, toileting behaviour should be motivated by a conscious voiding desire. Personal knowledge and attitude about micturition, however, may influence whether and how a woman responds to a voiding desire. Several studies have shown that, even when a woman has the desire to void, she may temporarily suppress this desire until it is impossible to do so any longer (Bendtsen *et al.* 1991). Nygaard and her colleagues' research revealed that more than 50% of teachers ($n = 791$) made a conscious effort to drink less fluid while at work, specifically to reduce the number of voids. They also did not realize, when questioned by the researchers, the importance of regular toilet visits (Nygaard & Linder 1997).

Social and cultural factors may also play important roles in toileting behaviour, including social norms about the appropriate time and place for voiding. As noted early, women often suppress the desire to void until a socially convenient time and appropriate place is reached (Abrams *et al.* 2002). Even the manner in which women micturate may be affected by culture. For example, those raised in western cultures typically sit on the toilet seat to urinate, but some Muslim women believe that it is wrong to sit on a toilet seat that has been occupied by other people. Therefore, when they use a sitting toilet they might stand on the toilet seat and squat to empty urine (Horan 1997).

Environmental factors also contribute to women's micturition behaviours. Privacy, safety, cleanliness and comfort of public toilets are considered very important to many women. They can develop negative perceptions of the physical environment of toilets and either alter their toileting stance or suppress the desire to void (Lundblad & Hellstrom 2005). Fifty to 85% of women do not sit on the seats when using public toilets, giving hygiene reasons for their actions (Moore *et al.* 1991, Cai & You 1998).

Consequences

The primary positive consequence of toileting behaviour is the maintenance of urinary continence, which can be defined as possessing and exercising the ability to store urine and to micturate at a time and place under voluntary control (Palmer 1996). Continent women not only achieve physical relief by expelling urine at the proper time and place (Fowler 2006), but also maintain self-esteem and social acceptability without worrying about the embarrassment of wetting and soiling accidents (Mitteneß & Barker 1995). Maintaining voluntary bladder control, which means being dry (Jansson

What is already known about this topic

- Women's toileting behaviour related to urinary elimination may contribute to bladder health problems.
- Behavioural treatments are effective for reducing lower urinary tract symptoms.
- An explicit definition of toileting behaviour is needed to clarify understanding of women's behaviour related to urinary elimination.

What this paper adds

- Inductive data analysis resulted in a new theoretical framework about women's toileting behaviour related to urinary elimination.
- The specific attributes of women's toileting behaviour include voiding place, voiding time, voiding position and voiding style.
- Healthy toileting behaviour can be regarded as voiding every 3–4 hours during waking time, an emptying urine volume less than 400 ml without straining, and taking a sitting or squatting position.

Implications for practice and/or policy

- Nurses should understand the factors involved in women's toileting behaviour, which includes behaviours related to voiding place, voiding time, voiding position and voiding style.
- The theoretical definition of the concept can be a basis for nurses to develop an instrument to assess of women's toileting behaviour better.
- Theory can guide the development of interventions designed to change women's toileting behaviour to maintain or improve their bladder health.

et al. 2005), is an expectation of 'socially normal' people (Mittiness & Barker 1995). This definition is similar to that of independent continence, defined as 'unconditionally continent' (Fonda & Abrams 2006).

The inability to perform one or more behaviours to be continent may lead to altered urinary elimination. Bladder over-distension may result from infrequent voiding and can cause bladder dysfunction by decreasing blood flow to bladder tissue (Saito & Miyagawa 2001). Some women may experience urinary retention because of an inability to initiate voiding when using public toilets. Thus, they may become homebound or limit their social activities because

they think that the only 'safe' toilet is in their homes (Soifer *et al.* 2001).

Discussion

Behaviours related to toileting to achieve urinary elimination or micturition are not well-defined. This concept analysis was challenging because of the lack of clearly articulated definitions and theoretical frameworks for, and consensus on the meaning of, toileting or micturition behaviours, despite the large volume of literature addressing micturition and incontinence in women. Other limitations that must be acknowledged are that only English language papers were included, and most research evidence for antecedents and consequences arose from survey or descriptive studies. Most studies used in this analysis included adult female participants, but few included women 65 years of age and over. Thus, more research that directly addresses toileting behaviours across the female lifespan is needed.

Although limitations existed, the concept analysis was rigorously conducted using Johnson's behavioural system model as its conceptual framework. Based on the literature reviewed, key components of women's toileting behaviours related to urinary elimination were extracted. These components include the concept's attributes, antecedents, and consequences. Analysis of the literature reveals the following theme: women's toileting behaviour is an integrative biological, behavioural and social reactive process related to a conscious desire to empty the bladder. Actions taken by women for actual emptying comprise toileting behaviours. Therefore women's toileting behaviour related to urinary elimination can be defined as voluntary actions related to the physiological event of emptying the bladder, comprised of specific attributes including voiding place, voiding time, voiding position and voiding style. These behaviours are influenced by the physical and social environments.

Conclusion

Through this concept analysis, a comprehensive theoretical framework on women's toileting behaviour was developed to help nurses understand better the factors involved in micturition, and to educate women about how to empty their bladders to promote bladder health. This framework may also be useful in developing an instrument to assess women's toileting behaviour systematically. It may also facilitate the development and testing of interventions designed to change women's toileting behaviour to maintain or improve their bladder health.

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Conflict of interest

No conflict of interest has been declared by the authors.

Author contributions

KFW and MHP were responsible for the study conception and design. KFW performed the data collection. KFW and MHP performed the data analysis. KFW was responsible for the drafting of the manuscript. KFW and MHP made critical revisions to the paper for important intellectual content. MHP supervised the study.

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