

Lower urinary tract symptoms of junior female clinical nurses.

Zhen Wei-wei¹, Zhu Gui-hua², Li Er-ding³, Heng Jin-li^{1*}

¹Department of 1st Retired Cadres, Nanjing General Hospital, Nanjing City, PR China

²Department of 2nd Retired Cadres, Nanjing General Hospital, Nanjing City, PR China

³Department of Stomatology, Nanjing General Hospital, Nanjing City, PR China

Abstract

Objective: To investigate lower urinary tract symptoms (LUTS) in junior female clinical nurses.

Methods: Two hundred and twelve nurses with less than 5 years of clinical work experience at Nanjing General Hospital were selected by multi-department sampling methods, and given questionnaires. The relationships between LUTS in the junior female clinical nurses, and factors such as parturition, menstruation and water in-take were analyzed with single factor linear analysis.

Results: Lowery urinary symptoms (LUTS) were correlated with marital status (B=0.08, p=0.0214), menstruation (B=-0.08, p=0.0121), and parturition history (B=0.05, p=0.0895).

Conclusion: These results indicate that LUTS in junior female clinical nurses are related to volume of water-intake, marital status, menstruation, and parturition history.

Keywords: Lower urinary tract symptoms, Junior female clinical nurses, Marital status, Parturition.

Accepted on December 06, 2017

Introduction

Lower urinary tract symptoms (LUTS) are common problems of bladder health. The symptoms are varied, and may appear at the urine storage period, voiding period or after urination [1-3]. These clinical symptoms negatively affect the mind and body, and also impose heavy burden on the family and society [4-6]. Studies on the epidemiology of LUTS in North America and Europe showed a higher prevalence in females (64.3%) than in males [7]. An investigation carried out on 1135 female nurses in three top hospitals in Beijing revealed an LUTS prevalence of 89.3% [8]. This is much higher than prevalence values usually associated with the female group [9,10]. Junior female clinical nurses are nurses who have less than 5 years of working experience as clinical nurses [11]. Nurses in this category are usually young, and they are often subjected to heavy workload and heavy work pressure [12]. They are more likely to have LUTS than nurses in other groups [13]. Reports published in China and elsewhere on LUTS are comprehensive. However, these reports have very little linkage with age of the subjects. The present study was carried out to analyze LUTS in junior nurses and factors that influence them.

Subjects and Methods

Study subjects

A total of 212 female nurses who had worked in Nanjing general hospital for about one year or more than one year (but less than 5 years) were selected from January, 2017 to March,

2017. These included nurses from the out-patients clinic, and nurses from internal medicine, surgery, pediatrics, gynecology and ICU departments. Nurses who met the requirements for experience were administered the study questionnaire. The inclusive and exclusive criteria were set according to Wan et al. [14]. Inclusive criteria were (1) nurses who had RN license of People's Republic of China, (2) nurses aged over 18 years, and (3) nurses who supported and understood this study, and who were willing to participate in it. The exclusion criteria were (1) nurses with advanced training from other hospitals, (2) nurses who had urinary system infection in the previous one month, and (3) nurses who were in gestation period.

Investigation tools

General data: The general information included age, marital status, volume of water-intake, data on menstruation, history of parturition and constipation.

ICIQ-FLUTS: ICIQ-FLUTS (Chinese edition) was used to evaluate the LUTS of the female nurses, and factors that influence the degree of LUTS in urine storage period, incontinence symptoms and various symptoms of quality of life of the nurses (4 dimensions totaling 12 items). Likert 5-grade scoring method was used, in which 0 means never; little means less than 1/3 of the time, sometimes means 1/2 to 1/3 of the time; often means more than 2/3 of the time, and always means all the time. The higher the score, the more sever the LUTS.

Investigation methods

Investigators were given unified training and unified instruction before the study. The subjects consented to confidentiality prior to administration of the questionnaire. After filling them out, the questionnaires were put in sealed envelopes to protect confidential information from the participants. If any questions arose in the process of filling out the questionnaire, the investigators gave routine responses to guarantee completeness and validity. Total number of granting was 212. Withdraw number was 212. The withdrawal rate was 100%.

Statistical analysis

SPSS 17.0 software was used to do statistical analysis. Statistical methods included descriptive statistical analysis, t-test, and analysis of variance (ANOVA). Statistical significance was assumed at $p < 0.05$.

Results

Lower urinary tract symptoms in storage period and factors that influence them

Results from logistic analysis revealed correlations between urinating at night and drinking water ($B=0.45$, $p=0.0195$); urinating at night and menstruation ($B=-0.53$, $p=0.0063$); bladder pain and volume of drinking water ($B=-0.42$, $p=0.0268$), bladder pain and menstruation ($B=-0.42$, $p=0.0268$); daily urination frequency and volume of drinking water ($B=-0.93$, $p<0.0001$), and between daily urination frequency and menstruation ($B=-0.93$, $p<0.0001$). These results are shown on Tables 1 and 2.

Table 1. Correlations between various items and features of LUTS in urine storage period.

Variable	Parameter	SE	χ^2	p	OR	95% CI
F1						
Drinking water	0.45	0.19	5.45	0.0196*	1.568	1.075, 2.288
F2						
Menstruation	-0.53	0.19	7.36	0.0063*	0.591	0.406, 0.862
F3						
Drinking water	-0.42	0.19	4.9	0.0268	0.66	0.457, 0.953
Menstruation	-0.42	0.2	4.64	0.0312	0.655	0.445, 0.962
F4						
Drinking water	0.93	0.21	19.71	<0.0001	2.543	1.684, 3.840
Menstruation	0.76	0.27	8.12	0.0044	2.142	1.268, 3.617

Note: F1: I urinate at the night usually; F2: I rush to the toilet to urinate; F3: I have pains in my bladder; F4: daily urination frequency)

Table 2. Correlations between LUTS in urine storage period and various factors.

Variable	Parameter	SE	χ^2	p	OR	95% CI
Title	-0.04	0.31	0.02	0.8881	0.957	0.516, 1.772
Marital status	0.14	0.09	2.36	0.1246	1.147	0.963, 1.366
Drinking water	0.07	0.07	0.82	0.3664	1.070	0.924, 1.238
Menstruation	-0.05	0.08	0.41	0.5213	0.949	0.807, 1.115
Parturition history	0.11	0.11	1.05	0.3066	1.114	0.906, 1.369
Constipation history	0.11	0.08	1.85	0.1741	1.115	0.953, 1.305

Note: F1-F4 represent symptoms in storage period (nocturia, urine urgency, frequent urination, and painful urination).

Table 3. Correlations between various items of LUTS in storage period and factors that influence them.

V1	Parameter	SE	χ^2	p	OR	95% CI
Marital status	0.37	0.18	3.99	0.0459	1.442	1.007, 2.066
Menstruation	-0.78	0.18	17.85	<0.0001	0.459	0.320, 0.659
V3						
Menstruation	-0.40	0.18	5.00	0.0254	0.671	0.473, 0.952

Note: V1: hesitancy in urination; V2: I need strength to urinate; V3: When I urinate, the flow stops and then continues again)

Table 4. Correlations between LUTS in urination period and their influencing factors.

Variable	Parameter	SE	χ^2	p	OR	95% CI
Title	-0.05	0.28	0.04	0.8476	0.947	0.546, 1.644
Marital status	0.11	0.08	1.84	0.1750	1.115	0.953, 1.304
Drinking water	-0.05	0.07	0.64	0.4223	0.947	0.829, 1.082
Menstruation	-0.29	0.08	13.38	0.0003	0.751	0.644, 0.876
Parturition history	0.21	0.09	5.25	0.0220	1.237	1.031, 1.483
Constipation history	0.13	0.07	3.45	0.0632	1.144	0.993, 1.318

NOTE: V1-V3: symptoms in urination period i.e. urinary hesitancy, arduous micturition, interrupted micturition)

LUTS in urination period and factors that influence them

Results from logistic analysis showed correlations between delayed urination and marital status ($B=0.37$, $p=0.0459$). Menstruation was correlated with hesitant urination ($B=-0.78$, $p<0.0001$), and unsteady flow of urine ($B=-0.40$, $p=0.0254$). In addition, hesitancy in urination, straining during urination and discontinuous urine flow were correlated with menstruation

(B=-0.29, p=0.0003), and with parturition history (B=0.21, p=0.0220). These results presented in Tables 3 and 4.

Table 5. Correlations between LUTS in urinary incontinence period and factors that influence them.

Variable	Parameter	SE	χ^2	p	OR	95% CI
I1						
Marital status	0.46	0.22	4.35	0.0369	1.590	1.029, 2.458
Parturition history	0.79	0.26	9.40	0.0022	2.203	1.330, 3.651
I3						
Marital status	0.55	0.21	7.10	0.0077	1.735	1.157, 2.602
Parturition history	0.72	0.23	9.91	0.0016	2.049	1.311, 3.203
I4						
Parturition history	0.72	0.36	4.06	0.0440	2.047	1.019, 4.109

NOTE: I1: I leak urine before reaching the toilet; I2: My leakage urine number; I3: I leak urine when I strain, cough or sneeze; I4: I leak urine even without the urge to pee; I5: I leak urine when asleep

Table 6. Correlations between LUTS in urinary incontinence period and factors that influence them.

Variable	Parameter	SE	χ^2	p	OR	95% CI
Title	-0.13	0.20	0.39	0.5325	0.882	0.595, 1.308
Marital status	0.16	0.07	5.15	0.0232	1.177	1.022, 1.355
Drinking water	-0.13	0.07	3.28	0.0701	0.882	0.770, 1.010
Menstruation	-0.09	0.07	1.66	0.1979	0.916	0.801, 1.047
Parturition history	0.25	0.08	9.97	0.0016	1.289	1.101, 1.508
Constipation history	0.05	0.07	0.49	0.4845	1.048	0.919, 1.196

NOTE: I1-I5: urinary incontinence symptoms

LUTS in urinary incontinence period and influencing factors

Logistic analysis established correlations between urine leakage before reaching the toilet, and marital status (B=0.46, p=0.0369). Urine leakage was also correlated with parturition history (B=0.79, p=0.0022), while urine leakage due to sneezing, coughing or straining was correlated with marital status (B=0.55, p=0.0077), and parturition history (B=0.72, p=0.0016). Urine leakage without the urge to urinate correlated with parturition history (B=0.72, p=0.0440). Marital status was correlated with all the types urine leakages seen (B=0.72, p=0.0440), and with parturition history (B=0.25, p=0.0016). These results are presented in Tables 5 and 6.

Factors that influence LUTS in urinary incontinence period

There were correlations between LUTS and marital status (B=0.08, p=0.0214), menstruation (B=-0.08, p=0.0121), and parturition (B=0.05, p=0.0895) (Table 7).

Table 7. Factors that influence LUTS during urinary incontinence.

Variable	Parameter	SE	χ^2	p	OR	95% CI
Marital status	0.08	0.04	5.29	0.0214	1.084	1.012, 1.162
Drinking water	-0.03	0.03	0.71	0.3996	0.975	0.919, 1.034
Menstruation	-0.08	0.03	6.30	0.0121	0.920	0.862, 0.982
Parturition history	0.12	0.04	8.90	0.0028	1.128	1.042, 1.221
Constipation history	0.05	0.03	2.88	0.0895	1.056	0.992, 1.124

Discussion

In this study, results of correlation analysis in the urine storage period showed obvious correlation between volume of drinking water and LUTS. It is recommended that normal adults take 1500 ml/kg daily [15]. The normal frequency of urination is once in about three hours, and once at night [16]. In a study of nurses in Taibei, it was found that many nurses hardly have time to drink water, and drink only when extremely thirsty [17]. Indeed, only 6% of the nurses in that study drink over 2000 mL of water daily. Adequate water intake dilutes the urine, balances urine pH, and prevents urinary tract infection and lowers incidence of bladder cancer [18]. Thus, low frequency of urination and insufficient liquid intake are important factors that influence LUTS [19].

In the urine storage period, there were correlations between menstruation and rushing to the toilet to urinate, bladder pain, frequency of urination and disruption in urine flow. Estrogen levels are decreased in patients with menstruation disorders, and estrogen receptors are reduced in bladder tissue, causing obstruction in bladder outlet [20-22]. Denervation super-sensitivity due to changes in detrusor compromises the function of the detrusor, thus inducing LUTS [23,24]. A study by Lugo Salcedo [25] found that menstruation is positively correlated with LUTS. This is also in agreement with the findings of Zheng [26].

There were correlations between parturition history and various types of urine leakage. These results are consistent with the finding that absence of parturition history, and delivery through cesarean section are protective factors against urinary incontinence [27-29]. Changes in hormone levels cause prolonged pregnancy, and affect body collagen, thereby damaging the mechanism involved in controlling urine [30]. In addition, vaginal delivery may bring about injury to the ligament suspension in the pelvic floor or injury to the connective tissue of fascia, leading to urinary incontinence, and difficulties in micturition [31,32]. On the other hand, cesarean section causes less injury to the pelvic floor, and indeed protects the muscles in the pelvic floor [33]. Studies have

shown that the incidence of urinary incontinence after delivery ranges from 9% to 30% [34]. In an investigation on 272 females from pregnancy to two years after delivery, it was found that about 10% of the females had constant urinary stress incontinence within two years after delivery [35]. Urinary incontinence has become a social public problem that cannot be neglected. It exerts severe negative effects on the body and health of the affected females [36].

In this study, marital status was also correlated with various forms of urinary incontinence. In a study of 3000 people in America, England and Sweden, it was found that 5.2% of married females aged over 40 years had LUTS, 14.9% had symptoms in urination and storage periods at the same time, while 26.3% had symptoms in storage, urination and urinary incontinence periods [37]. In China, LUTS are heterogeneous in nature. In Beijing area, incidence of LUTS was 83.1% in 5,664 married women over 20 years age who were selected and investigated from 18 districts and counties [38]. In addition, Fuzhou has reported 24.5% LUTS in urine storage period [39]. Thus, the incidence of LUTS is higher in married women. The LUTS involve storage period, urination period and urinary incontinence period. They constitute common health problems in females. These symptoms do not only lower life quality, they also increase medical costs [40]. Junior female clinical nurses are relatively young in age, and their understanding of LUTS is inadequate [41].

Limitations

This study has some limitations. In the first place, the subjects were junior clinical nurses from only three top hospitals in Nanjing of China. This restriction may cause skewedness in the results. Secondly, this is only a cross-sectional study. In addition, the study relied solely on typical clinical symptom questionnaire to diagnose LUTS. There is need for the use ultrasound diagnosis and urodynamics monitor in diagnosis of LUTS.

Conclusion

This study was aimed at investigating LUTS in junior female clinical nurses. It was found that LUTS widely exist in these nurses, and that the main factors that influence them are drinking water volume, menstruation and marital status. The importance of this study is that the findings are helpful for improving LUTS in junior clinical nurses, and for maintenance of good bladder health.

References

- Abrams P, Cardozo L, Fall M. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. *Am J Obstet Gynecol* 2002; 187: 116-126.
- Haylen B, de Ridder D, Freeman R. An International Urogynecological Association (IUGA) /International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn* 2010; 29: 4-20.
- Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, Van Kerrebroeck P, Victor A, Wein A. Standardisation Sub-Committee of the International Continence Society. The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. *Urology* 2003; 61: 37-49.
- Lukacz ES, Sampsel C, Gray M, Macdiarmid S, Rosenberg M, Ellsworth P, Palmer MH. A healthy bladder: a consensus statement. *Int J Clin Pract* 2011; 65: 1026-1036.
- Switbank L, Donovan J, du Heume J. Urinary symptoms and incontinence in women: relationships between occurrence, age, and perceived impact. *Br J Gen Pract* 1999; 49: 897-900.
- Chen GD, Hu SW, Chen YC, Lin TL, Lin LY. Prevalence and correlations of anal incontinence and constipation in Taiwanese women. *Neurourol Urodyn* 2003; 22: 664-669.
- Irwin D, Milsom I, Hunskaar S. Population-based survey of urinary incontinence, overactive bladder, and other lower urinary tract symptoms in five countries: results of the EPIC study. *Eur Urol* 2006; 50: 1306-1314.
- Zhang C, Hai T, Yu L. Association between occupational stress and risk of overactive bladder and other lower urinary tract symptoms: a cross-sectional study of female nurses in China. *Neurourol Urodyn* 2013; 32: 254-260.
- Liao Y, Yang C, Kao C. Prevalence and impact on quality of life of lower urinary tract symptoms among a sample of employed women in Taipei: a questionnaire survey. *Int J Nurs Study* 2009; 46: 633-644.
- Chang EM, Hancock KM, Johnson A, Daly J, Jackson D. Role stress in nurses: review of related factors and strategies for moving forward. *Nurs Health Sci* 2005; 7: 57-65.
- [No authors listed]. A multi-state assessment of employer-sponsored quality improvement education for early-career registered nurses. *J Contin Educ Nurs* 2013; 44: 20-21.
- Comrie RW. An analysis of undergraduate and graduate student nurses' moral sensitivity. *Nurs Ethics* 2012; 19: 116-127.
- Sampsel CM, Palmer MH, Boyington AR, O'Dell KK, Wooldridge L. Prevention of urinary incontinence in adults: population-based strategies. *Nurs Res* 2004; 53: S61-67.
- Wan X, Wu C, Xu D. Toileting behaviours and lower urinary tract symptoms among female nurses: A cross-sectional questionnaire survey. *Int J Nurs Stud* 2016; 65: 1-7.
- Wyman J, Burgio K, Newman D. Practical aspects of lifestyle modifications and behavioural interventions in the treatment of overactive bladder and urgency urinary incontinence. *Int J Clin Pract* 2009; 63: 1177-1191.
- Lukacz ES, Whitcomb EL, Lawrence JM, Nager CW, Lubner KM. Urinary frequency in community-dwelling

- women: what is normal? *Am J Obstet Gynecol* 2009; 200: 552.
17. Liao Y, Dougherty M, Biemer P. Factors related to lower urinary tract symptoms among a sample of employed women in Taipei. *Neurourol Urodyn* 2008; 27: 52-59.
 18. Zhu L, Lang J, Liu C, Han S, Huang J, Li X. The epidemiological study of women with urinary incontinence and risk factors for stress urinary incontinence in China. *Menopause* 2009; 16: 831-836.
 19. Nygaard I, Linder M. Thirst at work--an occupational hazard? *Int Urogynecol J Pelvic Floor Dysfunct* 1997; 8: 340-343.
 20. Hvidman L, Foldspang A, Mommsen S. Menstrual cycle, female hormone use and urinary incontinence in premenopausal women. *Int Urogynecol J Pelvic Floor Dysfunct* 2003; 14: 56-61.
 21. Rodriguez LV, Wang B, Shortliffe LM. Structural changes in the bladder walls of pregnant and hormone-treated rats: correlation with bladder dynamics. *BJU Int* 2004; 94: 1366-1372.
 22. Parekh MH, Chichester P, Lobel RW, Aikawa K, Levin RM. Effects of castration on female rabbit bladder physiology and morphology. *Urology* 2004; 64: 1048-1051.
 23. Robinson D, Toozs-Hobson P, Cardozo L. The effect of hormones on the lower urinary tract. *Menopause Int* 2013; 19: 155-162.
 24. Chen B, Wen Y, Zhang Z. Menstrual phase-dependent gene expression differences in periurethral vaginal tissue from women with stress incontinence. *Am J Obstet Gynecol* 2003; 189: 89-97.
 25. Lugo Salcedo F, Sánchez Borrego R. Assessment of female prevalence of overactive bladder (OAB) in Barcelona using a self-administered screening questionnaire: the Cuestionario de Autoevaluación del Control de la Vejiga (CACV). *Int Urogynecol J* 2013; 24: 1559-1566.
 26. Zhang W, Song Y, He X, Xu B, Huang H, He C, Hao L, Li Y. Prevalence and risk factors of lower urinary tract symptoms in Fuzhou Chinese women. *Eur Urol* 2005; 48: 309-313.
 27. Gyhagen M, Bullarbo M, Nielsen TF, Milsom I. Prevalence and risk factors for pelvic organ prolapse 20 years after childbirth: a national cohort study in singleton primiparae after vaginal or caesarean delivery. *BJOG* 2013; 120: 152-160.
 28. Persson J, Wolner-Hanssen P, Rydhstroem H. Obstetric risk factors for stress urinary incontinence: a population-based study. *Obstet Gynecol* 2000; 96: 440-445.
 29. Hirsch AG, Minassian VA, Dille A, Sartorius J, Stewart WF. Parity is not associated with urgency with or without urinary incontinence. *Int Urogynecol J* 2010; 21: 1095-1102.
 30. Wang Y, Xu K, Hu H, Zhang X, Wang X, Na Y, Kang X. Prevalence, risk factors, and impact on health related quality of life of overactive bladder in China. *Neurourol Urodyn* 2011; 30: 1448-1455.
 31. Petros P, Ulmsten U. An integral theory and its method for the diagnosis and management of female urinary incontinence. *Scand J Urol Nephrol Suppl* 1993; 153: 1-93.
 32. Farrell SA, Allen VM, Baskett TF. Parturition and urinary incontinence in primiparas. *Obstet Gynecol* 2001; 97: 350-356.
 33. Chaliha C, Digesu A, Hutchings A. Caesarean section is protective against stress urinary incontinence: an analysis of women with multiple deliveries. *BJOG* 2004; 111: 754-755.
 34. Huebner M, Antolic A, Tunn R. The impact of pregnancy and vaginal delivery on urinary incontinence. *Int J Gynaecol Obstet* 2010; 110: 249-251.
 35. Arrue M, Diez-Itza I, Ibañez L. Factors involved in the persistence of stress urinary incontinence from pregnancy to 2 years post partum. *Int J Gynaecol Obstet* 2011; 115: 256-259.
 36. Kwak Y, Kwon H, Kim Y. Health-related quality of life and mental health in older women with urinary incontinence. *Aging Ment Health* 2016; 20: 719-726.
 37. Coyne K, Sexton C, Thompson C. The prevalence of lower urinary tract symptoms (LUTS) in the USA, the UK and Sweden: results from the Epidemiology of LUTS (EpiLUTS) study. *BJU Int* 2009; 104: 352-360.
 38. Cox J, Stetz J, Pajak T. Toxicity criteria of the Radiation Therapy Oncology Group (RTOG) and the European Organization for Research and Treatment of Cancer (EORTC). *Int J Radiat Oncol Biol Phys* 1995; 31: 1341-1346.
 39. Ioka A, Tsukuma H, Ajiki W, Oshima A. Influence of age on cervical cancer survival in Japan. *Jpn J Clin Oncol* 2005; 35: 464-469.
 40. Irwin D, Kopp Z, Agatep B. Worldwide prevalence estimates of lower urinary tract symptoms, overactive bladder, urinary incontinence and bladder outlet obstruction. *BJU Int* 2011; 108: 1132-1138.
 41. Xu D, Chen L, Wan X. Toileting behaviour and related health beliefs among Chinese female nurses. *Int J Clin Pract* 2016; 70: 416-423.

***Correspondence to**

Heng Jin-li
Department of 1st Retired Cadres
Nanjing General Hospital
PR China