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The construct validity of brief continence self-assessment awareness questionnaires

Abstract

The aim of this study was to develop brief versions of the continence self-assessment awareness questionnaire (CSAAQ), sensitive to gender-specific experiences of incontinence, and to evaluate their construct validity. Recruitment took place at four Victorian healthcare settings during 2001 and 2002. A total of 431 participants completed the CSAAQ following an appointment or hospital discharge. Factor analyses performed on CSAAQ items demonstrated there were three factors (urinary incontinence symptoms, faecal incontinence symptoms, lifestyle adjustment behaviours) for both women and men. The urinary and faecal items that loaded on their respective factors were different for women and men. Consequently two versions of the CSAAQ were developed; one for males and one for females. Analyses supported the construct validity and internal consistency reliability of the gender specific questionnaires. The brief gender specific CSAAQs could be produced as a single questionnaire with separate sections for female and male specific items. The brief CSAAQs are suitable for use as an incontinence self-assessment questionnaire to increase awareness of individual incontinence issues and to encourage health-seeking behaviours.

Key words: Urinary incontinence, faecal incontinence, self-assessment, health promotion

Introduction

Incontinence is a widespread problem, with Australian prevalence data indicating that it is experienced by 40% of females and 14% of males¹. In Australia, around 8% of men and women who live in the community, report faecal incontinence symptoms and these issues are not confined to the elderly¹. The majority of women with urinary incontinence do not seek help for the condition^{2,3} and generally both women and men with faecal incontinence

do not discuss their conditions with healthcare professionals⁴. Several factors influence the decision of an individual to seek help for incontinence and they include symptom severity, age, inability to cope alone, duration of incontinence, impact of incontinence on quality of life, and concerns about the condition worsening^{2,3}. Many people believe that their incontinence will ease or disappear with time, and some women believe these symptoms are normal⁵. Early identification of incontinence and implementing interventions may prevent the condition from deteriorating and compromising quality of life.

Limited knowledge of the type of symptoms that deserve attention may be the underlying reason why many people do not seek early help for their incontinence². Providing health information has been shown to increase awareness and empower individuals to incorporate into their lives behaviours that prevent the exacerbation of symptoms, the occurrence of adverse health events, and the severity of disabilities⁶.

Significant economic costs are associated with incontinence. Expenditure by adults living in the community, to treat or manage urinary incontinence, was \$AUD710 million in Australia in 1998⁷ and \$US19.5 billion in the US in 2000⁸. Implementing preventive strategies may help to reduce the costs of treating incontinence. Self-administered continence assessment tools that help individuals recognise their incontinence issues and prompt them to seek medical assistance may increase health-seeking behaviours of individuals. In addition, if such tools are brief they may be more readily used than if they appear to be time consuming.

Background

A search of the literature revealed that there were several incontinence assessment instruments that healthcare professionals can use^{5,9,10} and one, the CSAAQ⁶ that individuals

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in the general population can use themselves. The CSAAQ encompasses both urinary and faecal incontinence and assesses the effect of incontinence on lifestyle. The CSAAQ⁶ is a validated questionnaire and the current study sought to refine this instrument.

Study Aim

The aim of this study was to develop brief versions of the original CSAAQ⁶ sensitive to gender specific experiences of incontinence and to evaluate their construct validity. Specifically, the construct validity and internal consistency reliability of each questionnaire were assessed. This paper reports the development of two brief versions of the CSAAQ that are gender sensitive.

Method

Participants

The participants included a broad cross-section of patients from medical, surgical, and rehabilitation settings (N = 431). The participants were recruited from four regional and rural healthcare settings across west and south-west Victoria, Australia. The characteristics of the participants are shown in Table 1.

Table 1: Description of the participants' characteristics

Characteristic	Females	Males
Participants (n)	251	180
Ages (years)		
Mean	60	61
SD	18	16
Types of treatment		
Medical (n)	45	54
Surgical (n)	119	78
Rehabilitation (n)	87	48

Procedures

This study commenced following approval from the ethics committees of our university and the four healthcare settings where the study was conducted. During a six-month period, a research assistant approached patients at each of the four healthcare settings and invited them to participate in the study. The research was explained to them and they were given a plain language statement to read and a consent form to sign. Patients who agreed to participate were given a *continence discharge educational package* containing an educational brochure about continence issues (*'A Guide to Developing Healthy Bladder & Bowel Habits'*), the original CSAAQ and a pre-paid envelope. The original CSAAQ contained twenty-one questions non-gender specific and two additional female specific questions. Participants were asked to read the information, complete the questionnaire at home within a few days of either being discharged from the hospital or attending their outpatient appointment, and return the questionnaire in the pre-paid envelope provided. Participants who did not return the questionnaire within a two-week period were contacted via telephone.

Measures

The original CSAAQ has 23 items, from which two gender-specific scales were formed: the CSAAQ-F (for females) and the CSAAQ-M (for males). The study participants were asked to complete twenty-one of the items and females who had given birth responded to an additional two items. The original twenty-three item CSAAQ was composed of four subscales: urinary incontinence symptoms (seven items), faecal incontinence symptoms (five items), lifestyle adjustment behaviours (six items), and other incontinence risk factors (three non-gender specific items incorporating questions related to surgery, weight, and medication and a further two birth-related questions for females). In the development of the gender specific questionnaires we did not include the three items from the *'other incontinence risk factors'* subscale that related to surgery, weight and medication. We focused on symptoms of incontinence, rather than risk factors that may or may not contribute to the condition developing. The instructions on the questionnaire were to answer 'Yes' or 'No' for each item that applied to the participant in the previous six to twelve months and a third choice response 'Don't Know' was added to one item (*'Are you overweight for your height?'*) to accommodate participants who could not give a definitive answer.

Analysis

To examine the construct validity of female and male brief versions of the CSAAQ, we performed exploratory factor analyses on the female and male data from the CSAAQ. This type of analysis was chosen to examine the latent structures of the female and male versions of the CSAAQ. The latent structures of these versions, and the items that loaded on each factor, may have differed from those of the original CSAAQ because we examined the questionnaire using separate female and male datasets. Although it is preferable to conduct factor analysis with interval or ratio data, this type of analysis can be used with dichotomous variables¹¹. Rummel¹² suggests that factor analysis may be appropriate when the dichotomous options represent the presence or absence of a quality. The CSAAQ was consistent with this suggestion, with each item representing the presence or absence of an incontinence symptom or behaviour. Exploratory factor analyses (maximum likelihood) with promax rotations (k = 4) were performed on the items 'urinary in the incontinence symptoms', 'faecal incontinence symptoms', and 'lifestyle adjustment behaviours' subscales. Promax rotations were used in preference to varimax rotations because the oblique (promax) method is better able to reveal whether a simple structure (ie the situation where an item has a large loading on one factor and small loadings on the other factors) than the orthogonal (varimax) method¹³. To determine the appropriateness of the correlational matrices for factor analysis, Bartlett's test of sphericity¹⁴ and the Kaiser-Meyer-Olkin (KMO)^{15,16} measure of sampling adequacy were used. The number of factors to extract was determined *a priori*. We hypothesised that three factors would be present in the data, because we were examining three subscales from the CSAAQ. Following the recommendation of Tabachnick and Fidell¹⁷, a minimum loading of ± 0.32 was required for an item to be included in a factor.

Results

Females CSAAQ-F

The correlational matrix was appropriate for factor analysis, with a KMO of 0.83 and a statistically significant Bartlett's test of sphericity¹⁴. Three factors that explained 43.05% of the variance (unrotated) were extracted from the data (see Table 2). The first, second and third factors contained items from the 'urinary incontinence symptoms', 'faecal incontinence symptoms' and 'lifestyle adjustment behaviours' subscales of the original CSAAQ, respectively. Six items were deleted from the questionnaire, five because they did not load sufficiently on the factors. These five items were:

1. Is your flow of urine slow or does it stop and start?
2. Do you have trouble starting to pass urine when you go to the toilet?
3. Have you experienced pain, burning or discomfort when passing urine?
4. Have you experienced a difficult or prolonged labour when giving birth to your children?
5. Have you given birth to more than three children?

The sixth item, '*Do you ever drink less fluid or avoid eating food at certain times of the day to avoid either accidental passing of urine or loss of bowel control?*', was deleted because it cross-loaded on two factors. For the items retained in the newly developed questionnaires, the alpha coefficients of each of the factors are shown in Table 2, and the correlations between the three factors are shown in Table 3.

Males CSAAQ-M

The correlational matrix was appropriate for factor analysis, with a KMO of 0.76 and a statistically significant Bartlett's test of sphericity¹⁴. Three factors that explained 48.45% of the variance (unrotated) were extracted from the data (see Table 2). The first, second and third factors contained items from the 'urinary incontinence symptoms', 'faecal incontinence symptoms' and 'lifestyle adjustment behaviours' subscales of the CSAAQ, respectively. Three items were deleted from the questionnaire because they did not load sufficiently on the factors. These items were:

1. Do you experience accidental leakage of urine while you're sleeping?
2. Have you experienced accidental leakage of faeces from the back passage?
3. Do you ever drink less fluid or avoid eating food at certain times of the day to avoid either accidental passing of urine or loss of bowel control?

For the remaining items, the alpha coefficients for each of the factors are shown in Table 2, and the correlations of the factors are displayed in Table 3.

Discussion

This research resulted in the development of two brief gender specific versions of the CSAAQ that are sensitive to the differences between how incontinence symptoms are experienced by women

and men. The analyses supported the inclusion of three factors (subscales) that form the basis of these questionnaires. The loadings of items on each factor for both the female and male versions of the brief CSAAQ support the construct validity of the gender specific questionnaires. Both female and male factor analyses demonstrated clear solutions that reflected the underlying urinary, faecal and behavioural dimensions of the questionnaires. The solutions found using oblique rotation of factors suggests that these issues are separate, but related. The medium to large correlations between the factors for both the female and male versions of the questionnaire further supports the premise that the incontinence factors are related.

The different loading of items in the gender-specific factor analyses supports the rationale for developing female and male versions of the questionnaire. The groupings of items for each gender reflect the different urinary incontinence symptoms experienced by women and men. The Urinary Incontinence Symptoms item referring to the experience of accidental leakage of urine while sleeping loaded on the female questionnaire, but not on the male version. Conversely, the items pertaining to hesitancy, having an intermittent stream, and having pain, burning, or discomfort while urinating loaded on the CSAAQ-M Urinary Incontinence Symptoms subscale, but not on the corresponding CSAAQ-F subscale. This finding supports the literature highlighting the different manifestations of urinary problems where females experience symptoms related to menopause and childbirth and males experience symptoms related to the prostate gland¹⁸.

The faecal incontinence symptoms item, pertaining to the experience of accidental leakage of faeces, loaded on the CSAAQ-F subscale, but not on the corresponding CSAAQ-M subscale and further illustrates that an inability to control faecal leakage is a core incontinence issue for women. This finding is consistent with the literature that faecal incontinence is associated with pelvic floor musculature and menopause – both female issues¹⁹. However, it is in conflict with Bharucha's²⁰ summary of prevalence studies indicating that the prevalence of faecal incontinence in men is similar to women. Given Bharucha's findings it may be useful to retain the item on faecal incontinence in the CSAAQ-M.

The three items from the lifestyle adjustment behaviours subscale loaded equally on the CSAAQ-F and CSAAQ-M. This result indicates that women and men use similar behaviour strategies to manage their incontinence. This finding is consistent with the results of two studies on the management of incontinence; the findings of one indicated that women reduced activities²¹, and of the other that men were reluctant to go to places where they were unsure of the availability of toilets²².

Although researchers have identified childbirth and difficult delivery as being strongly associated with urinary incontinence^{21,23}, these items did not load on the urinary incontinence symptoms subscale or on the other two subscales on the CSAAQ-F. Explanations may be that there are other predisposing variables than those associated with childbirth. These findings support other research that indicates modest to no associations between parity and urinary incontinence in women older than 45 years²⁴.

Table 2. Factor analyses with promax rotations of the female and male brief CSAAQ incontinence items (factor loadings <.3 are not displayed)

	Female Factors			Male Factors		
	I	II	III	I	II	III
<i>Urinary incontinence symptoms</i>						
When you pass urine, do you continue to dribble after you've finished?	.75			.57		
Do you experience accidental leakage of urine while you're sleeping?	.52					
When you have finished passing urine, do you feel that you have not emptied your bladder?	.48			.48		
Have you experienced ANY accidental leakage of urine (no matter what amount)?	.38			.61		
Is your flow of urine slow or does it stop and start?				.71		
Do you have trouble starting to pass urine when you go to the toilet?				.62		
Have you experienced pain, burning or discomfort when passing urine?				.45		
<i>Faecal incontinence symptoms</i>						
Have you experienced pain or discomfort when passing a bowel motion?		.67			.73	
Do you experience difficult and/or infrequent bowel motions?		.67			.76	
When you have finished passing a bowel motion, do you feel that you have not emptied your bowel?		.64			.54	
Have you experienced an inability to control wind from the back passage?		.49			.49	
Have you experienced accidental leakage of faeces from the back passage?		.42				
<i>Lifestyle adjustment behaviours</i>						
Have you avoided going out because of fear of either accidental passing of urine or accidental passing of a bowel motion?			.80			.81
Have you avoided going out because of uncertainty about toilet arrangements?			.74			.87
Have you given up enjoyable activities like walking, dancing or aerobics because of fear of either accidental passing of urine or loss of bowel control?			.69			.56
Eigenvalues	4.73	1.69	1.33	4.56	1.73	1.47
Alpha coefficient	.60	.73	.82	.75	.71	.76

Table 3. Correlation of factors for females and males (all correlations were significant at the 0.003 level)

	Urinary incontinence symptoms	Faecal incontinence symptoms	Lifestyle adjustment behaviours
Females			
Urinary incontinence symptoms	--	.37	.39
Faecal incontinence symptoms		--	.37
Lifestyle adjustment behaviours			--
Males			
Urinary incontinence symptoms	--	.41	.35
Faecal incontinence symptoms		--	.39
Lifestyle adjustment behaviours			--

Apart from the urinary incontinence symptoms subscale on the CSAAQ-F version, all subscales had adequate internal consistency reliability.

The brief CSAAQ-F and CSAAQ-M have 10 items that are common to both questionnaires as well as two additional female-specific items and three additional male-specific items. Given the extent to which the female and male versions of the questionnaire are similar, it may be pragmatic to consider using a single questionnaire that includes both non-gender specific and gender-specific items. The use of a single questionnaire would be a more cost-effective method of raising awareness of this health issue rather than distributing separate gender specific questionnaires.

The language used in the questionnaires may need to be modified for use outside Australia. Terms such as 'bowel motion' and 'back passage' that are widely understood by Australians may need to be changed to suit other English speaking countries.

Although the items in the original CSAAQ were derived from a thorough review of the literature and expert opinions, a possible limitation is that some items in the CSAAQ-F and CSAAQ-M may not have been identified and not included in the questionnaire. Because the original CSAAQ was designed for general population use, it may be necessary to consider adding gender-specific items that could enhance the content validity of the CSAAQ-F and CSAAQ-M. Further research to enhance other components of the validity and reliability of the questionnaire and to assess the predictive validity of the questionnaires needs to be conducted. It may be useful to further establish the stability of the questionnaires (eg test-retest reliability).

In addition, participants who completed the questionnaire are advised to seek medical attention (eg from a general practitioner or continence nurse) if they respond to any of the items in the affirmative. The effectiveness of this advice and whether completing the questionnaire prompts individuals to change their behaviour and seek incontinence assistance requires further research.

Incontinence has been identified as a major public health issue that requires proactive strategies to increase public awareness, health seeking behaviours, and better management of incontinence. The gender specific brief CSAAQ provides a useful self-assessment tool that can be incorporated into continence health promotion programs.

References

- Hawthorne G. Measuring incontinence in Australia. Melbourne: The University of Melbourne, 2006.
- Hannestad YS, Rortveit G, Hunskaar S. Help-seeking and associated factors in female urinary incontinence. The Norwegian EPINCONT Study. *Scand J Prim Health Care* 2002; 20(2):102-107.
- Kinchen KS, Burgio K, Diokno AC, Fultz NH, Bump R, Obenchain R. Factors associated with women's decisions to seek treatment for urinary incontinence. *J Womens Health* 2003; 12(7):687-698.
- Kalantar JS, Howell S, Talley NJ. Prevalence of faecal incontinence and associated risk factors: an underdiagnosed problem in the Australian community? *Med J Aust* 2002; 176(2):54-57.
- Avery K, Donovan J, Peters TJ, Shaw C, Gotoh M, Abrams P. ICIQ: a brief and robust measure for evaluating the symptoms and impact of urinary incontinence. *Neurourol Urodynam* 2004; 23(4):322-330.
- O'Connell B, Day K, Wellman D, Baker L. Development, implementation, and evaluation of a continence education package in acute and subacute care settings. *J Wound Ostomy Continence Nurs* 2005; 32(2):101-111.
- Doran CM, Chiarelli P, Cockburn J. Economic costs of urinary incontinence in community-dwelling Australian women. *Med J Aust* 2001; 174(9):456-458.
- Hu T-W, Wagner TH, Bentkover JD, Leblanc K, Zhou SZ, Hunt T. Costs of urinary incontinence and overactive bladder in the United States: a comparative study. *Urology* 2004; 63(3):461-465.
- Jorge JMN, Wexner SD. Etiology and management of fecal incontinence. *Dis Colon Rectum* 1993; 36(1):77-97.
- Sandvik H, Hunskaar S, Seim A, Hermstad R, Vanvik A, Bratt H. Validation of a severity index in female urinary incontinence and its implementation in an epidemiological survey. *J Epidemiol Community Health* 1993; 47(6):497-499.
- Ferguson E, Cox T. Exploratory factor analysis: a users' guide. *International Journal of Selection and Assessment* 1993; 1:84-94.
- Rummel RJ. Applied factor analysis. Evanston, IL: Northwestern University Press, 1970.
- Finch H. Comparison of the performance of varimax and promax rotations: factor structure recovery for dichotomous items. *Journal of Educational Measurement* 2006; 43(1):39-52.
- Bartlett MS. A note on the multiplying factors for various x2 approximations. 1954; 16(2):296-298.
- Kaiser HF. An index of factorial simplicity. *Psychometrika* 1974; 39(1):31-36.
- Kaiser HF. A second generation little jiffy. *Psychometrika* 1970; 35(4):401-415.
- Tabachnick BG, Fidell LS. Using multivariate statistics (5th ed). Boston: Pearson, 2007.
- Hunskaar S, Burgio K, Clark A, Lapitan MC, Nelson R, Sillén U et al. Epidemiology of urinary (UI) and faecal (FI) incontinence and pelvic organ prolapse (POP). In: Abrams P, Cardozo L, Khoury S & Wein A, (Eds). *Incontinence*. Paris: Health, 2005:255-312.
- Bliss DZ, Norton CA, Miller J, Krissovic M. Directions for future nursing research on fecal incontinence. *Nurs Res* 2004; 53(6S):S15-21.
- Bharucha AE. Fecal Incontinence. *Fecal Incontinence* 2003; 124:1672-1685.
- O'Connell B, Hanna B, Bailey S, Walsh H, Prosser A. The nature and severity of urinary incontinence in post-natal women. *Contemp Nurse* 2002; 13(2/3):158-168.
- O'Connell B, Munro I, Baker L. The nature and impact of incontinence in men who have undergone prostate surgery and implications for nursing practice. *Contemp Nurse* 2007; 24(1):280.
- Chaliha C, Kalia V, Stanton SL, Monga A, Sultan AH. Antenatal prediction of postpartum urinary and fecal incontinence. *Obstet Gynecol* 1999; 94(5 Pt 1):689-694.
- Chiarelli P, Brown W, McElduff P. Leaking urine: prevalence and associated factors in Australian women. *Neurourol Urodynam* 1999; 18:567.