ORIGINAL ARTICLE

Quality of life in women with urinary incontinence is impaired and comparable to women with chronic diseases

Rachel YK Cheung 張優嘉
Symphorosa SC Chan 陳丞智
Alice KW Yiu 姚嘉樺
Loreta LL Lee 李麗萊
Tony KH Chung 鍾國衡

Objectives To evaluate the quality of life in women with urinary incontinence (categorised by urodynamic findings).

Design Prospective cohort study on patients.

Setting Urogynaecology unit of a university teaching hospital in Hong Kong.

Patients Female patients presenting to our clinic from July 2008 to December 2009 and having their urinary incontinence categorised by urodynamic study.

Main outcome measures Patient's quality of life was assessed using the Medical Outcomes Study Short Form, Urogenital Distress Inventory Short Form, and Incontinence Impact Questionnaire Short Form. Their quality of life was compared according to their urodynamic category and a subgroup analysis was performed on patients having continence surgery for urodynamic stress incontinence.

Results Among the 223 women studied, 46% had urodynamic stress incontinence, 18% had detrusor overactivity, 2% had both urodynamic stress incontinence and detrusor overactivity, and 34% had no urodynamic abnormality. In all, the Medical Outcomes Study Short Form scoring was lower than normal local population. The Medical Outcomes Study Short Form score in detrusor overactivity group was significantly lower than urodynamic stress incontinence group in vitality and mental health domains. Detrusor overactivity group also had higher scores in Incontinence Impact Questionnaire Short Form in travel, social and emotional health subscales and total score (46.3 vs 29.1; P<0.01). Women with urodynamic stress incontinence and required continence surgery had higher scores in Incontinence Impact Questionnaire Short Form.

Conclusion Women with urinary incontinence had impaired quality of life and it was comparable to other chronic medical diseases. Women with detrusor overactivity have more impaired quality of life than women with urodynamic stress incontinence. Severity of urodynamic stress incontinence did not correlate with quality of life. Women who opted for continence surgery had poorer quality of life.

Key words
Quality of life; Questionnaires; Urinary incontinence; Urination

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Department of Obstetrics and Gynaecology, The Chinese University of Hong Kong, Prince of Wales Hospital, Shatin, Hong Kong
RYK Cheung, FHKCOG, FHKAM (Obstetrics and Gynaecology)
SSC Chan, FHKCOG, FHKAM (Obstetrics and Gynaecology)
AKW Yiu, FHKCOG, FHKAM (Obstetrics and Gynaecology)
LLL Lee, BSc
TKH Chung, FRCOG ad eundem, MD

Correspondence to: Dr RYK Cheung
Email: rachelcheung@cuhk.edu.hk

New knowledge added by this study

- Women with urinary incontinence (UI) have an inferior quality of life (QoL), which is comparable to patients with chronic diseases (heart failure, interstitial lung diseases, and gynaecological cancers).
- Women with urodynamic stress incontinence who opted for continence surgery had a poorer QoL, as reflected by Urogenital Distress Inventory Short Form and Incontinence Impact Questionnaire Short Form scores, but these were not associated with their symptom severity (as demonstrated by urodynamic study).

Implications for clinical practice or policy

- The impact of UI in QoL of women should not be overlooked.
- Women with UI may decide for continence surgery due to more impaired QoL but not the severity of symptoms.

Introduction

Urinary incontinence (UI) is a common and incapacitating problem in women, and has a reported prevalence of 34%.[1] Although UI does not cause death directly, a significant impact on quality of life (QoL) has been demonstrated, which is comparable to severe chronic diseases such as stroke, arthritis, and chronic respiratory ailments.[2]

Exploring the impact of urinary symptoms on QoL is important for clinical practice. The Medical Outcomes Study Short Form (SF-36) is a generic type of health-related quality of life questionnaire which assesses eight dimensions of an individual's QoL, in which a higher score means a better QoL.[3] It has been used to study QoL in normal populations together with patients suffering illnesses and estimate the relative burden of different diseases.[4] The Urogenital Distress Inventory Short Form (UDI-6) and the Incontinence Impact Questionnaire Short Form (IIQ-7) are validated condition-specific questionnaires and are frequently administrated to women with UI.[5,6] The UDI-6 evaluates the life impact of urinary symptoms: irritative symptom, stress symptom, and obstructive/discomfort symptom subscales. The IIQ-7 assesses the impact of UI on daily life: physical activity, travel, social activity, and emotional health. Both the UDI-6 and IIQ-7 have been validated in our population (Appendix).[7]

Extensive studies have been performed in assessing the impact of UI on QoL in women, mostly based on their urinary symptoms (stress incontinence, urge incontinence, or mixed symptoms).[8,9] Although there is a greater impact on QoL in women with mixed or urge incontinence than stress incontinence, all these were symptom-based assessments. Clinical history is often flawed when it comes to establishing an objective urodynamic diagnosis.[10,11] Moreover, as the urodynamic diagnosis is what determines treatment,[12-15] information on QoL in women with different urodynamic diagnoses is important.

Therefore, the objective of our study was to evaluate the QoL of UI women with different urodynamic diagnoses, using UDI-6, IIQ-7, and SF-36. Furthermore, we also set out to study the impact of QoL on women's decisions to undergo surgical treatment.

Methods

All women at their first presentation to the urogynaecology clinic of the institute with UI from July 2008 to December 2009 were invited to join the study. Exclusion criteria included: younger than 18 years, mental incapacity that would preclude completion of questionnaires, and failure to complete the questionnaire. Ethics approval for the study was granted by the local institution (Reference No. CRE-2009.080) and written informed consent was obtained from each patient by a research assistant.

The patients were asked to fill in the self-administered questionnaires (SF-36, UDI-6, and IIQ-7) before the consultation. Urinary symptoms including stress incontinence, urgency, urge incontinence, and other voiding problems were then assessed by trained gynaecologists who were blinded to the questionnaire scores. Demographic information, as well as medical, surgical, and obstetrical history were obtained, following which a physical examination was carried out. A midstream urine was obtained for culture to rule out a urinary tract infection.

All women underwent a standard urodynamic investigation, which consisted of uroflowmetry and filling and voiding cystometry, using a MAQUET RADIUS (MAQUET GmbH & Co. KG, Germany) multichannel urodynamic machine. The urodynamic procedure and diagnoses were in accordance with standards published by International Continence Society. Urodynamic stress incontinence (USI) refers to the involuntary leakage of urine during filling cystometry that is associated with increased intra-

尿失禁女性患者的生活質素受損，情況與長期病患者相似

目的 評估尿失禁女性患者的生活質素，並利用尿動力學檢查結果進行分組研究。

設計 以患者為對象的前瞻性隊列研究。

安排 香港一所大學教學醫院的泌尿婦科部門。

患者 2008年7月至2009年12月期間到上述部門就診，並接受尿動力學檢查的尿失禁女性患者。

主要結果測量 利用健康狀況調查問卷簡表（SF-36）、泌尿生殖影響困擾問卷簡表和尿失禁影響問卷簡表（IIQ-7）評估患者的生活質素。根據其尿動力學類別比較她們的生活質素，並為接受失禁手術的壓力性尿失禁患者進行分組分析。

結果 223名患者中，46%有壓力性尿失禁、18%有逼尿肌過度活動、2%兩者皆有，另34%尿動力檢查結果並無異常。患者的SF-36得分比正常人低；在精力及精神健康方面，逼尿肌過度活動組別的得分都比壓力性尿失禁組別顯著的低。至於在IIQ-7中，逼尿肌過度活動組別在旅遊、社交、情緒健康幾方面及總分數都得分較高（46.3比29.1；P<0.01）。需接受失禁手術的壓力性尿失禁患者，在IIQ-7中有較高得分。

結論 尿失禁女性患者的生活質素受損，情況與長期病患者相似。與壓力性尿失禁患者比較，逼尿肌過度活動患者有較差的生活質素。壓力性尿失禁的嚴重性與生活質素並無相關。接受失禁手術的患者有較差的生活質素。

abdominal pressure, in the absence of a detrusor contraction. Detrusor overactivity (DO) is defined as the occurrence of variable duration of involuntary detrusor contractions >15 cm H_2O during filling cystometry, which may be either spontaneous or provoked. Symptoms of urgency or urgency incontinence may or may not occur.[16] Severity of USI was classified into three grades according to urine leakage induced by the cough stress test: none, slight (ie following a series of coughs), and marked (ie with a single cough).

All women with UI were taught pelvic floor exercise by experienced continence advisors and were advised to perform them for 6 months. Surgical treatment would be offered to those with USI and who had no subjective satisfactory improvement of symptoms after pelvic floor exercises. Attending physicians who carried out the follow-up assessment were blinded to the UDI-6 and IIQ-7 scores.

Statistical analysis

Categorical variables were compared using Chi squared or Fisher's exact tests, and the Mann-Whitney *U* test was used to compare continuous variables. Analysis of variance with post-hoc tests (multiple comparisons of Tukey test) was used to investigate the mean difference of scores according to different urodynamic diagnoses. The effect of urodynamic diagnoses and other characteristics including age, body mass index (BMI), parity and number of vaginal births on UDI-6 and IIQ-7 scores were analysed using multiple regression with an analysis of covariance model. The statistical analyses were performed using the Statistical Package for the Social Sciences (Windows version 7.5/9.0; SPSS Inc, Chicago [IL], US). A P value of less than 0.05 was considered statistically significant.

Results

During the relevant period, 270 women consulted our clinic for UI and a total of 223 women completed the study; 10 were excluded because of mental incapacity, 24 did not complete the questionnaires, and 13 declined to join the study. None had UI due to urinary tract infection. All those who completed the questionnaires underwent urodynamic study. Among them, 103 (46%) had USI, 40 (18%) had DO, 4 (2%) had both USI and DO, and 76 (34%) had normal urodynamic findings. The demographic and clinical characteristics of the women are shown in Table 1. There were no significant differences in age or parity among women with USI, DO, or USI+DO. Nor were there any significant differences between them with respect to their number of vaginal births, number of instrumental deliveries, BMI, smoking habits, menopausal status, or history of diabetes mellitus. However, these results were limited by the small sample size in each diagnostic group.

The scores of all domains of the SF-36 are listed in Table 2. Compared to the DO group, there were significantly higher scores for vitality and mental health in women with USI and for mental health only among women with normal urodynamic findings. The DO group tended to score lower than the USI group for all other domains, but the differences did not attain statistical significance.

The mean UDI-6 scores were 40.8 for the group with normal finding, 40.9 for USI patients, 51.3 for DO patients, and 44.8 for USI+DO group. There was no significant difference in mean scores between the USI and normal finding groups, but the corresponding difference was significant when comparing the DO and normal finding groups (P=0.04) as well as the USI and DO groups (P=0.03). Irritation and obstruction/discomfort subscale scores of UDI-6 in DO women

TABLE 1. Demographic data of women with different urodynamic diagnoses*

Variable	No. (%) of patients or mean ± standard deviation			
	Normal finding (n=76)	USI (n=103)	DO (n=40)	USI+DO (n=4)
Age (years)	48.9 ± 10.8	52.1 ± 8.0	48.1 ± 9.6	56.5 ± 12.5
Parity	1.9 ± 1.3	2.4 ± 1.2	1.9 ± 1.0	3.3 ± 2.2
No. of vaginal deliveries	2.0 ± 1.2	2.3 ± 1.2	2.0 ± 1.0	3.0 ± 2.6
No. of instrumental deliveries	0.1 ± 0.4	0.2 ± 0.4	0.2 ± 0.4	0
Weight of biggest infant (kg)	3.1 ± 0.7	3.3 ± 0.7	3.3 ± 0.6	3.2 ± 0.1
Body mass index (kg/m^2)	23.8 ± 3.6	25.4 ± 5.7	24.4 ± 4.7	25.8 ± 5.7
Smoking	1 (1.3%)	3 (2.9%)	1 (2.5%)	0
Diabetes mellitus	7 (9.2%)	15 (14.6%)	2 (5.0%)	0
Post-menopause	31 (40.8%)	46 (44.7%)	13 (32.5%)	3 (75.0%)

* USI denotes urodynamic stress incontinence, DO detrusor overactivity, and USI+DO urodynamic stress incontinence and detrusor overactivity

TABLE 2. The Medical Outcomes Study Short Form (SF-36) scores of women according to urodynamic diagnoses*

SF-36 domain	Mean ± standard deviation				
	Normal finding (n=76)	USI (n=103)	DO (n=40)	USI+DO (n=4)	Overall (n=223)
Physical functioning	77.0 ± 21.5	73.1 ± 18.1	69.3 ± 20.2	67.5 ± 20.6	73.6 ± 19.9
Role: physical functioning	53.6 ± 40.8	50.0 ± 39.4	43.1 ± 44.2	43.7 ± 37.5	50.0 ± 40.7
Bodily pain	64.6 ± 27.2	62.4 ± 20.6	54.6 ± 25.3	60.3 ± 23.6	62.1 ± 24.0
General health	44.5 ± 22.3	43.4 ± 19.8	35.1 ± 19.5	30.0 ± 23.5	42.2 ± 21.0
Vitality	47.8 ± 18.1	49.9 ± 16.6‡	39.6 ± 19.0‡	40.0 ± 7.1	47.3 ± 17.8
Social functioning	52.6 ± 16.7	51.5 ± 17.7	45.9 ± 20.8	43.8 ± 16.1	50.8 ± 18.0
Role: emotional functioning	53.9 ± 43.5	55.4 ± 43.0	45.0 ± 43.1	66.7 ± 47.1	53.5 ± 43.3
Mental health	60.8 ± 18.2†	62.3 ± 17.9‡	49.6 ± 17.5†‡	53.0 ± 24.1	59.6 ± 18.5

* USI denotes urodynamic stress incontinence, DO detrusor overactivity, and USI+DO urodynamic stress incontinence and detrusor overactivity
† P<0.05 vs normal urodynamic finding
‡ P<0.05 vs USI

TABLE 3. The Urogenital Distress Inventory Short Form (UDI-6) and Incontinence Impact Questionnaire Short Form (IIQ-7) scores of women according to urodynamic diagnoses*

UDI-6 / IIQ-7 domain	Mean ± standard deviation				
	Normal finding (n=76)	USI (n=103)	DO (n=40)	USI+DO (n=4)	Overall (n=223)
UDI-6 total score	40.8 ± 22.3†	40.9 ± 18.5‡	51.3 ± 19.1†‡	44.8 ± 19.7	42.8 ± 20.3
Irritation	48.5 ± 32.6†	45.9 ± 30.5‡	67.8 ± 26.1†‡	68.8 ± 29.8	51.2 ± 31.4
Stress	49.3 ± 26.8	58.5 ± 27.2	50.6 ± 30.6	56.3 ± 33.1	53.9 ± 28.0
Obstruction/discomfort	24.8 ± 26.5	18.1 ± 21.9‡	35.3 ± 26.4‡	9.8 ± 18.8	23.4 ± 25.1
IIQ-7 total score	33.1 ± 25.5†	29.1 ± 22.3‡	46.3 ± 27.4†‡	50.5 ± 31.3	34.0 ± 25.3
Physical activity	34.0 ± 28.5	32.8 ± 27.2	41.3 ± 28.5	41.7 ± 28.9	34.9 ± 27.9
Travel	33.8 ± 30.1	26.9 ± 27.3‡	47.9 ± 31.8‡	45.8 ± 45.9	33.4 ± 30.5
Social/relationships	34.2 ± 32.6†	27.4 ± 28.4‡	51.7 ± 36.2†‡	66.7 ± 47.1	34.8 ± 33.0
Emotional health	30.3 ± 24.2†	28.5 ± 25.9‡	44.2 ± 30.1†‡	47.9 ± 41.0	32.3 ± 26.9

* USI denotes urodynamic stress incontinence, DO detrusor overactivity, and USI+DO urodynamic stress incontinence and detrusor overactivity
† P<0.05 vs normal urodynamic finding
‡ P<0.05 vs USI

were higher than that in the USI group (67.8 vs 45.9, P=0.01; 35.3 vs 18.1, P<0.01, respectively). Stress subscale scores were higher in the USI group than in the normal finding group (58.5 vs 49.3, P=0.13; Table 3).

The mean IIQ-7 scores were 33.1, 29.1, 46.3, and 50.5 in the normal finding, USI, DO, and USI+DO groups, respectively, and significantly higher in the DO group than in the USI and normal finding groups. Moreover, for three out of four of our subscales, the mean scores in the DO group were significantly higher than that in the USI group, namely for the travel (47.9 vs 26.9, P=0.01), social (51.7 vs 27.4, P<0.01) and emotional (44.2 vs 28.5, P<0.01) subscales (Table 3).

Multiple regression was used to study the effect of age, BMI, parity, number of vaginal births, and urodynamic diagnosis on the UDI-6 and IIQ-7 scores. No significant effect was demonstrable for any of these factors except for differences in the urodynamic diagnosis. For the total score of UDI-6, the adjusted mean score was highest in the DO group (49.9), followed by the USI+DO group (47.2), the USI group (41.2) and the normal finding group (39.3), which yielded a P value of 0.047. For the IIQ-7, the adjusted mean was highest in USI+DO group (53.8), followed by the DO group (44.2), normal finding group (35.7) and USI group (28.4), which yielded a P value of 0.01.

Among the 103 women with a diagnosis of USI, 26 were mild and in 77 severe, based on the severity of urine leakage. There were no significant differences in the mean IIQ-7 total and subscale scores.

All USI women had been taught pelvic floor exercises and were reviewed after 6 months. At the time of this report, 26 (25%) had had continence

TABLE 4. The Medical Outcomes Study Short Form (SF-36), Urogenital Distress Inventory Short Form (UDI-6), and Incontinence Impact Questionnaire Short Form (IIQ-7) scores of urodynamic stress incontinence women having or not having continence surgery

Domain	Mean ± standard deviation		P value
	No continence surgery group (n=77)	Continence surgery group (n=26)	
SF-36 domains			
Physical functioning	76.4 ± 16.1	63.2 ± 20.4	0.01
Role: physical functioning	52.3 ± 39.7	43.3 ± 38.4	0.31
Bodily pain	61.9 ± 21.1	63.7 ± 19.6	0.69
General health	43.3 ± 20.2	43.6 ± 18.8	0.96
Vitality	50.3 ± 17.7	48.7 ± 13.3	0.61
Social functioning	51.8 ± 17.5	50.5 ± 18.5	0.75
Role: emotional functioning	55.1 ± 43.3	56.4 ± 43.0	0.90
Mental health	62.5 ± 18.2	61.8 ± 17.1	0.87
UDI-6 total score	39.2 ± 19.7	45.7 ± 17.9	0.79
Irritative subscale	43.8 ± 30.6	52.0 ± 29.9	0.69
Stress subscale	58.0 ± 25.5	60.1 ± 32.2	0.11
Obstructive/discomfort subscale	15.7 ± 21.4	25.0 ± 22.4	0.81
IIQ-7 total score	26.4 ± 19.7	37.3 ± 27.6	0.01
Physical subscale	30.2 ± 24.3	40.7 ± 33.7	0.02
Travel subscale	24.7 ± 25.3	33.3 ± 32.0	0.03
Social subscale	25.3 ± 26.8	33.3 ± 32.7	0.36
Emotional subscale	25.3 ± 23.8	37.5 ± 29.7	0.04

surgery performed and the other 77 women were satisfied with their status and had declined surgery. Among those opting for surgery, 16 had endured severe USI. There was no significant difference in the demographics between those who had surgery and those who did not. The mean score in the physical functioning domain of the SF-36 was significantly lower in the women who opted for continence surgery. The total score of IIQ-7 together with the physical, travel, and emotional subscale scores were all higher in the surgery group (Table 4).

Discussion

Urinary incontinence has a major impact on the QoL of women. Many studies have reported that the impact was higher in women with urge incontinence than with stress incontinence.[8,9] However, most assessments were based on the urinary symptoms. Urodynamic investigation is usually the most important determinant of management. It is therefore not only interesting to evaluate the impact of UI on QoL of women according to the urodynamic diagnoses, but also as a guide to clinicians as a means of offering treatment and the monitoring of outcomes in women with different diagnoses.

The SF-36 is a widely used generic QoL assessment instrument. A high level of measurement equivalence of the scales between populations has been demonstrated, thus allowing cross-cultural comparison and data pooling.[17] When compared with the normative values of SF-36 scores obtained from women within the same age-group,[18] lower scores were seen in all domains with UI, especially in the DO group. The scores in role-physical and social function domains were substantially decreased, by 36% and 45%, respectively in UI women (role-physical: 78.1 vs 50.0, social function: 91.4 vs 50.8). This implied that women with UI had more impairment in many aspects, including general health, as well as physical, social and emotional functioning. There was a debilitating impact on daily activities. In general, all domains in the SF-36 of the DO group were poorer than the USI or normal finding groups, though only vitality and mental health domains showed statistical significance. In the vitality domain, they reported being worn out, less energetic, and more tired than those in USI and normal finding groups, while they also reported much nervous and being downhearted in the mental health domains of the SF-36.

Using the SF-36, many researchers have reported the QoL of women suffering from other medical diseases.[19-22] Women with UI of the same age had lower scores in all domains except physical functioning than patients with heart failure (managed in out-patient clinics) or interstitial lung disease.[19,20]

The general health, vitality, and social function were also poorer than those who had primary unilateral total hip arthroplasty[21] (general health: 66.0 vs 42.2; vitality: 67.3 vs 47.3; social function: 67.9 vs 50.8). Surprisingly, the general health and social function domains of UI women were also lower than those with gynaecological cancers[22] (general health: 42.9 vs 42.2; social function: 54.2 vs 50.8). This indicated that the impairment in QoL in women with UI was at least comparable to women with other chronic diseases.

The condition-specific questionnaires UDI-6 and IIQ-7 were also adopted in this study to supplement the generic characteristic of SF-36 to study women with UI. Overall, the DO group scored higher than the USI group or normal group both in the UDI-6 and IIQ-7. The finding in the IIQ-7 demonstrated the higher impairment in QoL of DO women than in USI women; the travel, social, and emotional domains were also higher. This is consistent with the previous study[23] and reflected DO women being frustrated with their urinary problem.

The IIQ-7 score in the USI group was not significantly different from the normal group. Although the severity of incontinence was milder in the latter, their QoL was not significantly better. This was also reflected by subgroup analysis results. The severity of symptoms graded in the urodynamic study in USI women did not correlate with their QoL impairment, which demonstrated the diverse perception of QoL impairment by individual women.

For USI women, the QoL impairment correlated significantly with their short-term treatment but not the severity of the urine leak during urodynamic assessment. Surgical treatment was offered to women who had no subjective improvement after pelvic floor exercise. Women who had continence surgery were found to have more impaired QoL. Understandably, the severity of symptoms was not the major determinant of surgery but greater impact on QoL may well be more relevant. This also implies that QoL considerations are important when deciding on management.

Our study was limited by selection bias of the women referred to our specialist clinic, which represented those who were motivated to seek treatment for their symptoms. The conclusion of poorer QoL in DO than in USI group may only apply to those who actively seek help.

Conclusion

Women with UI had impaired QoL. The impairment was comparable to that of women suffering from other chronic medical diseases; DO was associated with significantly greater impact in QoL than USI. Severity of USI did not correlate with the degree of impairment of QoL. Women who opted for continence surgery had poorer QoL.

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Appendix. Urogenital Distress Inventory Short Form (UDI-6) and the Incontinence Impact Questionnaire Short Form (IIQ-7)

日期：

UDI-6 小便困苦清單

你有沒有經歷過以下的症狀？如果有，這些症狀有多困擾你？

		完全沒有	輕微	中度	嚴重
1.	經常去小便	□0	□1	□2	□3
2.	由急迫感覺引致的失禁	□0	□1	□2	□3
3.	由活動、咳嗽或打噴嚏引致的失禁	□0	□1	□2	□3
4.	小量的小便失禁（例如數滴）	□0	□1	□2	□3
5.	有困難去排清小便	□0	□1	□2	□3
6.	小腹或生殖器官部位的疼痛或不適	□0	□1	□2	□3

IIQ-7 小便失禁影響問卷

你的小便失禁有否影響你的：

		完全沒有	輕微	中度	嚴重
1.	做家務的能力（例如：煮飯、清潔家居或洗衣等）	□0	□1	□2	□3
2.	體育康樂（例如：步行、游泳或做運動等）	□0	□1	□2	□3
3.	娛樂活動（例如：睇戲、聽演唱會等）	□0	□1	□2	□3
4.	搭車或駕駛車輛外出半小時以上的能力	□0	□1	□2	□3
5.	外出參與社交活動	□0	□1	□2	□3
6.	心理健康（如神經緊張、抑鬱或憤怒）	□0	□1	□2	□3
7.	沮喪感覺	□0	□1	□2	□3