Psychometric properties of a Chinese version of the Level of Expressed Emotion scale and expressed emotion of family members perceived by patients with severe mental illness

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KEY MESSAGES

1. The psychometric properties of the Chinese version of the Level of Expressed Emotion scale revealed a high level of reliability and validity in a large convenience sample of Chinese outpatients with severe mental illness in Hong Kong.
2. The level of expressed emotion (EE) of family members perceived by patients with severe mental illness was moderate, and that perceived by patients with unipolar disorder was highest, particularly for intrusiveness/hostility and emotional involvement.
3. The level of EE of family members perceived by patients with severe mental illness differed significantly across countries, indicating possible cultural influence.

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Introduction

Expressed emotion (EE) refers to the amount of (1) criticism, (2) hostility, (3) positive remarks, (4) warmth, and (5) emotional over-involvement expressed in family relationships, particularly among relatives of a psychiatric patient.[1] Of the five components, criticism, hostility, and emotional over-involvement are most predictive of patient's relapse and course of illness (particularly in patients with schizophrenia or mood disorders), and are associated with patient's symptoms, compliance with medication, family burden, and functioning.[2]

The traditional measurement tools including Camberwell Family Interview (CFI) and Five-Minute Speech Samples rate the attitudes and feelings expressed towards a patient by a main caregiver. Nonetheless, their application is limited by the lengthy training and administration required, the complex scoring system, and the availability of a key relative.[1] Patients should be the focus of assessment when trying to understand their perception of the relationship with and attitudes of their family.[2] For example, comments and emotions expressed by family members may be perceived by the patient as signs of love and care or coercive attempts to restore his/her desirable social behaviour.[2]

A self-report, 60-item Level of Expressed Emotion (LEE) scale[3] is the only valid instrument that addresses the EE perceived by patients about their own behaviour.[1,2] The scale has satisfactory correlation with the CFI and high accuracy when asking patients about their perception of EE with careful consideration given to the influence of psychotic symptoms. As the components of EE and their relative intensities are most likely to vary across cultures, the EE of family members perceived by patients with mental illness has not been adequately considered from a cultural perspective, particularly so in Chinese populations that have strong values of interdependence, collective action, and obligation of family care.[3,4]

The LEE scale has been translated into Chinese and reduced from 60 to 52 items. Its content and construct validity and internal consistency have been found satisfactory in a convenience sample of Hong Kong Chinese patients with schizophrenia.[4] The present study further examined the psychometric properties of the Chinese version of the LEE scale and the level of EE of family members perceived by Chinese patients with severe mental illness (SMI) in Hong Kong.

Methods

This study was conducted from November 2011 to October 2012. It aimed to validate a Chinese version of the LEE scale. In phase 1, semantic equivalence of the original English and translated Chinese version and test-retest reliability of the Chinese version

were examined. In phase 2, patients with SMI (schizophrenia, psychotic disorders, unipolar and bipolar disorders, and personality disorders) and one of their family caregivers were asked to complete a set of questionnaires twice over a 6-month period to examine the internal consistency, reproducibility, responsiveness, and construct validity of the Chinese version. These data were also used to examine the level of EE of family members perceived by patients with different subtypes of SMI.

Subjects were recruited from one regional psychiatric outpatient clinic serving about 5000 outpatients in Kowloon West Hospital Cluster of Hospital Authority. In phase 1, two convenience samples of 40 patients with SMI were asked to complete both Chinese and English versions of the LEE scale to test the semantic equivalence of the two versions and assess the test-retest reliability over a 2-week interval. In phase 2, a convenience sample of about 350 Chinese outpatients with SMI (at least five subjects per item for factor analyses) and one of their main family caregivers were invited to participate. This sample size allowed a ±0.05 sampling error with 95% confidence interval, with a power of 0.80 and a potential non-response rate of 20%.

Inclusion criteria were: (1) patients aged ≥18 years and living with one or more family members over the last 3 months, (2) primarily diagnosed by a psychiatrist with one type of SMI, according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, and (3) able to understand Chinese/Mandarin and complete the questionnaire. Patients were excluded when they had co-morbidity of any other mental or chronic physical illness, were mentally unstable, or had been discharged from a psychiatric unit within the last month. The main family caregiver referred to a family member (aged ≥18 years and living with patient and without mental illness or cognitive impairment) who was responsible for most of the patient's daily care and considered by the patient as his/her key carer.

Instruments and data collection

In phase 2, six research instruments were used, including the Chinese version of LEE scale, Family Assessment Device (FAD), Family Burden Interview Schedule (FBIS), Beck's Depression Inventory-II (BDI-II), Beck's Anxiety Inventory (BAI), and eight items of the Brief Psychiatric Rating Scale (BPRS) for positive symptoms. All scales demonstrated satisfactory internal consistency and construct validity.[1,4]

Each patient completed the self-report questionnaire (the Chinese version of LEE scale and demographic data sheet) and returned it in a sealed envelope. When attending a psychiatric consultation, the psychiatrist used the BPRS, BDI-II, and BAI to assess the patient's psychiatric symptoms. The caregivers were interviewed by a research assistant by telephone using FBIS and FAD. Both parties completed the same questionnaires twice over 6 months.

Data analysis

The item equivalence between the Chinese and English version of the LEE scale was evaluated using weighted kappa, and their total scale/subscale equivalences were assessed by intraclass correlation coefficient using one-way ANOVA test. Pearson's product-moment correlation test was used to evaluate the test-retest reliability of the Chinese version after a 2-week interval, and its internal consistency was tested using Cronbach's alpha coefficient.

Only patients who reported no major changes in either the symptom severity or family functioning after 6 months were used to assess the reproducibility of the Chinese version, and intraclass correlation was calculated using random effects one-way ANOVA. Responsiveness of the LEE scale to change in symptom severity was evaluated by: (1) observed change for two measurements (mean difference [test 1 minus test 2]) and (2) effect sizes (observed change divided by standard deviation of baseline score), examining whether the change in LEE mean scores followed the expected change patterns in severity of symptoms, depression, and/or anxiety scores.

Construct validity was established by: (1) testing the correlation between the Chinese version and other measures with relevant theoretical constructs (FAD and FBIS) using Pearson's correlation test; and (2) using exploratory and confirmatory factor analyses to generate and conclude the factor solution as explained by the scale items using LISREL 9.1. The level of EE perceived by patients was compared between subgroups of SMI to determine their perceived family attitude and emotional environment.

Results

Phase 1

Two convenience samples of 40 patients with SMI were recruited: one group for equivalence testing and another for assessing test-retest reliability. Refusal rates were 13% and 15%, respectively, mainly due to time constraints and unwillingness to expose their mental condition.

The overall scale and 52 items of the Chinese version of the LEE scale indicated substantial agreement and thus good semantic equivalence with the original English version. 47 items had a kappa >0.85 (range, 0.86-0.95) and the remaining five (items 20, 27, 37, 48, and 50) had a kappa value between 0.76 and 0.82. Intraclass correlation coefficient between the two versions was 0.90 (P=0.01) for the

TABLE 1. Characteristics of patients with severe mental illness and family caregivers who did or did not respond*

Characteristics	Respondents (n=262)	Non-respondents (n=59)	χ^2 or *t* value
Patients			
Gender			2.08
Female	102 (38.9)	22 (37.3)	
Male	160 (61.1)	37 (62.7)	
Age (years)	29.12±10.05 (19-45)	29.45±8.91 (20-46)	1.12
Education level			2.19
Primary or below	30 (11.5)	6 (10.2)	
Secondary	181 (69.1)	42 (71.2)	
Tertiary	51 (19.5)	11 (18.6)	
Duration of mental illness (months)	35.21±14.25 (12-98)	32.90±17.02 (14-96)	1.98
Primary psychiatric diagnosis			1.58
Bipolar affective disorders	12 (4.6)	3 (5.1)	
Psychotic disorders	50 (19.1)	13 (22.0)	
Schizophrenia	118 (45.0)	26 (44.1)	
Unipolar affective disorders (eg major depression)	48 (18.3)	10 (16.9)	
Others (eg personality disorders and dual diagnoses)	34 (13.0)	7 (11.9)	
Re-hospitalisation in the past 3 months			
No. of re-admissions	0.40±0.29	0.49±0.31	3.38†
Length of re-hospitalisation (days)	8.12±4.11	10.01±6.38	2.16
No. of family members living with patient	2.25±0.98 (1-5)	2.13±0.98 (1-4)	1.31
Contact with main caregiver (hours/week)	30.40±9.54 (8-44)	29.13±11.49 (7-30)	1.04
Psychiatric medication			1.58
Anti-depressants	50 (19.1)	11 (18.6)	
Anti-convulsants	7 (2.7)	2 (3.4)	
Atypical anti-psychotics	90 (34.4)	19 (32.2)	
Conventional anti-psychotics	83 (31.7)	19 (32.2)	
Lithium salts	6 (2.3)	1 (1.7)	
Both anti-depressants & anti-psychotics	20 (7.6)	4 (6.8)	
Psychiatric treatments			1.48
CPN visits & education	178 (67.9)	30 (50.8)	
Family therapy/education	32 (12.2)	8 (13.6)	
Medication compliance management	102 (38.9)	16 (27.1)	
Psycho-education	98 (37.4)	28 (47.5)	
Social & work skills training	87 (33.2)	19 (32.2)	
Others (eg, relaxation & self-regulation)	75 (28.6)	20 (33.9)	
Family caregivers			
Gender			1.16
Female	158 (60.3)	34 (57.6)	
Male	104 (39.7)	25 (42.4)	
Age (years)	42.58±10.82 (21-67)	43.9±7.12	1.92
Education level			1.83
Primary or below	48 (18.3)	9 (15.3)	
Secondary	182 (69.5)	41 (69.4)	
Tertiary	32 (12.2)	9 (15.3)	
Relationship with patient			1.28
Child	38 (14.5)	8 (13.6)	
Parent	98 (37.4)	22 (37.3)	
Sibling	33 (12.6)	7 (11.8)	
Spouse	63 (24.0)	14 (23.7)	
Others (eg grand-parent and nephew)	30 (12.5)	8 (13.6)	
Household income, monthly (HK$)			1.67
≤5000	8 (3.1)	2 (3.4)	
5001-10 000	43 (16.4)	9 (15.3)	
10 001-20 000	103 (39.3)	23 (39.0)	
20 001-30 000	83 (31.7)	18 (30.5)	
>30 000	25 (9.5)	7 (11.9)	

* Data are presented as No. (%) or mean±SD (range)
† P<0.05

total scale and 0.81-0.92 for the four subscales.[4] Very minor amendments were made to the key wording of a few items. Test-retest reliability coefficient for the Chinese version over the 2-week interval was *r*=0.92 for total scale (P=0.01) and 0.89-0.95 for subscales (P=0.01-0.008), indicating a high stability of responses to the items over 2 weeks.

Phase 2

A total of 262 pairs of patients and family caregivers completed all the questionnaires (response rate, 82.0%). 59 pairs refused to participate mainly due to lack of interest or time; five questionnaires were incomplete and excluded from data analysis. The respondents and non-respondents were comparable in most sociodemographic and clinical characteristics (P>0.30, Chi-square test or independent sample *t* test, Table 1).

Construct validity

All corrected item-total correlations were positive with nearly all 52 items falling within the range of 0.30-0.70. After confirmation of its factorability, the principal components analysis and Catell's scree test indicated that there were four components (intrusiveness/hostility, attitude towards patient, tolerance, and emotional involvement) with an eigen value of >1.0, with 50 of 52 items having factor loadings of ≥0.40. Two items with very low factor loading were deleted from item rotation ("Doesn't ask a lot of personal questions" [0.17] and "Expects the same level of effort from me, even if I don't feel well" [0.19]). After varimax rotation (Table 2), all 50 items had substantial loading (≥0.40) on only one factor, except for "Can cope well with stress" (item 46) that was only counted in emotional involvement by interpreting its meaning and a higher loading. The four-factor solution (intrusiveness/hostility [12 items], attitude towards patient [13 items], tolerance [12 items]; and emotional involvement [13 items]), explained 71.8% of the total variance of EE construct.

For confirmatory factor analysis, three models were tested using LISREL 9.1, including the two-factor model suggested by the original authors, the three-factor structure suggested by Gerlsma and Hale,[1] and the four-factor model in the present study. The summary of the fit indices of the three hypothesised models with both uncorrelated and correlated factors is shown in Table 3. The four-factor model with paths between all factors showed a much better fit based on all fit indices (χ^2/df=1.93, P=0.75; AGFI=0.96; TLI=1.02; RMSEA=0.031; WRMR=0.78) than the other two models tested; and critical ratios for the regression weights were >2.0, indicating each item with a significant contribution at the 0.05 level to its associated factor. A path diagram of the best-fit four-factor model indicated

TABLE 2. Results of varimax rotation of four identified factors for the Chinese Version of the Level of the Expressed Emotion scale

Items	Factor loading ≥0.40			
	Factor 1 (intrusiveness/ hostility)	Factor 2 (attitude towards patient)	Factor 3 (tolerance)	Factor 4 (emotional involvement)
1. Doesn't butt into my conversations (3)	0.49			
2. Isn't overprotective with me (6)	0.47			
3. Doesn't insist on doing things with me (14)	0.48			
4. Doesn't pry into my life (41)	0.47			
5. Supports me when I need it (36)	0.56			
6. Isn't always interfering (10)	0.46			
7. Leaves me feeling overwhelmed (20)	0.49			
8. Often checks up me to see what I'm doing (24)	0.46			
9. Isn't always nosing into my business (28)	0.51			
10. Always has to know everything about me (32)	0.49			
11. Butts into my private matters (37)	0.45			
12. Gets upset when I don't check in with him/her (49)	0.52			
1. Is sympathetic toward me when I'm ill or upset (8)		0.51		
2. Encourages me to seek outside help when I'm not feeling well (12)		0.48		
3. Makes me feel valuable as a person (19)		0.50		
4. Tries to make me feel better when I'm upset or ill (26)		0.50		
5. Is willing to gain more information to understand my condition when I'm not feeling well (39)		0.42		
6. Doesn't blame me when I'm feeling unwell (43)		0.47		
7. Tries to reassure me when I'm not feeling well (51)		0.41		
8. Says I just want attention when I say I'm not well (4)		0.45		
9. Doesn't help me when I'm upset or feeling unwell (15)		0.47		
10. Says I cause my troubles to occur in order to get back at him/her (22)		0.50		
11. Says it is OK to seek professional help (30)		0.45		
12. Accuses me of exaggerating when I say I'm unwell (34)		0.50		
13. Often accuses me of making things up when I'm not feeling well (47)		0.48		
1. Is tolerant with me even when I'm not meeting his/her expectations (2)			0.45	
2. Can see my point of view (9)			0.41	
3. Doesn't feel that I'm causing him/her a lot of trouble (13)			0.43	
4. Understands my limitations (23)			0.46	
5. Blames me for things not going well (18)			0.51	
6. Is realistic about what I can and cannot do (27)			0.49	
7. Is understanding if I make mistakes (40)			0.42	
8. Makes me feel guilty for not meeting his/her expectations (5)			0.41	
9. Puts me down if I don't live up to his/her expectations (16)			0.40	
10. Gets angry with me when things don't go right (31)			0.42	
11. Is impatient with me when I'm not well (42)			0.42	
12. Hears me out (29)			0.43	
1. Calms me down when I'm upsets (1)				0.41
2. Doesn't panic when things start going wrong (11)				0.40
3. Is able to be in control in stressful situations (25)				0.43
4. 'Flies off the handle' when I don't do something well (48)				0.42
5. Makes me feel relaxed when he/she is around (33)				0.41
6. Can cope well with stress (38)			0.40	0.45
7. Loses his/her temper when I'm ill or upset (7)				0.41
8. Doesn't insist on being with me all the time (17)				0.41
9. Doesn't know how to handle my feelings when I'm not feeling well (21)				0.45
10. Gets angry with me for no reason (35)				0.42
11. Expects too much from me (44)				0.43
12. Makes matters worse when things aren't going well (46)				0.41
13. Gets irritated when things don't go right (50)				0.43
% of variance explained	**21.48**	**19.32**	**16.01**	**14.98**

TABLE 3. Summary of fit indices of three hypothesised models of the Level of Expressed Emotion scale (n=262)*

Model	χ^2	df	χ^2/df	P value	GFI	AGFI	TLI	RMSEA (90%CI)	SRMR	WRMR
Four-factor model										
Uncorrelated factors	98.34	50	1.97	0.80	0.97	0.96	1.00	0.040 (0.036-0.044)	0.039	0.85
Correlated factors†	92.58	48	1.93	0.75	0.99	0.98	1.02	0.031 (0.027-0.035)	0.028	0.78
Two-factor model										
Uncorrelated factors	102.33	50	2.05	0.54	0.88	0.87	0.89	0.052 (0.044-0.060)	0.050	0.92
Correlated factors	97.02	48	2.02	0.58	0.89	0.90	0.95	0.050 (0.042-0.058)	0.054	0.89
Three-factor model										
Uncorrelated factors	134.21	50	2.68	0.20	0.86	0.85	0.89	0.071 (0.061-0.081)	0.071	0.99
Correlated factors	125.88	48	2.60	0.25	0.89	0.88	0.91	0.067 (0.055-0.076)	0.060	0.94

* χ^2 denotes Chi-squared goodness-of-fit, df degree of freedom, P value (a good fit if P≥0.1), GFI goodness-of-fit index (range, 0-1, a good fit if GFI ≥0.9), AGFI adjusted good-of-fit index (a good fit if AGFI ≥0.9), TLI Tucker-Lewis index (acceptable, 0.90-0.95; a good fit if TLI >0.95), RMSEA root mean square error of approximation (a good fit if RMSEA ≤0.05), SRMR standardised root mean square residual (a good fit if SRMR <0.05), WRMR weighted root mean residual (a good fit if WRMR <0.90)

† Model fit indices tested with paths (correlations) set up between the hypothesised factors in each model

moderate correlations between four factors (0.49-0.59) and their corresponding items (0.49-0.71).

Internal consistency and concurrent validity

The internal consistency of the Chinese version of the LEE scale was high, with Cronbach's alpha of 0.90 for overall scale and 0.86-0.92 for four subscales. All corrected item-total correlations were positive (0.30-0.70). As expected, the Chinese version and its four factors negatively correlated with the FAD (r= -0.46, P<0.05 to r= -0.54, P<0.01) and its subscales (r= -0.46, P<0.05 to r= -0.68, P<0.001), and positively correlated with the FBIS (r=0.48, P<0.05 to r=0.56, P<0.01). The total and subscales of the Chinese version were also positively inter-correlated (r=0.49 to r=0.65, P<0.01).

Reproducibility and responsiveness to change of the Chinese version

Reproducibility of the Chinese version of the LEE scale between the two measurements (over a 6-month interval) in patients (n=100) who reported no major changes in either symptom severity (stable mental state) or family functioning were very satisfactory (intraclass correlation coefficient=0.90; F=5.33, df=98, P=0.01). For assessing responsiveness to changes in symptom severity, the observed changes in mean LEE score among the patients with a considerable negative change in symptom severity (n=95) ranged from 1.24 to 6.58 for overall score, and from 0.31 to 2.89 for the four subscales. The changes in the mean LEE score correlated with the pattern of changes in the severity of psychotic (r=0.57, P=0.01) or depressive (r=0.52, P=0.03) symptoms. The Chinese version showed moderate effect size (0.54) for detecting an increase in the patients' symptom severity (n=95) in the overall score and small-to-moderate effect size (0.38-0.58) in the four subscales. The Chinese version also showed moderate effect size (0.50) for detecting symptom improvement (n=70) in the overall score and small-to-moderate effect size (0.38-0.58) in the four subscales. Otherwise, the effect size for detecting changes in anxiety symptoms was very small (0.10-0.15) for all types of SMI.

Level of EE of family members perceived by patients with SMI

The mean total score of the Chinese version for patients with SMI in terms of their psychiatric diagnosis were (in descending order): 132.88 (SD, 20.54) for unipolar disorder, 121.47 (SD, 20.33) for psychotic disorders, 119.45 (SD, 23.65) for schizophrenia, and 111.01 (SD, 18.15) for bipolar disorder. The ANOVA test followed by Tukey's HSD comparisons indicated that the level of perceived EE was higher in patients with unipolar disorder than in those with schizophrenia, psychotic disorders, or bipolar disorder (P<0.01), and was higher in those with schizophrenia or psychotic disorders than in those with bipolar disorder (P<0.03 and P<0.01, respectively). For the subscales, the mean scores were higher in patients with unipolar disorder than in those with bipolar disorder (P<0.01); scores in two subscales (intrusiveness/hostility and emotional involvement) were also higher in patients with schizophrenia or psychotic disorders than in those with bipolar disorder (P<0.01).

Discussion

The Chinese version of the LEE scale demonstrated very satisfactory psychometric properties when used as a measurement of the level of EE of family

members perceived by 262 Hong Kong Chinese patients with SMI. The satisfactory weighted kappas and intraclass correlation coefficients indicated that the items in the Chinese version were appropriately translated and retained a comparable meaning to the original English version. The high test-retest reliability, internal consistency, and reproducibility also confirmed that the translated version has a high potential for application.[4,5] The association between family functioning (negative) and caregiving burden (positive) may reveal not only the good concurrent validity between these instruments but also the high impact of patients' perceived EE on family member's health and well-being in caring for a relative with SMI.[1,4] Effective strategies to reduce patients' perceived EE may also help improve family interpersonal relationships as well as family harmony and functioning, and in turn facilitate family caregivers to cope more effectively with problems and difficulties in caring for both the patient and the whole family.

The Chinese version also indicated a very satisfactory responsiveness to changes in symptom severity (depressive and psychotic symptoms) of all people with SMI, with moderate effect size for detecting both symptom deterioration and improvement over 6 months. The LEE scale may be useful to detect early relapse in schizophrenia and other SMIs, as supported by previous research in which both family- and patient-perceived EE were predictors of relapse of SMI.[6] The LEE scale also indicated moderate effect size for detecting symptom improvement in patients with SMI, particularly for the subscale emotional involvement (effect size=0.58). Emotional over-involvement in which a high level of family members' responses to a patient's daily behaviours and life activities, and sometimes his/her private matters, may impose a negative impact on the patient's psychosocial health and result in increased anxiety, self-blame, or social withdrawal.[1] Less emotional involvement by family members can result in better family functioning and better social adjustment in patients with SMI and, subsequently, less aggressive and demanding behaviour.[2] Although controversies persist about whether EE can alter the effect of family-focused intervention on mood disorders, higher EE families (especially those with higher critical comments and emotional over-involvement) report higher levels of depression over 2 years, regardless of the mode of treatment received.[6]

Some aspects of high EE, particularly the moderate level of criticisms and emotional reactions towards patient, are positively associated with better social functioning and adjustment in people with schizophrenia.[2] With an appropriate level of EE, family caregivers can exert more control over a patient's difficult behaviour and thus can better plan and monitor family activities and be more able to adjust to or cope with their caregiving role.[5]

In the present study, the hypothesised four-factor structure of the Chinese version of the LEE scale with paths (and moderate correlations) between four factors was confirmed. This four-factor model, similar to the one used in Chinese people with schizophrenia,[4] showed that intrusiveness and hostility, various negative attitudes towards the patient, level of tolerance, and extent of emotional involvement are four moderately correlated factors or concepts that cover patients' perceived EE of their family. This Chinese version is shortened (from 60 to 50 items) and can explain more variance and is more convenient and user-friendly, with higher construct validity than the original English and other versions. Intrusiveness/hostility and emotional over-involvement are the two key components of EE most commonly accepted and agreed by researchers across cultures.[2,6] The other two factors (attitudes towards patient and tolerance) have been increasingly recognised.[2] This perception is also consistent with the Chinese belief that open expression of emotions and comments, either positive or negative, should be discouraged, and self-control of emotions and negative remarks should be emphasised.[4,6] Family members with high EE have negative impact on patient's behaviour; they often expect the patient to take main responsibility for and be able to control his/her emotions and illness-related behaviours.[2] The findings of the four-factor structure provide further support for the proposed multi-dimensional nature of the family attitude and emotional environment in caring for a patient with SMI, as suggested by other studies.[1,2,4]

Participants with different types of SMI reported a moderate level of perceived EE. Consistent with other studies,[1,2] depressed patients indicated a high level of perceived EE, mainly relating to their high perceived intrusiveness and irritability (emotion over-involvement) and inadequate social support obtained from their family members. The development and course of depression is a dynamic interactional process in which family support and caring attitude can serve as a buffer to onset of the illness or a mediator of the recovery process.

The level of EE in the present study was inconsistent to that in other studies in Asian and western countries. One study reported a low level of EE in most (45-75%) families in Asian and western countries.[7] In contrast, most of our Chinese patients reported a moderate-to-high level of perceived EE. The mean EE level of our patients was higher than that of 26 depressed outpatients measured by the Dutch version of the LEE scale.[1] Our study was consistent with a study of Chinese populations in which over 40% of family members of patients with schizophrenia were rated as having high EE.[5]

Attitude and emotional responses to a mentally ill relative such as protection, hostility, anger and devotion may vary according to family dynamics and practices within a particular culture.[7] This highlights the uniqueness in Chinese culture of some (patients' perceived) family's emotional responses to their mentally ill relative. The interpretation of the dimension and degree of EE may require the inclusion of different cultures in order to be valid and accurate.

A few limitations of this study are noted. First, this study used only the patient's perception of the family member's level of EE. It is possible that the responses/ratings from the patients with SMI are unreliable due to the illness; and the correlations of LEE with other psychosocial and mental health measures would be artificially inflated. Researchers need to ensure a high level of reliability of patient's self-report by checking their mental stability and competence. Second, the sample was non-representative. Most participants were male, well-educated, Hong Kong born Chinese, mentally stable, with a primary diagnosis of one type of SMI and no co-morbidity of any other mental illnesses. The participants were recruited from one psychiatric outpatient clinic in Hong Kong, where similar socio-economic backgrounds and mental healthcare services were found. In addition, the sample size was relatively small and minimum for factor analysis of a 52-item scale. This study should be replicated in other kinds of mentally ill patients with diverse socio-demographic and clinical backgrounds. Third, the findings did not show clearly how the Chinese version of the LEE scale could be related to the original EE concept, which is operationally defined to measure the family's emotional climate and stress environment from the perspective of family caregivers. Re-examining the convergent validity of the Chinese version of the LEE scale with standard measures such as the CFI may confirm its consistency with the EE perceived by family members.

Conclusion

The Chinese version of the LEE scale is reliable and valid for measuring the level of EE of family members perceived by patients with SMI. The Chinese version showed moderate effect size for detecting changes in symptom severity in psychotic and unipolar disorders; the four-factor structure accounted for a high percentage of the total variance of the EE construct. Most patients with SMI, especially those with unipolar disorder, reported a moderate level of perceived EE. The Chinese version of the LEE scale can be further tested in healthy individuals and the general public, as well as in different Chinese communities.

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