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THE ROLE OF RELATIVES' EXPRESSED EMOTION AND PERSONALITY TRAITS IN PREDICTING SCHIZOPHRENIA RELAPSE

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ABSTRACT

The debilitating nature of schizophrenia and recurrent relapse of its psychotic episodes are often poorly understood and can be confusing to many family members, who play the role as primary caregivers. This study aimed at investigating the role of relatives' expressed emotion (EE) and personality traits in predicting relapse among schizophrenia patients. A total of 160 subjects in which the dyads of 80 patients diagnosed with schizophrenia and 80 key relatives were recruited to participate in Phase 1 and then followed-up 6 months later for Phase 2 of the study. The Family Questionnaire (FQ) was administered to measure relatives' EE level while Eysenck Personality Questionnaire-Revised (EPQ-RS) was used to measure their personality traits. Patients' were considered to relapse if they were readmitted into the psychiatric wards within 6 months post-hospital discharge from their index hospitalization. Results showed that the odds for patients to relapse was increased by 8 folds when relatives demonstrated high-EE level. Relatives' critical comments (CC) component turned out to be a strong predictor with 12% chance for schizophrenia relapse when they demonstrated an increase in CC level. Relatives' personality traits particularly the lie scale and extraversion trait also turned out to be the significant direct predictors to patients' relapse. Relatives with elevated lie scale score or also considered as the conformists predicted patients' relapse almost 3 folds. On the contrary, a unit decreased in extraversion trait predicted the odds for patients to relapse by 29%. Results supported the worldwide findings on the significant role of relatives' high-EE level particularly the CC component in predicting the course of schizophrenia. The significant contribution of relatives' extraversion and conformism traits is indeed a novel finding in studies of schizophrenia relapse. Results generally supported the viability of EE construct in predicting relapse among local schizophrenia patients.

Key words: Rehospitalization - Critical Comments - Emotional Over-Involvement - Extraversion - Lie Scale - Conformism – Extended Family – Modernization – Urbanization

INTRODUCTION

Within the context of Malaysia, schizophrenia has often been conceptualized as *gila* (lunacy or madness) by the society. Its debilitating nature often makes the affected person experienced a loss of touch with reality, inability to care for themselves and impairment in thinking processes which resulted in incoherence of speech. This condition is known as psychosis (Nolen-Hoeksema, 2011). People suffering from schizophrenia have often been reported to experience recurrent relapse of its psychotic episodes. In fact many people who improved after an episode of schizophrenia tended to experience the psychotic symptoms again later on in their lives. Zubin et al., (1992) found that only about 22% of those who experienced one psychotic episode and improved, did not show a lasting impairment. Meanwhile, the remaining 78% continued to experience recurrent relapse of the psychotic episodes with different degrees of impairment in between. Kaplan et al., (1994) also reported that more than 50% of the patients with schizophrenia have poor outcome which among others include repeated hospitalizations and symptom exacerbation. In Malaysia, attempts to collect information about patients with mental disorders have only recently started by the National Mental Health Registry (NMHR). The pioneering project for NMHR was gathering data on new cases of schizophrenia that sought treatment from government-based facilities, university hospitals and private health services (Aziz et al., 2008). Some of the so-called newly registered cases of schizophrenia also included those of chronic schizophrenia patients, hence the exact data regarding schizophrenia relapse cases is yet to be ascertained.

Several factors have been implicated to explain relapse in schizophrenia. Kingdon and Turkington (2005) suggested that relapse may be linked to life events and circumstances that produce low-key but prolong type of stresses. It may also be due to some specific factors that triggered anxiety in an already vulnerable patients. One of the main contributory psychosocial/familial factors that have been consistently found to relate to relapse is the expressed emotion (EE) demonstrated by family members toward people with schizophrenia. EE refers to the negative emotional climate of household environment demonstrated by the family members in their daily interactions with the patients which may take the form of either being overly critical, hostile or becoming emotionally over-involved with the patients (Barrowclough & Hooley, 2003; Butzlaff & Hooley, 1998; Hooley, 2007; Ivanović et al. 1994; López et al. 2009; Parker & Hadzi-Pavlovic, 1990). Karanci and İnandilar (2002, p.80) considered EE as a thermometer that reflected affective family environment. Likewise, King et al., (2003) also suggested that it reflected family members' general attitudes toward patients with schizophrenia in their daily interactions. Generally, EE measures the household emotional climate (Lobban et al. 2003) indexed by the presence of critical comments (CC)/critical attitudes, hostile behaviors and emotionally over-involved (EOI)/intrusive attitudes on the part of relatives when they speak about the patients in an interview conducted during patients' psychiatric hospitalization (Leff & Vaughn, 1985).

EE was conceptualized based on Brown and colleagues' seminal works on the role of psychosocial factors particularly family interactions in influencing the course of schizophrenia (Brown et al., 1958; Brown et al., 1962; Brown & Rutter, 1966; Brown et al., 1972) and indeed it had generated worldwide research interest. Many Western studies have replicated Brown and colleagues' earlier findings and they repeatedly demonstrated that patients with schizophrenia

who returned to live with their families that demonstrated high-EE level tended to relapse twice as likely within 6 to 9 months post-hospital discharge compared to their counterparts who returned to low-EE households (Butzlaff & Hooley, 1998; Kavanagh, 1992; Parker & Hadzi-Pavlovic, 1990). An aggregate analysis of 25 studies found that only 21% of the patients in low-EE household relapsed compared to 50% of their counterparts in high-EE household who relapsed within the same specified period (Bebbington & Kuipers 1994). These findings suggested the robust role of EE in predicting schizophrenia relapse.

Despite of the robustness of EE in influencing the course of schizophrenia among the Western samples, its role has not be ascertained among schizophrenia patients in Malaysia. There are only two published studies on EE and schizophrenia relapse conducted in Malaysia. One study specifically targeted on patients and relatives who lived in Kelantan and Terengganu (Azhar & Varma 1996) while the other by Roseliza-Murni et al. (2014) conducted the study on schizophrenia patients and their key relatives in Kuala Lumpur. Azhar and Varma (1996) investigated the prevalence of high-EE attitudes among 83 relatives of schizophrenia patients and found that majority of them (72.3%) demonstrated low-EE level. Their EE levels did not predict relapse among the patients, a finding which was in contrast to that of Roseliza-Murni et al's. (2014) and many major studies worldwide (e.g., Bebbington & Kuipers, 1994; Brown et al., 1958; Brown et al., 1962; Brown & Rutter, 1966; Brown et al., 1972; Butzlaff & Hooley, 1998; Kavanagh, 1992; Parker & Hadzi-Pavlovic, 1990). According to Azhar and Varma (1996) the most likely explanation to their findings was cultural differences between schizophrenia patients in Malaysia and those in other countries. Indeed, culture, nationality and ethnicity have been suggested by many studies (Bhugra & McKenzie, 2003; Jenkins & Karno, 1992; López et al. 2009) to play important roles in how relatives responded to schizophrenia disorder in general and schizophrenia patients, in particular. However, its contrasting finding to the of Roseliza-Murni et al's. (2014) may also be due to the validity of the 30-items questionnaire used to measure EE, as it was personally drawn and rated in the form of a "Yes/No/Infinite" response format, the type which was also in contrast to the traditional method of measuring the EE level. Likewise, Azhar and Varma (1996) also did not provide any psychometric properties in relation to their EE questionnaire.

Within schizophrenia relapse research, an area that has been neglected is investigating the impact of relatives' personality traits on the course of schizophrenia progression. Up to this point the role of relatives' personality traits have been investigated as one of the predictors of EE in relatives, but none have investigated its direct role on schizophrenia outcome. Earlier empirical evidence regarding relatives' EE level that may be related to some aspects of their personality traits have been demonstrated by Hooley and Hiller (2000) and King et al., (2003). According to Hooley and Hiller (2000) high-EE relatives scored significantly higher on norm-favoring subscale but scored significantly lower on the tolerance, flexibility, empathy and self-realization subscales of the California Psychological Inventory (CPI) when compared with their counterparts in low-EE group. The flexibility subscale turned out to be the single most relevant trait that contributed towards relatives' EE level. King et al., (2003) demonstrated that high-EE mothers scored significantly higher on conscientiousness and significantly lower on neuroticism scale of the Revised NEO-Personality Inventory (NEO-PI) than the low-EE mothers. Results of these studies provided clinically useful information regarding the association between relatives' personality traits and their EE levels. However, the direct impacts of relatives' personality traits

on the course of schizophrenia remained unknown. Hence, the present study aimed at investigating: (i) the predictive value of relatives' EE index as well as its components on schizophrenia relapse; and (ii) the predictive value of relatives' personality traits on schizophrenia relapse.

MATERIALS AND METHODS

Participants

Eighty schizophrenia patients who were receiving inpatient psychiatric treatment at Hospital Kuala Lumpur (HKL) and University Malaya Medical Center (UMMC) together with 80 of their key relatives were recruited to participate in Phase 1 and Phase 2 of the study. Patient-participants were those receiving inpatient psychiatric treatments and had been diagnosed with schizophrenia based on the diagnostic criteria outlined in the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV: APA, 1994) or the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition Text-Revision (DSM-IV-TR: APA, 2000). The selections of patient-participants were based on the inclusion and exclusion criteria. These criteria had been described in detail in Roseliza-Murni et al., (2014). Relative-participants were those who declared themselves as the next of kin and individuals who were responsible for the well-being of the patients as stated in patients' hospital records. Only the patient-participants were followed up for the Phase 2 of the study where they were checked for possible relapse 6 months post-hospital discharge. All participants consented to participate in this study. Written inform consents for both patients and relatives were granted by relative-participants. Prior to starting the study approvals, consents and ethical clearances were obtained from the Ministry of Health Research and Ethics Committee (MREC) and UMMC Medical Ethics Committee (MEC). This study was also registered with the National Medical Research Registry (NMRR) and assigned to ID2640.

Measure for Relatives' EE

A 20-item self-reported instrument known as the Family Questionnaire (FQ: Weidemann et al., 2002) was employed to measure relatives' EE index (high-EE or low-EE level) as well as its components, which were the CC and EOI. Ten items were designed to measure each component. The FQ was scored on a 4-point scale that ranged from Never/Very Rarely to Very Often. All items representing each component were added up to match the suggested cut-off scores of 23 for CC and 27 for EOI components. Relatives were classified as high-EE if they scored either 23 or greater on the CC scale or 27 or greater on the EOI scale. According to Weidemann et al., (2002) relatives were considered to be in high-EE category if their scores exceeded the cut-off points in either one or both scales. The FQ was presented in both Bahasa Melayu and English versions. Back translation was employed for translating the FQ into Bahasa Melayu and reliability analysis demonstrated that Cronbach's alphas for the translated version of CC=0.90 and EOI=0.88.

Measure for Personality Traits

This study adopted the Eysenck Personality Questionnaire-Revised short scale (EPQ-RS: Eysenck et al., 1985), a well-established instrument that had been extensively used in many studies on personality traits. The EPQ-RS was a self-reported 48-item dichotomous response questionnaire that measured four subscales which were extraversion, neuroticism, psychoticism and lie/social desirability scale. Each of the subscale was measured by 12 items and have been reported to demonstrate good reliability values that ranged from 0.76 to 0.90 (Eysenck et al. 1985). The EPQ-RS was also presented in both Bahasa Melayu and English versions. Back translation was employed for translating the EPQ-RS into Bahasa Melayu in earlier study by Wan Shahrazad et al. (2011). The reported reliability analysis revealed satisfactory values of Cronbach's alphas that ranged from 0.30 to 0.75 for male respondents and from 0.44 to 0.76 for female respondents. The moderately low reliability value of psychoticism scale was consistent with Eysenck et al.'s (1985) argument that it suffered several psychometric shortcomings which among others include low reliability, low range of scoring and grossly skewed distribution. According to Cattell and Tsujioka (1964) the low reliability value of psychoticism scale may also be due to its nature that tapped several different facets of personality such as lack of empathy, hostility, cruelty and non-conformism. This was in contrast to the extraversion scale, which largely measured the sociability and activity levels. Hence, its reliability value was high. Taking these postulations into consideration, the moderately low reliability value for the psychoticism scale was considered as acceptable for this study.

Measure for Patients Relapse

Relapse was operationally defined as psychiatric rehospitalization that resulted from the return or worsening of schizophrenia symptoms as assessed by the treating psychiatrists. The key measurement of relapse was rehospitalization, and it was based on Lin et al.'s (2008, p.408) suggestion that "hospitalization often indicates that clinical symptoms have reached a level of severity that cannot be tolerated or safely managed in an outpatient department". Therefore, patients were considered to relapse if they had been readmitted into the psychiatric wards within 6 months post-hospital discharge.

ANALYSIS

Data were analyzed using the IBMSPSS Statistics 20. Logistic regression was administered as it was able to predict discrete outcome from a set of predictors that may be continuous, discrete, or dichotomous in nature, or even a mixture of these variables (Tabachnick & Fidell, 2007).

RESULTS

Participants Characteristics

Patient-participants consisted of 56 males and 24 females. The 70% male- to 30% female-patients ratio reflected the 2:1 ratio between male to female patients as depicted by the profile of the registered cases provided by the NMHR report (Ministry of Health Malaysia [MOH], 2008). Analysis of racial distribution revealed that 55% of the patients were Malays, 25% Chinese, 16.25% Indians and 3.75% of other races. This statistics also resembled the data provided by NMHR report whereby 55% of the registered cases were Malays, followed by 28% Chinese and 9% Indians, which were reflective of Malaysian population (MOH, 2008). Analysis of patients' marital status indicated that 62.5% of them were single, 23.8% married, while the remaining 13.8% were either widowed or divorced. Again this data complied with NMHR statistics whereby 68% of the patients in the registry reported to be single, 23% married and 8% were either widowed, divorced or separated (MOH, 2008). Patients' age at the first onset of schizophrenia range from 12 to 42 years (Mean=22.15, SD=5.76) and their past psychiatric hospital admissions range from one to 20 times (Mean=5.37; SD=4.51).

Relative-participants comprised of 48.8% males and 51.2% females who declared themselves as the next of kin or primary caregivers. Their relationships with the patients included mothers (31.2%), fathers (16.2%), spouses (15%), siblings (27.5%), adult offspring (5%), aunts/uncles (3.75%) and a grandmother (1.25%). The length of time these relatives were living with the patients range from 1 to 65 years (Mean=23.46, SD=12.68). With regard to the EE level, 53.8% of the relatives scored in the low-EE category, while the remaining 46.2% demonstrated high-EE level. Eighty percent of the relatives were categorized in low-EOI group, while the remaining 20% were classified as high-EOI. Meanwhile, 65% of the relatives fell into low-CC category and 35% were classified as high-CC.

The Predictive Value of Relatives' EE Level (High-EE) on Schizophrenia Relapse

Logistic regression analysis was performed to assess the prediction of patients' relapse 6 months post-hospital discharge on the basis of relatives' EE level (high and low-EE). The model with categorical EE level yielded a likelihood ratio χ^2 (1, N=80)=19.37, $p=0.000$, Nagelkerke $R^2=0.29$, suggesting that the model fitted significantly better than the constant-only model. This model also yielded an improvement in the overall correct classification value of 73.8% compared to constant-only model (52.5%). Of the correctly classified cases, 78% were for the prediction of non-relapse cases and 69% for the prediction of relapse cases. Results indicated that relatives' high-EE level contributed significantly to the prediction of schizophrenia relapse. For every one unit increased in relatives' high-EE level, the odds for patients to relapse 6 months later was also increased by 8.37 folds (95% CI: 3.02 - 23.15). Table 1 summarizes the contribution of relatives' high-EE level measured during patients' index hospitalization in predicting relapse 6 months later.

Table 1 Logistic Regression on the Predictive Value of Relatives' High-EE Level on Patients' Relapse

Variables	B	Wald χ^2 Test	Odd Ratio	95% CI for Odd Ratio		Sig.
				Lower	Upper	
Categorical EE (High- EE level)	2.12	16.73	8.37	3.02	23.15	0.000**
(Constant)	-.84	6.34	.43			.012

**p<0.001

The Predictive Value of Relatives' EE Components (CC and EOI) on Schizophrenia Relapse

Taking the issue of multicollinearity between categorical EE (high and low-EE level) and its components (CC and EOI) into consideration, a separate logistic regression analysis was performed to assess the predictive value of CC and EOI on patients' relapse processes. The model with CC and EOI components yielded the likelihood ratio χ^2 (2, N=80)=9.32, p=0.009, Nagelkerke R^2 =0.15, suggesting the model fitted significantly better than the constant-only model. The addition of CC and EOI components into the model also indicated an improvement in the model fit, Hosmer and Lemeshow χ^2 (8, N=80)=6.24, p=0.62. This result suggested a model with good predictive value with an overall correct classification value of 62.5%, which was an improvement from the constant-only model (52.5%). Of the correctly classified cases, 66.7% was for the prediction of relapse cases and 57.9% for non-relapse cases. The contribution of relatives' CC and EOI components towards patients' relapse is shown in Table 2. Of the two EE components, relatives' CC level turned out to be the significant contributor to patients' relapse. For every one unit increased in relatives' CC level, the odd for patients to relapse was increased by a factor of 1.12 (95% CI: 1.03 - 1.18). In contrast, relatives' EOI level did not contribute significantly towards patients' relapse.

Table 2 Logistic Regression on the Predictive Value of Relatives' High CC and EOI Levels on Patients' Relapse

Variables	B	Wald χ^2 Test	Odd Ratio	95% CI for Odd Ratio		Sig.
				Lower	Upper	
CC	.095	7.69	1.12	1.03	1.18	0.006*
EOI	.008	.06	1.01	.94	1.08	.81
(Constant)	-1.76	4.23	.17			.04

*p<0.05

The Predictive Value of Relatives' Personality Traits on Schizophrenia Relapse

Another logistic regression was performed to investigate the contribution of relatives' personality traits on patients' relapse processes. The model with four relatives' personality traits yielded a likelihood ratio χ^2 (4, N=80)=18.17, $p=0.001$, Nagelkerke $R^2 =0.27$, suggesting the model fitted significantly better than the constant-only model. The addition of four personality traits into the model also indicated an improvement in model fit, Hosmer and Lemeshow χ^2 (8, N=80)=5.70, $p=0.68$. This suggested a model with good predictive value and produced an overall correct classification value of 70%, which was an improvement from the constant-only model (52.5%). Of the correctly classified cases, 73.8% was for the prediction of relapse cases and 65.8% was for non-relapse cases. The contribution of extraversion, neuroticism, psychoticism and lie scale in predicting patients' relapse is shown in Table 3. Of the four relatives' personality traits, extraversion and lie scale turned out to be the significant predictors to patients' relapse. For every one unit increased in relatives' lie scale score, the odd for patients to relapse was increased by a multiplicative factor of 2.67 (95% CI: 1.28 - 5.58). The inverse relationship between extraversion and relapse indicated that for every one unit decreased in relatives' extraversion trait the odd for patients to relapse was increased by a factor of 0.29 (95% CI:0.57 - 0.89).

Table 3 Logistic Regression on the Predictive Value of Relatives' Personality Traits on Patients' Relapse

Variables	B	Wald χ^2 Test	Odd Ratio	95% CI for Odd Ratio		Sig.
				Lower	Upper	
Extraversion	-.34	8.93	.71	.57	.89	0.003*
Neuroticism	.16	2.78	1.17	.97	1.41	0.096
Psychoticism	-.28	.99	.75	.43	1.31	0.319
Lie Scale	.98	6.78	2.67	1.28	5.58	0.009*
(Constant)	-6.55	2.11	.001			.15

* $p < .05$

DISCUSSION

Results of the present study yielded a novel and interesting findings with regard to the psychosocial/familial aspects that predicted relapse among schizophrenia patients in Klang Valley, Malaysia. It has been demonstrated that the odds for patients to relapse 6 months post-hospital discharge was increased by more than 8 times when their relatives demonstrated an increase in high-EE level. The odds for patients to relapse also increased by 12% when relatives demonstrated an increase in their CC level. These results thus, replicated the worldwide findings on the significant role of relatives' high-EE level (Bebbington & Kuipers, 1994; Brown et al.,

1972; Butzlaff & Hooley, 1998; Goldstein, 1987; Ivanović et al. 1994; Kavanagh, 1992; Parker & Hadzi-Pavlovic, 1990), and the contribution of their CC component on schizophrenia relapse processes (Brown et al., 1972; Harrison et al., 1998; Jenkins & Karno, 1992). In fact, the eight-fold increase in relapse among schizophrenia patients in the present study exceeded the documented 3.7 times relapse rate as reported in an aggregate study among the Western samples (Parker & Hadzi-Pavlovic, 1990). However, this result was lower than the 10 times more frequent rate of relapse among the Belgrade sample (Ivanović et al. 1994). Taken together, the present study and a large number of past studies consistently demonstrated higher schizophrenia relapse rates when relatives demonstrated high-EE attitudes. The significant contribution of relatives' CC level towards patients' relapse processes also supported the postulation that critical comments/attitudes "... accounts for the vast majority of what is really being measured by the construct of expressed emotion" (Jenkins & Karno, 1992, p. 10). Along this line, Hogarty et al., (1986) also suggested that the most contribution of EE-relapse association comes from CC rather than EOI component.

The insignificant contribution of relatives' high-EOI level in influencing schizophrenia relapse can be explained by a large proportion of relatives (80%) who were categorized into the low-EOI group. This finding was in contrast to that of Western findings. It is possible that culture may play some important roles in the non-significant contribution of EOI on schizophrenia relapse processes. Being of Asian origin and adopting the Eastern values, and apparently close to one-third of the participants in this study were Malaysian-Chinese, it is highly likely that the Malaysian culture hold similar values to that of Chinese in the mainland. Thus, just like the relatives of schizophrenia patients in mainland China and just like what has been proposed by Phillips and Xiong (1995), the over-protective attitudes among some of the relatives may reflect the concerns and caring dispositions towards an ill family member. Hence, EOI attitudes may not be stressful to the patients after all, and therefore, did not predict relapse among schizophrenia patients in the present study.

Even though only 46.2% of the relatives demonstrated high-EE attitudes and 35% of them were categorized into high-CC group, this study was able to demonstrate the predictive value of high-EE and CC component on schizophrenia relapse. This finding is clearly in contrast to that of Azhar and Varma's (1996) findings among relatives and schizophrenia patients in the states of Kelantan and Terengganu – the socially more cohesive but less industrialized states in Malaysia. One possible explanation for the differences in findings would be the role of cultural variation in shaping relatives' attitudes and values. According to Jenkins and Karno (1992, p.16) "culture, as a system of shared meanings and symbols, offers the most powerful explanation for the observed variations in expressed emotion in different population." Even though participants in the present study and those of Azhar and Varma's (1996) were both Malaysian populations, however cultural variations may exist and play some roles in the attitudes and values among people in the metropolitan areas such as Kuala Lumpur and Klang Valley (the participants in this study) who tended to adopt a more individualistic culture, as opposed to those from Kelantan and Terengganu (Azhar and Varma's study sample) who tended to adopt a more socially cohesive and collectivist culture. Modernization and the influence of western culture can be readily observed in the urban and metropolitan areas of Kuala Lumpur and Klang Valley. However, this condition was rarely observed in Kelantan and Terengganu.

According to Phillips and Xiong (1995) when a society moves toward westernization, it is also expected that EE would play a larger role in determining the relapse process. When a society undergoes westernization it also embraces the living arrangement that comprises of a nuclear family unit, and this is commonly seen among residents of Kuala Lumpur and Klang Valley. On the contrary, the people of Kelantan and Terengganu still practices and values the living arrangement that comprises of extended family units. Martins et al., (1992) suggested that families consisting of small unit of members or a single relative may experienced greater burden than the extended families as those in the extended families can share their stresses and difficulties of dealing with the patients. Kurihara et al., (2000) also suggested that members of the extended families tended to have more positive attitudes toward their mentally ill relatives than those from nuclear families. The reason being, a greater number of family members living together will create an environment that encouraged a shared burden of care. This condition is in contrast to the nuclear family unit who shouldered the burden of care alone or only shared it with a small unit of people. Hence, the extended family environment is presumed to have a more positive family environment. It is therefore possible that the stresses of living in urban metropolitan areas, which also provided limited family resources or supports in the form of extended family members, influenced the difference in high-EE rates and the difference in the predictive role of EE in relapse processes among participants in the present study and those of Azhar and Varma's (1996). Additionally, the difference in measures of EE in the present study to that of Azhar and Varma's may also explain the inconsistent results.

Results of the present study is also novel as it demonstrated the significant direct contributions of relatives' personality traits in predicting patients' relapse. In contrast to previous studies that looked into the role of relatives' personality traits as the contributory factors toward their EE levels (e.g., Hooley & Hiller, 2000; King et al., 2003), the present findings highlighted the direct associations between relatives' personality traits and patients' relapse processes. Results demonstrated that the odds for patients to relapse was directly increased by almost 3 times when relatives demonstrated an increase in the lie scale score. According to Eysenck and Eysenck (1986) the lie scale measured the tendency of a person to dissimulate or fake good, which was particularly prominent under high motivational circumstances such as taking the test as part of employment recruitment. However, under low motivation to dissimulate, the scale was suggested to measure some stable personality traits that may also denote some degree of social naiveté. Eysenck and Eysenck (1986, p.15) further suggested that "...under conditions of little motivation to dissimulate, the L-scale score may be used as a measure of whatever personality function is being measured by the scale;..." however "... little is known about the precise nature of this function." Within the context of Malaysia, Wan Rafaei (1993) suggested that the lie scale measured the degree of conformity among Malaysians. Thus, the lie scale did not measure what it was originally designed to measure, but reflected a unique trait among Malaysians who tended to be more conformists. It is noteworthy that while the present study revealed that high lie scale score and high-EE level significantly predicted relapse among the patients, Hooley and Hiller (2000) also demonstrated that relatives with high-EE level also scored significantly higher on norm-favoring subscale of the CPI. According to Hooley and Hiller (2000), high scores on norm-favoring subscale reflected greater concerns regarding conventionality in behaviors and attitudes. Could it be also possible that people with high scores on this scale also demonstrated high degree of conformism? This is yet to be ascertained and needed further investigation.

The observed inverse relationship between patients' relapse and relatives' extraversion trait suggested the odds for patients to relapse was increased by 29% when relatives demonstrated one unit decreased in their extraversion traits. On the contrary, this finding also denotes that relatives who scored high on extraversion trait can contribute to lesser rate of relapse among the patients. According to Rawlings (1984) the extraversion scale measured different degrees of sociability with high scores indicating extraversion and low scores indicating introversion. The extraverts were described by Eysenck and Eysenck (1986, p. 9) as being "... carefree, easy-going, optimistic, and likes to laugh and be merry". On the other hand, the typical introverts were described as "... reserved and distant except to intimate friends..... somewhat pessimistic, and places great value on ethical standards" (Eysenck & Eysenck, 1986, p. 9). Thus, it is possible that the characteristics of the introverts created a stressful household environment for patients with schizophrenia that subsequently lead to their relapse. On the contrary, the characteristics of the extraverts may act as a buffer against relapse among the patients. The characteristics of the extraverts seemed to equate those of low-EE relatives which was described by Leff and Vaughn (1985) as characterized by the cool, easy going and flexible attitudes.

Generally, the present study demonstrated that relatives' high-EE level particularly the CC component contributed significantly to the prediction of schizophrenia relapse 6 months post-hospital discharge. Likewise, results also highlighted the novel findings on the role of relatives' personality traits particularly the lie scale/conformism trait and the degree of extraversion-introversion traits that significantly predicted the relapse processes among schizophrenia patients in Klang Valley. These findings thus, demonstrated the importance of relatives' expressed emotion and personality traits in influencing the course and outcome of schizophrenia. Thus, these familial/psychosocial factors need to be considered when designing future intervention strategies.

This study has a number of limitations. Firstly, it was carried out only in Kuala Lumpur and Klang Valley – the most industrialized and urbanized areas in Malaysia. Hence, the culture and attitudes of the participants may not represent Malaysia's general population, which also comprises of those who lives in less developed and less industrialized states, who may also values social cohesion and extended family units. Secondly, majority of the participants were recruited from HKL – a government subsidized public hospital, which was mainly visited by participants from lower socioeconomic background. Again, it may not represent the demographic profile of Malaysian population. Hence, results of this study should be interpreted cautiously as it may only be generalizable to patients within Kuala Lumpur and Klang valley.

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