The nature and efficacy of culturally-adapted psychosocial interventions in schizophrenia: a systematic review and meta-analysis

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	interventions were more efficacious than usual treatment in proportion to the degree of adaptation. Both context and design influenced efficacy. Investigating whether adaptation improves efficacy, most importantly amongst ethnic minorities, requires more comparisons against unadapted interventions.

The nature and efficacy of culturally-adapted psychosocial interventions for schizophrenia: a systematic review and meta-analysis

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Abstract

Background. Evidence-based psychosocial treatments for schizophrenia founded on Western belief systems and values may not be efficacious in different cultures without adaptation. This systematic review analyses the nature and outcomes of culturally-adapted psychosocial interventions in schizophrenia, examining how interventions have been adapted, their efficacy and what features drive heterogeneity in outcome.

Method. Articles identified by searching electronic databases from inception to 3rd March 2016, reference lists and previous reviews were independently screened by two authors for eligible controlled trials. Data on the nature of adaptations was analysed inductively using thematic analyses. Meta-analyses were conducted using random effects models to calculate effect sizes (Hedges' g) for symptoms.

Results. Forty-six studies with 7828 participants were included, seven adapted for minority populations. Cultural adaptations were grouped into nine themes: language, concepts and illness models, family, communication, content, cultural norms and practices, context and delivery, therapeutic alliance, and treatment goals. Meta-analyses showed significant post-treatment effects in favour of adapted interventions for total symptom severity (n=2345, g-0.23, 95% confidence interval (CI) -0.36 to -0.09), positive (n=1152, g-0.56, 95% CI -0.86 to -0.26), negative (n=855, g-0.39, 95% CI -0.63 to -0.15), and general (n=525, g-0.75, CI -1.21 to -0.29) symptoms.

Conclusions. The adaptation process can be described within a framework that serves as a benchmark for development or assessment of future adaptations. Culturally adapted interventions were more efficacious than usual treatment in proportion to the degree of adaptation. There is insufficient evidence to show that adapted interventions are better than non-adapted interventions. Features of context, intervention and design influenced efficacy. Investigating whether adaptation improves efficacy, most importantly amongst ethnic minorities, requires better designed trials with comparisons against unadapted interventions.

Key words

Cultural-adaptation, schizophrenia, psychosis, ethnic minorities, psychosocial intervention

Introduction

Migrant and ethnic minority populations have, approximately, a three-fold increased incidence of schizophrenia (Cantor-Graae, 2007, Cantor-Graae and Selten, 2005). In the United Kingdom (UK), elevated rates of schizophrenia have been reported for Black and Minority Ethnic (BME) populations when compared to the majority White British population, with the highest rates for Black Caribbean, followed by Black African and then Asian groups (Fearon *et al.*, 2006). Ethnic disparities exist in treatment access, experiences and outcomes of schizophrenia, with disadvantages consistently reported for minority populations in Western countries (i.e. countries derived from and influenced by European cultures). UK research and policies have highlighted inequalities for ethnic minorities, including poorer engagement with services and professionals, more coercive care pathways, compulsory hospital admissions and involvement in the criminal justice system, higher doses of medication and inferior access to psychological therapies (Bhui *et al.*, 2003, Department of Health, 2005, Keating *et al.*, 2002, The Sainsbury Centre for Mental Health, 2006).

Current guidelines in the UK and United States of America (USA) (Dixon *et al.*, 2010, National Institute for Health and Care Excellence, 2014) recommend cognitive behavioural therapy (CBT) and family intervention (FI) for schizophrenia based on meta-analytic evidence of effectiveness (Pharoah *et al.*, 2010, Wykes *et al.*, 2008). However, it is unclear whether the effectiveness of these interventions generalises across ethnic groups since ethnic minorities remain underrepresented in clinical trials of most psychological interventions (Brown *et al.*, 2014, Hussain-Gambles *et al.*, 2004, Waheed *et al.*, 2015). It has been suggested that outcomes of psychosocial interventions are poorer for ethnic minorities than Caucasians (Bhugra *et al.*, 1997). This is perhaps not surprising given that most psychosocial interventions have been developed in the West (i.e. Europe or the USA) and are underpinned by Western cultural values. Culture has been defined as '…the set of distinctive spiritual, material, intellectual and emotional features of society or a social group… it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs.' (United Nations Educational, Scientific and Cultural Organisation (UNESCO)) (Torres, 2002). There is evidence that people are more likely to seek help and engage with psychiatric and psychological treatment when their cultural beliefs and explanatory models are considered (Bhui and Bhugra, 2004, Carter *et al.*, 2016, Rathod *et al.*, 2010). Therefore, to improve acceptability and effectiveness of treatment, there has been growing interest in adapting interventions in schizophrenia to be congruent with the cultural contexts and values of minority populations (e.g. Edge *et al.*, 2016, Rathod *et al.*, 2013). Adaptation and evaluation of such interventions is also necessary to allow

psychosocial treatment to be evidenced in majority populations in low and middle income countries' (LMIC) (Feigin, 2016).

Systematic reviews of cultural-adaptations of psychosocial interventions for mental illness (Benish *et al.*, 2011, Chowdhary *et al.*, 2014, Griner and Smith, 2006, Huey and Polo, 2008, Smith *et al.*, 2011) find adapted interventions' mean effect sizes for primary outcomes (0.41-0.72) comparable to non-adapted interventions in Western populations (e.g. 0.35-0.44; Wykes *et al.*, 2008). However, most systematic reviews have included diagnostically and ethnically mixed samples and not attempted to disentangle how far these factors shape interventions' effects. Few have analysed the nature of cultural adaptations systematically to provide an empirically derived framework or model of adaptation. Without a framework to describe adaptation it is difficult to examine what type or degree of adaptation was efficacious.

Chowdhary *et al.* (2014) conducted a systematic review of 20 controlled trials of culturally adapted psychological treatments for depression, including CBT, interpersonal therapy, psychoeducation, problem-solving therapy and dynamic oriented therapy. They used a framework developed by Bernal and Sáez-Santiago (2006) to describe adaptations, which were mostly within the language, therapist and context dimensions. They reported effect size (SMD) -0.72 for depressive symptoms but noted that the small number of studies, incompleteness of data and significant heterogeneity in context, interventions and study design prevented comparison of the degree or types of adaptations across different interventions.

Bhui *et al.* (2015) reviewed 21 studies of various designs to identify adaptations in a wide range of interventions designed to improve therapeutic communications between BME patients and clinicians in psychiatric services. Thematic analyses classified adaptations somewhat broadly using Tseng's (2001) framework, which includes ethnic matching, changes to structure and content, technical delivery or structure of therapy, working with social systems, and facilitating empowerment and engagement. Culturally-adapted psychotherapies, ethnographic and motivational assessment were found to be effective and preferred by patients and carers; and high quality trials' efficacy for outcomes including symptoms and medication adherence were d=0.18-0.75.

It is therefore clear that evidence-based psychosocial interventions for schizophrenia spectrum diagnoses, originally developed in the West are an important element of therapy that require adaptation for both minority ethnic groups in Western countries; and for majority ethnic groups in non-Western countries. However, it is not clear to what extent these contrasting types of adaptation are successful, or even whether different types of adaptation

and target ethnic groups are comparable. One obstacle to understanding adaptations' importance in psychosocial interventions for schizophrenia is that none of the existing frameworks describing cultural adaptations (Barrera and Castro, 2006, Bernal and Sáez-Santiago, 2006, Hwang, 2009, Tseng, 2001) focus on interventions specific to this area. The review therefore had two aims: 1) to analyse inductively the nature of cultural-adaptations to psychosocial interventions and develop a framework describing the adaptations identified across controlled trials in schizophrenia; and 2) to assess the efficacy of adapted psychosocial interventions for schizophrenia spectrum diagnoses and examine the effect of differences between interventions, samples and other context and design features on outcome

Methods

The review followed Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Moher *et al.*, 2009).

Search strategy and study selection

On 3rd March 2016 the lead author (AD) conducted an electronic database search of Ovid MEDLINE, EMBASE, PsycINFO and Web of Science. Databases were searched from inception. See **A1** online supplementary material for search strategy. Two co-authors (AD and SB) independently screened the articles for eligibility using the following criteria:

Inclusion criteria

- Trials of any design evaluating a culturally adapted evidence-based psychosocial intervention (i.e. psychotherapies or interventions that address psychological and social factors to improve psychological and social functioning).
- Adaptations are made to the format, delivery or content of an existing Western intervention (i.e. influenced by European culture, including Europe, USA, Canada and Australia) to meet the cultural needs of a specific ethnic group or subculture (i.e. minority culture within a larger dominant culture).Trials evaluate interventions adapted for a minority ethnic population in a Western country or any non-Western population.
- Participants 18 years+ with a diagnosis of schizophrenia (DSMIV or ICD-10 F20-29: schizophreniform disorder, schizoaffective disorder, delusional disorder or psychosis not otherwise specified).
- At least one validated patient outcome measure to provide information on clinical effectiveness
- Peer-reviewed published articles available in English

Exclusion criteria

- Adaptations are generalised across multiple ethnic groups (and no findings available per group, despite author contact)
- Interventions without specific adaptations for culture; including assessment of an existing intervention in a different subculture or ethnic group without adaptation, direct translation only, or adapting for some other characteristic such as age or location (e.g. rural vs. urban)
- A novel intervention developed specifically for a particular subculture or ethnic group without adaptation of an existing evidence-based intervention (derived from a Western model)
- Non-evaluative studies (e.g. literature reviews, qualitative studies, case studies)

Full text papers of potentially relevant articles were accessed and screened by two reviewers (AD & SB). Authors were contacted to request English versions of non-English citations and those that could not be accessed. Reference lists of full text articles and systematic literature reviews were screened to identify any additional papers not picked up in the search. Key experts were contacted with full reference lists to identify missing studies. All uncertainties or disagreements relating to eligibility of articles were resolved via discussion with RD.

Data extraction

Descriptive characteristics of eligible studies were recorded in a data extraction spreadsheet. All adaptations described in the papers were extracted and summarised. Where there was limited information, corresponding authors were contacted and adaptations were extracted from any material they provided such as written summaries, protocol and treatment manuals. Sample size, means and standard deviations for symptom scores for adapted intervention(s) and control(s)) at each time point (baseline and follow-up(s)) were recorded. Authors were contacted for unreported data to calculate effect sizes.

Analysis of cultural-adaptation

Our aim was to review the current literature on cultural adaptations in schizophrenia and provide a synthesis that was grounded in empirical work and evidence. Thematic analysis (Braun and Clarke, 2006) was applied inductively to the extracted and summarised data on adaptations to generate themes and subthemes emerging from the data. This therefore reflected current application in the field, rather than deductively applying an existing model or framework to the data. We used Braun and Clarke's six phased approach: 1) data familiarisation; 2) generating codes (identifying adaptations in most basic form); 3) searching

for themes (identifying common areas of adaptation repeated across studies and combine into themes and subthemes); 4) reviewing themes; and 5) defining and naming themes.

Analysis of outcomes

Meta-analyses were conducted to examine the effects of culturally-adapted interventions on symptoms in schizophrenia. We focused on symptoms as this was the most commonly reported outcome, and assessed using reliable, validated and comparable scales. Only RCTs were included in the meta-analyses as they provide the most robust evidence of effectiveness (Concato *et al.*, 2000).

Meta-analyses were performed using Review Manager (version 5.3) software. Effect sizes were calculated using Hedge's (adjusted) *g*, which consists of the difference between the means of the adapted intervention versus the control group divided by the pooled standard deviation (corrected for sample size) and then further weighted for sample size (Hedges and Olkin, 2014). 95% confidence intervals (CI) are presented.

Cochrane's risk of bias tool (Higgins *et al.*, 2011) was used to assess the quality of RCTs by rating the level of bias (unclear, low, high) across six domains: sequence generation, allocation concealment, blinding of outcome assessors, incomplete outcome data, selective outcome reporting, and other sources of bias. Four RAs independently assessed all the studies and the lead author (AD) made final decisions on discrepant ratings. Publication bias was explored by examination of funnel plots (Higgins and Green, 2008) and there was evidence of slight asymmetry for positive symptoms (Egger et al., 1997). See online supplementary for risk of bias assessments (**A2**) and funnel plots (**A3**).

Heterogeneity of effects was assessed using I^2 tests (Higgins and Thompson, 2002) and explored using sensitivity and subgroup analyses to see if any outliers, pre-treatment differences, or intervention or study characteristics biased the results (see Table 1 for list of variables in subgroup analyses). Given the expected and observed variation across studies, random effects models were applied as they provide conservative estimates adjusted for observed heterogeneity (Brockwell and Gordon, 2001, Kontopantelis and Reeves, 2010).

Results

Study characteristics

46 papers comprising 43 individual studies with 7828 participants were included; 31 simple RCTs, 12 cluster RCTs, one block RCT and two non-randomised pilot trials. Sample sizes ranged from six to 3082 with a mean of 182. See **Figure 1** for the PRISMA flow chart and online supplementary for **Table A4** of descriptive characteristics of studies.

Intervention characteristics

Interventions were delivered in 13 different countries. The majority (74%, n=34) were conducted in Asia (25 in China, two in each of Pakistan, Taiwan, India and one in each of Iran, Saudi Arabia and Malaysia). Nine studies (20%) were conducted in America (six in the USA; two in Mexico; and one in Brazil) and one study (2%) was conducted in each of Europe (Italy), Australia and Africa (Egypt). Most interventions (85%, n=39) were adapted for a majority population with only seven studies (15%) adapted for a minority population.

Around half of the studies (54%, n=25) were family interventions (FI) consisting of a psycho-educational or mutual support component. FIs varied across the studies in terms of their components and the evidence-based models they were adapted from. Twenty two studies (88%) included group FI sessions. In 12 (48%) studies, all of the sessions were designed for the family members and patients to attend together, in five (20%) patients attended at least part of the intervention (25-86% of the sessions), and in eight (32%) only family members were invited. Ten studies (22%) evaluated some form of cognitive therapy, consisting of three social cognitive skills training, one social cognitive remediation therapy, three cognitive behavioural therapies (CBT), two meta-cognitive training (MCT), and one integrated psychological therapy (IPT). Family members attended two of the CBT interventions; the remaining eight cognitive interventions were for patients only. Three studies (7%) were combined interventions comprising components adapted from multiple Western therapy manuals and theoretical frameworks. One of these was a combined psychosocial intervention that included family therapy sessions. The other two were symptom coping programmes for patients only. Five studies (11%) assessed social skills training (SST). Family members attended four of the SST interventions. Of the remaining interventions, two (4%) were illness management and recovery (IMR) programmes and one (2%) comprised a mindfulness based psycho-education programme, both for patients only.

Over half of the interventions (59%, n=27) were delivered in a clinical setting. Six were delivered in community settings and four delivered sessions in both clinical and community settings. Nine studies did not report intervention setting. Duration of interventions ranged from three weeks (Lin et al., 2013) to two years (Carrà et al., 2006; Xiong et al., 1994; Zhang & Heqin, 1993; Zhang et al., 1998), with a mean of eight months. The majority of the interventions were led by mental health professionals (80%, n=37); five of these (all assessing group FIs) were co-facilitated by a family member participating in the study. Five studies did not specify therapist training.

Characteristics of the interventions are described in supplementary **Table A5.**

Cultural adaptations

A total of nine themes emerged from the data on adaptations. Details of the themes describing cultural-adaptations, with examples from the reviewed studies, are described in online supplementary (**Table A6**).

Language

Language adaptations were reported in all 46 studies: translating the original intervention into the national language (e.g. Bradley *et al.*, 2006, Koolaee and Etemadi, 2009, Kumar *et al.*, 2010, Xiang *et al.*, 1994), including local colloquialisms and idioms to improve cultural relevance and acceptability (Gohar *et al.*, 2013, Habib *et al.*, 2015, Naeem *et al.*, 2015, So *et al.*, 2015), and/or exchanging jargon for more culturally-appropriate words (e.g. replacing 'module' with 'treatment areas'; Valencia et al. 2010; Naeem *et al.*, 2015, So *et al.*, 2015).

Concepts and illness models

Most interventions (78%, n=36) incorporated culturally appropriate presentations of concepts, with consideration of culture-specific belief systems, enhanced mental health stigma and low levels of education. This included working with alternatives to the 'biopsychosocial' model, including the attribution of mental illness to spiritual or supernatural agents (Kopelowicz *et al.*, 2012, Razali *et al.*, 2000), predestination and fate (Koolaee and Etemadi, 2009), and an imbalance of yin and yang forces (Chan *et al.*, 2009). Some studies reported the inclusion of spiritual factors in formulations and discussion of locally held beliefs in psychoeducation (e.g. Habib *et al.*, 2015, Naeem *et al.*, 2015). Stigma was addressed by sharing personal stories and recovery narratives for normalisation, and holding group forums for participants to discuss concerns (Chien, 2008, Chien and Chan, 2004, Guo *et al.*, 2010, Lin *et al.*, 2013). Due to varied understanding and experience of mental illness and low education levels in certain cultural contexts, adaptations were made to alter the complexity and amount of psychoeducation or therapy material provided to make it more manageable for patients and families (Kung *et al.*, 2012, Patterson *et al.*, 2005, Zimmer *et al.*, 2007).

Family

Most individual interventions (76%, n=35) were adapted to acknowledge the pivotal role of the family in patient's care and recovery, as well as culturally distinct family structures and processes. This included efforts to encourage families' active and continued involvement throughout the intervention (Carrà *et al.*, 2007, Habib *et al.*, 2015); e.g. offering additional sessions or informal home visits for family members and maintaining contact after treatment (Bradley *et al.*, 2006, Kung *et al.*, 2012, Shin and Lukens, 2002, Xiong *et al.*, 1994). Modifications to accommodate more interdependent family structures and higher value being

put on familial responsibility than individualism (e.g. Chien, 2008, Li and Arthur, 2005) included involving family members in decision-making, assessing the needs of the family as a whole, and for example emphasising how medication adherence would benefit the family unit rather than the individual (Kopelowicz *et al.*, 2012, Mausbach *et al.*, 2008, Patterson *et al.*, 2005). Further considerations included sensitivity to culture-specific roles and expectations, e.g. expecting younger members not to question their elders (Chien and Chan, 2004, Koolaee and Etemadi, 2009, Valencia *et al.*, 2010).

Communication

Twenty two (48%) studies reported adaptations to integrate culturally-specific ways of communicating and learning. This included culturally-appropriate methods for dealing with conflict and problem solving, e.g. preference for reparative action rather than discussion in Chinese cultures (Chien, 2008, Chien and Chan, 2004, 2013, Chien and Lee, 2010, Chien *et al.*, 2008)) and replacing concepts of assertiveness and expression of individual needs in the West with mutual respect and avoidance of confrontation in more family dominant cultures (Habib *et al.*, 2015, Kung *et al.*, 2012, Patterson *et al.*, 2005). Considerations were made in relation to the disclosure of private information, due to the reluctance to openly discuss family matters (Chien and Chan, 2013) or irrelevance of confidentiality in close-knit families (Valencia *et al.*, 2010, Valencia *et al.*, 2007). Culturally appropriate teaching methods were also used; for example, encouraging collaboration and active participation in more passive cultures (Kopelowicz *et al.*, 2003, Patterson *et al.*, 2005), and using practical rehearsals and visual aids (Chien and Lee, 2010, Shin and Lukens, 2002).

Content

Twenty interventions (43%) made modifications to content. Content was added or removed from original manuals (Gohar *et al.*, 2013, Razali *et al.*, 2000, So *et al.*, 2015, Valencia *et al.*, 2010, Zimmer *et al.*, 2007) to improve cultural relevance (e.g. So *et al.* (2015) removed references to a conspiracy theory about a Western celebrity in meta-cognitive therapy for Chinese people) or feasibility (e.g. Valencia *et al.* (2010) omitted video-assisted modelling social skills training from the Mexican version due to limited technology).

Cultural norms

Adaptations were made to incorporate culture specific norms and practices in 31 (67%) studies. Interventions incorporated spiritual or religious practices and coping methods such as traditional healers, religious texts and prayer (Bradley *et al.*, 2006, Habib *et al.*, 2015, Wahass and Kent, 1997). Culturally relevant activities and scenarios were also integrated, e.g. Karaoke, Tai Chi and Mahjong (Mann and Chong, 2004); Baduanjin relaxation exercises (Kung *et al.*, 2012); and traditional folk stories/characters in role plays, recordings and videos

(Habib *et al.*, 2015, Lak *et al.*, 2010, Wahass and Kent, 1997). Recognising the social structures of certain cultures, additional efforts were made to incorporate community support through peer leaders, group meetings/workshops/seminars, and social gatherings outside of therapy (Chien and Lee, 2010, Kung *et al.*, 2012, Ran *et al.*, 2003, Xiang *et al.*, 1994).

Context

Almost half of the studies (48%, n=22) reported adaptations to facilitate feasibility in specific cultural contexts. These involved addressing cultural norms or organisational barriers due to lack of commitment, funding or resources (Kung *et al.*, 2012, Li and Arthur, 2005, Lin *et al.*, 2013). For example, delivering interventions at accessible locations where there are sufficient resources (e.g. Carrà *et al.*, 2007, Li and Arthur, 2005), offering flexibility in scheduling sessions (e.g. Guo *et al.*, 2010, Habib *et al.*, 2015); changing the duration of treatment (e.g. Kung *et al.*, 2012, Lin *et al.*, 2013); seeing patients and family together or separately (e.g. Carrà *et al.*, 2007, Kulhara *et al.*, 2009, Kung *et al.*, 2012); and the use of group versus individual interventions (e.g. Chien and Chan, 2004, Chien and Thompson, 2013).

Therapeutic alliance

Adaptations to improve therapeutic alliance were present in 28% (n=13) of studies. These included matching therapists and clients for ethnicity and other characteristics such as age, gender or language to enhance acceptability (e.g. Bradley *et al.*, 2006, Koolaee and Etemadi, 2009). A few studies reported training or supervising therapists to improve cultural competency (Kopelowicz *et al.*, 2003, Kopelowicz *et al.*, 2012). Other studies reported modifications to build rapport, trust and engagement; e.g. therapists engaging in small talk and warm up activities before the intervention (Kopelowicz *et al.*, 2003, Valencia *et al.*, 2010, Wang *et al.*, 2013), and presenting appropriate forms of self-disclosure from their own lives to facilitate a more personalised therapeutic relationship (Valencia *et al.*, 2010).

Treatment goals

These were modified in thirteen studies (28%) to develop formulations that were realistic and congruent with cultural values. These involved developing shared goals to meet the needs of the family unit and managing expectations of different family members; for example, the tendency to expect immediate and practical help from close relatives in Chinese cultures (Chien and Chan, 2004, Chien *et al.*, 2006).

Efficacy

All but four RCTs (Carrà *et al.*, 2007, Chien, 2008, Chien *et al.*, 2004, Wang *et al.*, 2013) evaluated the efficacy of culturally-adapted interventions against symptoms using validated scales, most often the BPRS or the PANSS (**Table A4**).

31 of the 40 RCTs examining symptoms were two-armed trials. Six (Chien & Chan, 2004; Chien & Chan, 2013; Chien, Chan & Thompson, 2006; Koolaee & Etemadi, 2010; Kopelowicz et al., 2012; Lak et al., 2010) comprised two adapted interventions and a third comparison group. Two of these reported results from the same trial (Chien & Chan, 2004; Chien et al., 2006). Three trials (Chien & Thompson, 2013; Mausbach et al., 2008; Ran et al., 2003) included one adapted intervention and two comparison groups.

Two studies (Gohar et al., 2013; Mausbach et al., 2008) compared the adapted intervention to the non-adapted version of the same intervention in a particular context, the gold standard test of whether modifying for culture is more effective than not. Both studies found no significant between-group differences in efficacy. One (Mausbach et al., 2008) was excluded from the meta-analysis because it included the same participants as an earlier study (Patterson et al., 2005) and had inadequate random allocation methods. Ten RCTs (Mann & Chong, 2004; Ran et al., 2003; Razali et al., 2000; Wahass & Kent, 1997; Weng et al., 2003; Xian et al., 1994; Xiong et al., 1994; Zhang & Hequin, 1993; Zhang et al., 1998; Zimmer et al., 2007) were excluded because sufficient data to allow calculation of g were neither reported nor could be obtained from the authors.

Therefore 29 studies were included in the meta-analyses on total, positive, negative and general symptoms. For forest plots, see **Figure 2** for total symptoms and **A7** supplementary for positive, negative and general symptoms. See **Table 1** for summary statistics for subgroup analyses for total symptoms and **A8** supplementary for positive, negative and general symptoms.

Post treatment effects

Total symptoms

For the 19 RCTs (n=2345) examining total symptom scores post-treatment (0-3 months), effect of the adapted intervention significantly exceeded that of control (*g:*-0.23; CI-0.36,-0.09; *p*<.001), with moderate heterogeneity (X^2=34.72, df18, *p*<.001, $I^2$48%) (**Figure 2**). To explore what study parameters might moderate heterogeneity or efficacy, we divided these studies into various subgroups (**Table 1**). Distinguishing between studies of minorities in the West and adaptation to ethnic majorities in LMIC reduced overall heterogeneity (see I^2), efficacy being significantly greater in studies of minorities (CI for mean difference in g:-0.67, -0.01; p0.044). Interventions attended by service users and family members were trend-

significantly more efficacious than those attended by service users only (CI for mean difference in g:-0.66, 0.01; p0.057). Distinguishing interventions by clinical setting (versus community) reduced heterogeneity (see I^2) without there being a significant difference in efficacy between groups. Other potential moderating variables neither significantly reduced I^2 in all subgroups nor identified groups with significantly different efficacy.

Positive symptoms

16 studies (n=1152) examined the effects of the adapted intervention on positive symptoms post-intervention (0-3 months)**.** There was significant efficacy (*g:*-0.56, CI-0.86,-0.26, *p*<.001), but substantial heterogeneity (X^2=86.99, df15, *p*<.001, $I^2$83%). No potential moderators substantially reduced heterogeneity (I^2) across all subgroups but cluster randomised trials had significantly poorer efficacy than others (CI for mean difference in g:0.25, 01.12; p0.036); and Chinese studies had significantly poorer efficacy (CI for mean difference in g:-1.50, -0.47; p0.018).

Negative symptoms

12 studies (n=855) reported post-treatment effects on negative symptoms (g:-0.39, CI-0.63,-0.15), with moderate heterogeneity ($\chi^2$30.79, df11, *p*<.001, $I^2$64%). Studies using standard care as a control were more efficacious than those using an active control (p0.076) or enhanced care (p0.042) and this reduced heterogeneity (I^2) in all groups. Dividing studies into family versus individual interventions reduced heterogeneity across all groups (difference in efficacy, p0.096).

General symptoms

Eight studies (n=525) examining PANSS general symptoms post-treatment demonstrated significant effects of the adapted intervention versus standard care (*g:*-0.75, CI-1.21,-0.29) and high heterogeneity ($X^2$40.99, df7, *p*<.001, $I^2$83%). Otherwise, distinguishing studies with more or less attrition than 15% reduced overall heterogeneity slightly ($I^2$70% in each group). There were no significant differences between subgroups in efficacy.

Sensitivity analyses

Further to examine the effect of methodology on outcomes we performed a range of other planned sensitivity analyses.

Individual studies

For each symptomatic outcome, studies were removed individually to identify any difference to mean weighted effect size or heterogeneity. Most showed negligible effects. However, one positive outlier (Habib *et al.*, 2015) reduced the effect size and heterogeneity when

removed from analyses of positive (*g:*-0.44 & $I^2$77%), negative (*g:*-0.34 & $I^2$60%) and general symptoms (*g:*-0.55 & $I^2$63%), but findings remained significant in favour of the adapted intervention (*p* <.001). Removing two studies (Bradley et al., 2006; Gohar et al., 2013) with highest risk of bias (i.e. open trial; 'as treated' analyses) increased efficacy for negative symptoms (g:-0.45 and 0.46) and positive symptoms (g:-0.61, Gohar et al., 2013). Excluding one study (So et al., 2015) with pre-treatment differences and high attrition (>40%) increased the effect size for general symptoms (g:-0.87) and positive symptoms (g:-0.60).

Follow up assessments

Separate analyses were conducted at multiple follow-up points; each analysis included fewer studies (n≤6) than the post-treatment analyses. For total symptoms, the aggregated effect was significant at 3, 6, 12 and 18-24 months follow-up (*g*0.18 to 1.00), with significant and large heterogeneity at 18-24 months ($I^2$79). Meta-analyses for positive symptoms showed significant effects at 12 months (*g:*-0.33; CI-0.54,-0.11) but not at 3, 6 or 15-18 months. Negative symptoms at 6 months follow-up showed significant improvement compared to controls (*g:*-0.27; CI–0.51,-0.04) based on data from two studies. There was no significant heterogeneity for positive and negative symptoms at follow-up. Only one study assessed general symptoms at 6 months (Kopelowicz *et al.*, 2003) (n=84, *g:*-0.09*,* CI-0.52, 0.34, *p*=0.67).

Three armed trials

For three-armed trials with two adapted interventions and one control (Chien & Chan, 2004; Chien & Chan, 2013; Chien, Chan & Thompson, 2006; Koolaee & Etemadi, 2010; Kopelowicz et al., 2012; Lak et al., 2010), all effects remained significant in favour of the adapted intervention when the above analyses were repeated exchanging the adapted intervention of interest with the second adapted intervention**.** One trial (Chien & Thompson, 2013) had one adapted intervention and two comparator groups but there was no difference in effect depending on whether data from the active (psychoeducation) or standard care control was included.

Degree of adaptation

There was a significant correlation between greater number of adaptations and better total symptom efficacy (r-0.49, p0.034). Regression confirmed that g improved 0.1 for each adaptation (B-0.097, β=-.487). **A9** supplementary details the adaptations for the reviewed studies.

Discussion

The present review and meta-analysis is the first to synthesise current evidence on the nature and effectiveness of culturally-adapted psychosocial interventions in schizophrenia. Thematic analyses of cultural-adaptations reported in each of the reviewed studies produced a framework that serves as a benchmark for future adaptations. It also provided an indication of the degree of adaptation for any given intervention, notwithstanding the *caveat* that not all adaptations are necessary or possible in different contexts.

We found considerable agreement regarding what constitutes cultural-adaptation. All studies reported adaptations to *language.* The majority made adaptations in the domains of *concepts and illness models*, *family* and *cultural norms and practices*: considering explanatory models of illness, incorporating spiritual/religious activities, and acknowledging culture-specific familial structures (e.g. interdependent and hierarchical). Other common adaptations were to recognise different forms of *communicating*, learning and problem-solving, removal of culturally-irrelevant *content*, and changing aspects of delivery to recognise *contextual* barriers. Studies also made modifications to improve engagement and *therapeutic alliance* and develop shared *treatment goals*. As previously reported in relation to adapted treatments for depression (Chowdhary *et al.*, 2014), authors reported changes to delivery to improve acceptability and feasibility in specific cultural contexts, rather than the core components of the interventions, thus maintaining their underlying theoretical models.

Our meta-analysis demonstrated significant effects in favour of the adapted intervention at post-treatment and follow-up. Post-treatment effect sizes for symptomatic outcomes (total symptoms *g*-0.23, positive *g*-0.46, negative *g*-0.39) were similar to those for non-adapted interventions (e.g. CBT SMD positive=0.37, negative=0.44; Wykes et al. 2008).

Since methodological quality can influence effect sizes (Tarrier and Wykes, 2004), with large differences in results from meta-analyses including RCTs versus those with observational or quasi-experimental designs (Pfammatter *et al.*, 2006), we restricted inclusion to studies with RCT designs, homogeneous ethnic groups and 100% schizophrenia samples. This may explain the more modest efficacy against total symptoms than in previous reviews of adapted interventions which included non-randomised trials and mixed ethnic and diagnostic samples (e.g. Chowdhary et al., 2014; Griner & Smith, 2006). Nonetheless, methodology still varied considerably, with differences in allocation (cluster/block, standard), control condition (standard care, active), and quality (e.g. 'intention to treat' analysis, blinding, attrition). Only two trials (Gohar et al., 2010; Mausbach et al., 2008) compared adapted and non-adapted interventions, the gold standard test of whether adaptation improves efficacy. Neither found significant treatment differences for psychopathology; Mausbach et al. (2008) was excluded as it comprised the same sample as an earlier study (Patterson et al., 2005) but had poor

randomisation methods and Gohar et al. (2013), though included, was an open trial. Moreover, few studies used active control conditions. We can therefore only conclude that adapting interventions for culture is more effective than usual care. Sensitivity analyses provided limited evidence that removal of individual trials with high risk of bias (i.e. pre-treatment differences, open trial and 'as treated' analyses) increased the effect size. Future studies using better designs, preferably three-armed RCTs, must be recommended to evaluate whether adapted interventions are more efficacious than standard care and their non-adapted equivalents.

To make a meta-analysis meaningful, one must assume that different interventions for a particular diagnosis have common elements that produce common efficacy in analogous populations. Where this is not the case, heterogeneity occurs and must be examined to reveal what processes influence outcome. The results showed that different types of interventions had generally similar efficacy, which suggests that each have common elements that may well be important to outcome even in diverse populations. However, there was substantial heterogeneity for each outcome, unsurprising given the diverse contexts and interventions (Higgins & Green, 2008). Subgroup analyses showed that features of context (i.e. Chinese or not; ethnic minority/Western or majority/ non-Western population), intervention (i.e. individual or family participation) and study design (i.e. randomisation method; control group) moderated outcome but were difficult to disentangle and there was limited evidence of a consistent pattern across symptomatic outcomes. The majority of studies were adapted for a majority population and were in Asian countries; with around half conducted in China. There was some evidence that studies of ethnic minorities in Western countries or outside China were more efficacious than studies of ethnic majority populations in non-Western countries or those in China. However, due to the small number of studies looking at minority populations, we were unable to examine efficacy of adaptations by ethnic minority group. Subgroup analyses also suggested that interventions attended by family members were more efficacious. Findings relating to differences in specific intervention models (e.g. CBT versus MCT) are inconclusive; though we attempted to examine intervention types in the subgroup analyses, categories were broad due to the limited number of studies available. Future trials should continue to test adapted interventions for specific ethnic or cultural populations with schizophrenia diagnoses to build on the current evidence base.

Limitations of this review include variation across studies in the quality of reporting of methodology. All papers reported some level of adaptation, but often poorly. Some authors did not respond to requests for additional information which may have led to an incomplete

picture of adaptation. Additionally, our empirically derived framework is based on adapted interventions reported in clinical trials. However, although beyond the scope of this review, it is worth noting that we reviewed our thematic framework against adaptations reported in non-evaluative studies that were generated from an initial broad search of the literature (with no restriction on design). Its application worked well, with no additional themes of adaptation identified. Some studies with incomplete statistical data were excluded from the meta-analyses, despite several attempts to contact authors. Poor reporting of methods in reviewed papers proved to be problematic for analysing overall risk of bias which meant we focused on three aspects of quality with the most variation (i.e. attrition, 'intention to treat' analysis, pre-treatment differences) in our heterogeneity analyses. We did not include unpublished studies but funnel plots reassured us of no more than minimal positive bias for positive symptoms due to selective reporting. We focused on symptomatic outcomes as this was the most common reported and consistently measured outcome. However, this outcome may not be the most appropriate or meaningful outcome for all psychosocial interventions. A limitation arises from the original studies that did not provide evidence as to how often symptomatic improvement was clinically significant. It is therefore unclear how criteria for such clinical significance translate across different cultures. Future studies should aim to measure the effects of adaptation on other patient outcomes, such as functioning and relapse. Another avenue for future research would be to consider caregiver outcomes and more qualitative data relating to the acceptability of culturally-adapted interventions to patients, carers and healthcare professionals.

Preliminary findings suggest that the greater the degree of cultural-adaptation the more efficacious the intervention. Although greater adaptation might correlate with unmeasured features of studies, such as quality of interventions or therapists, our framework may provide a useful heuristic model to guide clinicians and researchers in the development and reporting of adapted psychosocial interventions in schizophrenia. Our framework covers the *nature* of cultural adaptations. A fruitful avenue for future research is to review and develop guidelines relating to the *process* of cultural adaptation. This has recently been attempted in relation to depression (Chowdhary et al. 2014) and suggests that the process of adapting interventions is systematic and reliable but that information is missing in published work. Methodology relating to the nature and process of adaptation requires better reporting in future studies.

Conclusion

The degree of similarity in the process of adaptation across different psychosocial interventions allowed generation of a common framework describing cultural-adaptation

which may be useful in developing and reporting future interventions. This was validated by the evidence that not only were adapted interventions more efficacious than usual care but also that degree of cultural adaptation was proportional to efficacy. There was substantial heterogeneity in outcome, with features of context, intervention and study design affecting efficacy that were often related and difficult to disentangle. There was insufficient evidence to conclude that culturally adapted interventions are more efficacious than unadapted ones. While improved efficacy is an important aim for interventions adapted for ethnic minorities, adaptation is a necessity for implementation in low to middle income countries. Future research warrants better designed controlled trials that compare adapted versus unadapted interventions, particularly in minority populations.

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Conflict of interest

None

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The nature and efficacy of culturally-adapted psychosocial interventions for schizophrenia: a systematic review and meta-analysis

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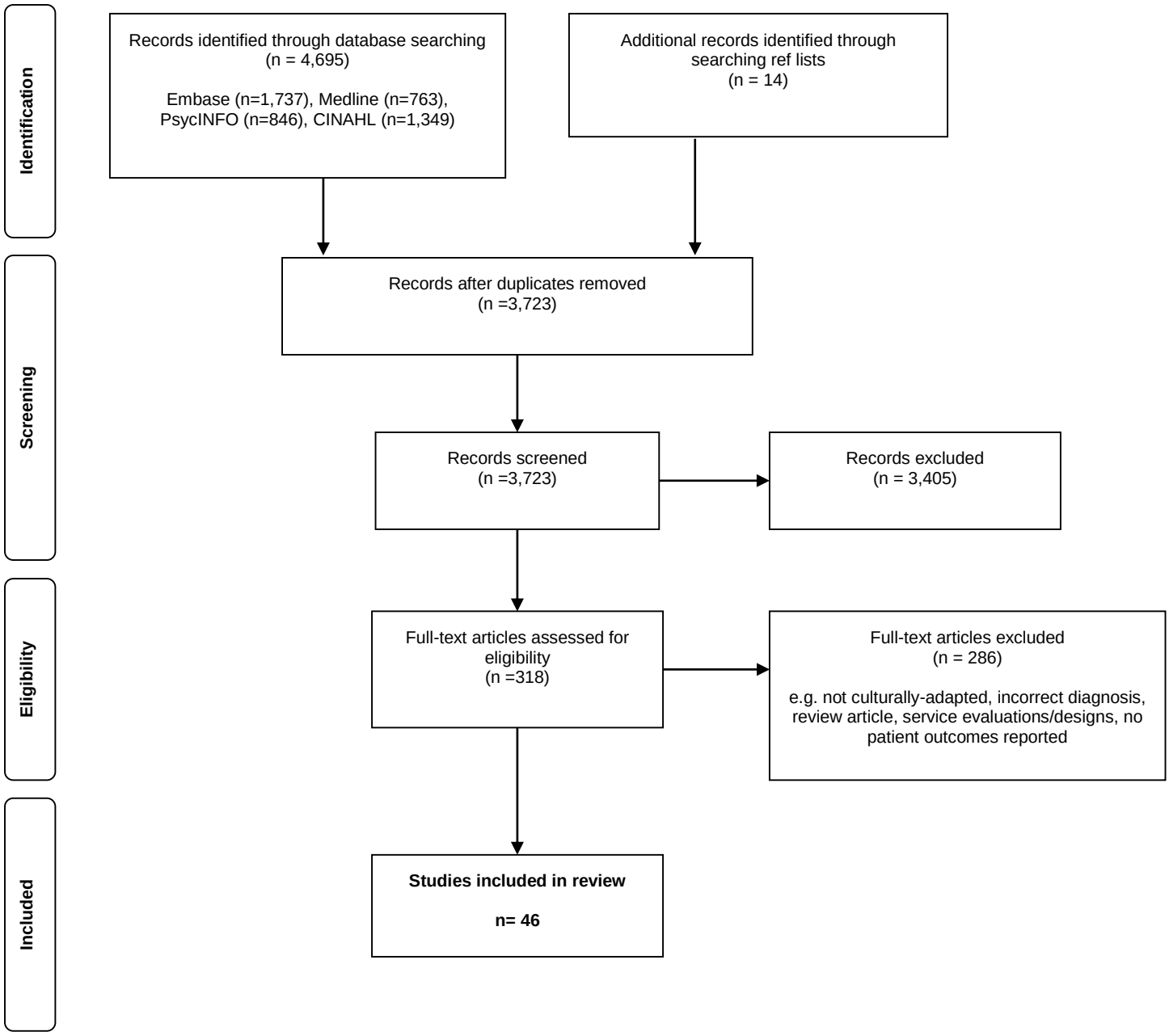

Figure 1. PRISMA flow diagram

TABLES AND FIGURES

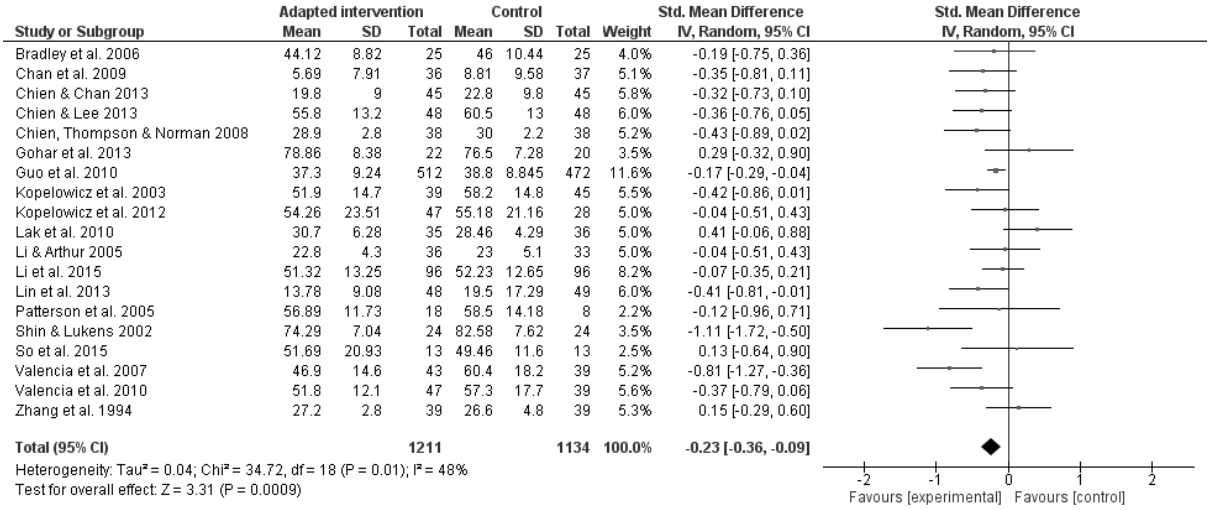

Figure 2. Forest plot of effect of culturally-adapted psychosocial interventions compared to control on total symptom severity post-treatment

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Table 1:

Subgroup analyses of RCTs of culturally-adapted interventions for schizophrenia (total symptoms; post-intervention; n=19)

Variable	SMDs			Heterogeneity				Number of studies	Sample size
	Effect size	95% CI	*p*	Chi^2	df	I^2 (%)	*p*		
Intervention type									
FI	-0.26	-0.50 to -0.03	**0.03**	13.21	7	47	0.07	8	559
Other (CBT, MCT, SCST, combined, IMR, PE, ST, ST + FI)	-0.21	-0.38 to -0.03	**0.02**	21.15	10	53	**0.02**	11	1786
OR									
Cognitive (CBT, MCT)	-0.05	-0.31 to 0.22	0.73	0.22	1	0	0.64	2	218
Skills training (ST, ST + FI)	-0.30	-0.79 to 0.18	0.22	14.20	3	79	**0.003**	4	323
Other (SCST, combined, IMR, PE)	-0.19	-0.33 to -0.05	**0.008**	4.37	4	9	0.36	5	1245
Control									
Standard care/ medication	-0.24	-0.41 to -0.06	**0.007**	14.01	8	43	0.08	9	1581
Enhanced standard care	-0.34	-0.54 to -0.14	**0.0010**	0.45	4	0	0.98	5	385
Active control	-0.10	-0.57 to 0.37	0.67	16.57	4	76	**0.002**	5	379
Region/ Population									
Western country/ Minority	-0.44	-0.71 to -0.17	**0.001**	11.52	6	48	0.07	7	451
Non-western country/Majority	-0.14	-0.27 to 0.00	**0.04**	15.79	11	30	0.15	12	1894
Attendees									
Patient only	-0.06	-0.30 to 0.18	0.63	10.34	6	42	0.11	7	550
Patient & family	-0.31	-0.47 to -0.15	**0.0002**	21.81	11	50	**0.03**	12	1795
Intervention modality									
Group	-0.25	-0.43 to -0.07	**0.006**	22.87	11	52	**0.02**	12	1713
Individual	-0.06	-0.31 to 0.18	0.61	0.01	1	0	0.92	2	261
Both	-0.26	-0.59 to 0.08	0.13	10.22	4	61	**0.04**	5	371
Intervention setting									
Clinical	-0.20	-0.29 to -0.11	**0.0001**	7.99	10	0	0.63	11	1831
Community	-0.24	-0.62 to 0.13	0.21	1.38	1	28	0.24	2	159
Both	0.02	-0.33 to 0.36	0.92	0.89	1	0	0.35	2	128
Attrition									
Below 15%	-0.21	-0.41 to -0.02	**0.03**	25.56	11	57	**0.008**	12	1016
Above 15%	-0.25	-0.45 to -0.05	**0.01**	9.15	6	34	0.17	7	1329
ITT									
Yes/ no attrition	-0.26	-0.44 to -0.08	**0.004**	29.50	11	63	**0.002**	12	1926
No/ 'as treated'	-0.16	-0.35 to 0.03	0.11	4.98	6	0	0.55	7	419
Design									
RCT	-0.24	-0.42 to -0.07	**0.007**	32.67	13	60	**0.002**	14	1895
Cluster/ block RCT	-0.16	-0.35 to 0.02	**0.09**	1.83	4	0	0.77	5	450
Country									
Chinese	-0.13	-0.27 to -0.00	**0.05**	12.14	9	26	0.21	10	1755
Not Chinese	-0.37	-0.62 to -0.13	**0.003**	16.65	8	52	**0.03**	9	590
Pre-treatment differences									
No	-0.22	-0.37 to -0.08	**0.002**	33.01	16	52	**0.007**	17	2235
Yes	-0.24	-0.75 to 0.26	0.35	1.49	1	33	0.22	2	110
Measure									
PANSS	-0.23	-0.42 to 0.04	**0.02**	13.04	7	46	0.07	8	1522
BPRS	-0.23	-0.43 to -0.02	**0.03**	21.56	10	54	**0.02**	11	823

Note:

CBT=Cognitive Behavioural Therapy; MCT=Metacognitive Therapy; SCST=Social Cognitive Skills Training; IMR=Illness Management and Recovery Programme; PE=Psychoeducation; ST=Skills Training; FI=Family Intervention; PANSS=Positive and Negative Symptom Scale; BPRS=Brief Psychiatric Rating Scale;

SUPPLEMENTARY

The nature and efficacy of culturally-adapted psychosocial interventions for schizophrenia: a systematic review and meta-analysis

SUPPLEMENTARY MATERIAL

CONTENTS

Appendix 1: Search strategy

TOTAL = CINAHL, PsycINFO, Medline & EMBASE = 4695

PsycINFO [ovid] = 846

[PsycINFO 1806 to March Week 1 2016]

1. exp schizophrenia/ or exp psychosis/
2. (psychotic or schizo* or psychosis or psychoses).sh.ti.ab.hw.id [subject heading, title, abstract, heading word, key concepts]
3. ((chronic* or sever*) adj5 mental* adj5 (ill* or disorder*)). sh.ti.ab.hw.id.
4. or/1-3
5. exp ethnology/ or exp culture (Anthropological) / or exp racial and ethnic groups/ or exp racial and ethnic differences/ or exp cross-cultural differences/ exp sociocultural factors/ or exp cultural sensitivity/ or exp acculturation/ or exp minority groups
6. (ethnic* or ethnolog* or cultur* or acculturation or rac* or minorit* or transcultur* or sociocultur*).sh.ti.ab.hw.id.
7. ((cultur* adj3 (identity or cross or specific or sensiti* or relevant or adapt* or competen* or divers*)).sh.ti.ab.hw.id.
8. ((ethnic or racial) adj3 (identity or group or minorit* or difference or variation or divers*)). sh.ti.ab.hw.id.
9. or/5-8
10. exp cross-cultural treatment/ or exp psychosocial rehabilitation/ or exp mental health services/ or exp psychotherapy/ or exp behaviour therapy/ or exp sociotherapy
11. ((psychological or psychosocial or psychiat* or clinical) adj5 (intervention or therap* or rehabilitation or treatment or care)).sh.ti.ab.hw.id.
12. ((cognitive or behav* or famil* or systemic or social* or education*) adj5 (intervention or therap* or rehabilitation or treatment or training or skill*)).sh.ti.ab.hw.id.
13. ((cognitive or behav*) adj5 (remediat*).sh.ti.ab.hw.id.
14. ((evidence based or empirically supported) adj5 (intervention or therap* or treatment)). sh.ti.ab.hw.id.
15. or/10-14
16. exp clinical trials/ or exp treatment effectiveness evaluation/
17. exp experimental controls
18. (controlled or clinical) adj3 (trial). sh.ti.ab.hw.id.

19. (random* or control* or trial or condition or assigned or group). sh.ti.ab.hw.id.
20. or/ 16-19
21. 4 and 9 and 15 and 20

Medline [ovid] = 763

[Ovid MEDLINE(R) 1946 to February Week 4 2016]

1. exp schizophrenia/ or exp psychotic disorders/
2. (psychotic or schizo* or psychosis or psychoses).ab.hw.kf.ti.kw [abstract, subject heading word, keyword heading word, title, keyword heading]
3. ((chronic* or sever*) adj5 mental* adj5 (ill* or disorder*)).ab.hw.kf.ti.kw
4. or/1-3
5. exp culture/ or exp ethnology/ or exp acculturation/ or exp cross-cultural comparison/ or exp cultural characteristics/ or exp cultural diversity/ or exp ethnic groups/ or minority groups
6. (ethnic* or ethnolog* or cultur* or accultur* or rac* or minorit* or transcultur* or sociocultur*).ab.hw.kf.ti.kw
7. (cultur* adj3 (identity or cross or specific or sensiti* or relevant or adapt* or competen* or divers*)). ab.hw.kf.ti.kw
8. ((ethnic or racial) adj3 (identity or group* or minorit* or difference or variation or divers*)). ab.hw.kf.ti.kw
9. or/5-8
10. exp rehabilitation/ or exp mental health services/ or exp psychotherapy/ or exp behaviour therapy
11. ((psychological or psychosocial or psychiat* or clinical) adj5 (intervention or therap* or rehabilitation or treatment or care)). ab.hw.kf.ti.kw
12. ((cognitive or behav* or famil* or systemic or social* or education*) adj5 (intervention or therap* or rehabilitation or treatment or training or skill*)). ab.hw.kf.ti.kw
13. ((cognitive or behav*) adj5 (remediat*). ab.hw.kf.ti.kw
14. ((evidence based or empirically supported) adj5 (intervention or therap* or treatment)). ab.hw.kf.ti.kw
15. or/10-14
16. exp clinical trial/ or exp controlled clinical trial/ or exp randomized controlled trial
17. exp random allocation/ or exp double-blind method/ or exp single blind method/ or exp control groups
18. (controlled or clinical) adj3 (trial). ab.hw.kf.ti.kw
19. (random* or control* or trial or condition or assigned or group). ab.hw.kf.ti.kw

20. exp feasibility studies/ exp pilot projects/ exp intervention studies
21. or/16-20
22. 4 and 9 and 15 and 21

Embase [ovid] = 1737

[Embase 1980 to 2016 Week 10]

1. exp schizophrenia/ or exp psychosis/
2. (psychotic or schizo$ or psychoses or psychosis).ti.hw.ab.kw.sh [title, heading words, abstract, key word, subject headings]
3. ((chronic$ or sever$) adj5 mental$ adj5 (ill$ or disorder$)).ti.hw.ab.kw.sh [title, heading words, abstract, key word, subject headings]
4. or/1-3
5. exp ethnology/ or exp ethnic group/ or exp cultural factor/ or exp minority group/ or exp cultural anthropology/ exp ethnic and racial groups/ exp cultural competence
6. (ethnic$ or ethnolog$ or cultur$ or accultur$ or rac$ or minorit$ or transcultur$ or sociocultur$).ti.hw.ab.kw.sh
7. (cultur$ adj3 (identity or cross or specific or sensiti$ or relevant or adapt$ or competen$ or divers$)).ti.hw.ab.kw.sh
8. ((ethnic or racial) adj3 (identity or group$ or minorit$ or difference or variation or divers$)).ti.hw.ab.kw.sh
9. or/5-9
10. exp psychiatric treatment/ or exp psychotherapy/ or exp sociotherapy/ or exp mental health services/ or exp psychosocial rehabilitation/ or exp behaviour therapy
11. ((psychological or psychosocial or psychiat$ or clinical) adj5 (intervention or therap$ or rehabilitation or treatment or care)). ti.hw.ab.kw.sh
12. ((cognitive or behav$ or famil$ or systemic or social$ or education$) adj5 (intervention or therap$ or rehabilitation or treatment or training or skill$)). ti.hw.ab.kw.sh
13. ((cognitive or behav$) adj5 (remediat$). ti.hw.ab.kw.sh
14. (evidence based or empirically supported) adj5 (intervention or therap$ or treatment). ti.hw.ab.kw.sh
15. or/10-14
16. exp clinical trials (topic)/ or exp controlled clinical trial/ or exp randomized controlled trial
17. exp randomisation/ or exp control group

18. (controlled or clinical) adj3 (trial). ti.hw.ab.kw.sh
19. (random$ or control$ or trial or condition or assigned or group).ti.ab
20. exp intervention study/ exp pilot study/ exp feasibility study
21. or/ 16-20
22. 4 and 9 and 15 and 21

CINAHL [EBSCO host] = 1349

MH = exact subject heading, MM = exact major subject heading

TX = keyword

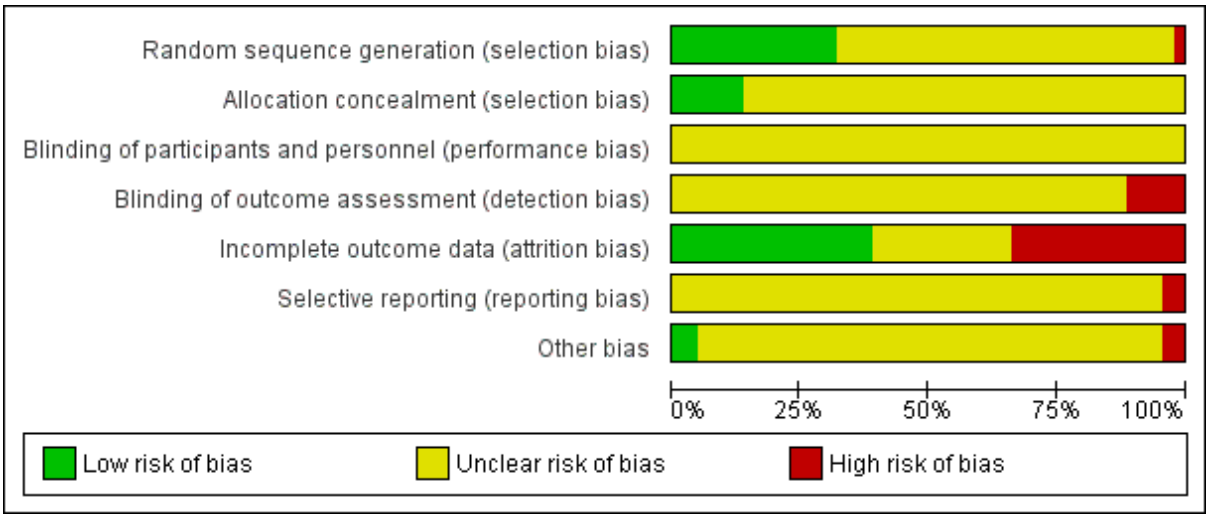
1. (MH “Schizophrenia+”) OR (MH “Psychotic Disorders+”)
2. TX=(psychotic OR schizo* OR psychosis OR psychoses)
3. TX=((chronic* OR sever*) N5 mental* N5 (ill* OR disorder*))
4. OR/1-3
5. (MH "Culture+") OR (MM "Acculturation") OR (MM "Cultural Diversity") OR (MM "Ethnic Groups") OR (MM "Ethnology") OR (MM "Minority Groups") OR (MM "Cultural Competence")
6. TX=(ethnic* OR ethnolog* OR cultur* OR accultur* OR rac* OR minorit* OR transcultur* ORsociocultur*)
7. TX=(cultur* N3 (identity OR cross OR specific OR sensiti* OR relevant OR adapt* OR competen* OR divers*))
8. TX=((ethnic OR racial) N3 (identity OR group* OR minorit* OR difference OR variation OR divers*))
9. OR/5-8
10. (MH "Rehabilitation, Psychosocial+") OR (MH "Mental Health Services+") OR (MH "Psychotherapy+") OR (MH "Behavior Therapy+")
11. TX= ((psychological OR psychosocial OR psychiat* OR clinical) N5 (intervention OR therap* OR rehabilitation OR treatment OR care))
12. TX=((cognitive OR behav* OR famil* OR systemic OR social* OR education*)N5 (intervention OR therap* OR rehabilitation OR treatment OR training OR skill*))
13. TX=((cognitive OR behav*) N5 (remediat*))
14. TX=((“evidence based” OR “empirically supported”) N5 (intervention OR therap* OR treatment))
15. OR/10-14

16. (MH "Clinical Trials+") OR (MM "Double-Blind Studies") OR (MM "Intervention Trials") OR (MM "Triple-Blind Studies") OR (MM "Therapeutic Trials") OR (MM "Single-Blind Studies") OR (MM "Randomized Controlled Trials")
17. (MM "Random Assignment") OR (MM "Control Group")
18. TX=((controlled OR clinical) N3 (trial))
19. TX=(random* OR control* OR trial OR condition OR assigned OR group)
20. TX= (“intervention study” OR “pilot study” OR “feasibility study”) OR MH “Feasibility Study”
21. OR/16-20
22. 4 and 9 and 15 and 21

SUPPLEMENTARY

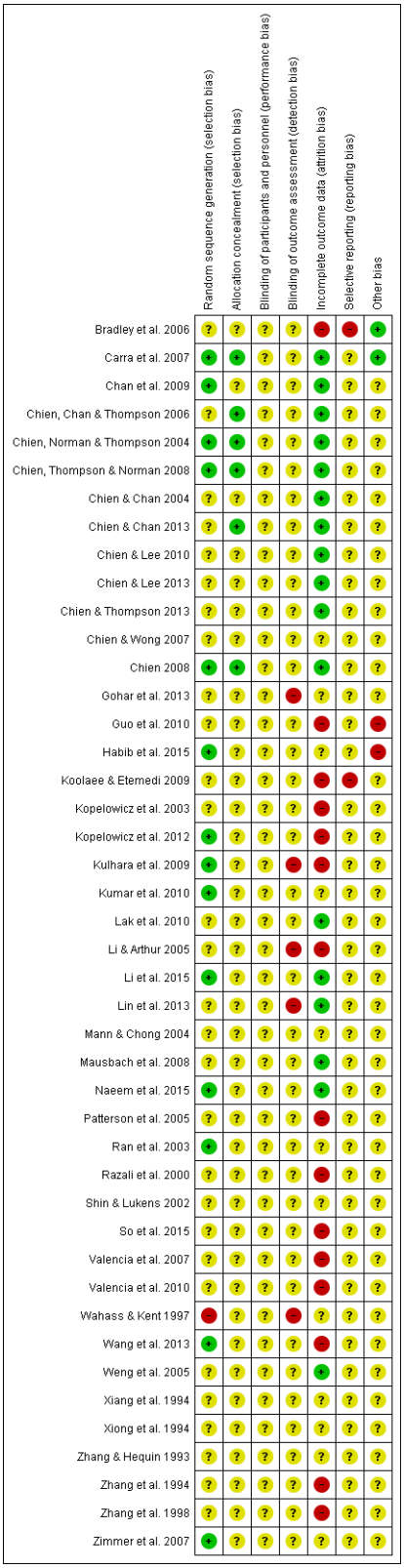
Appendix 2: Risk of bias assessments

A2.1: Risk of bias graph



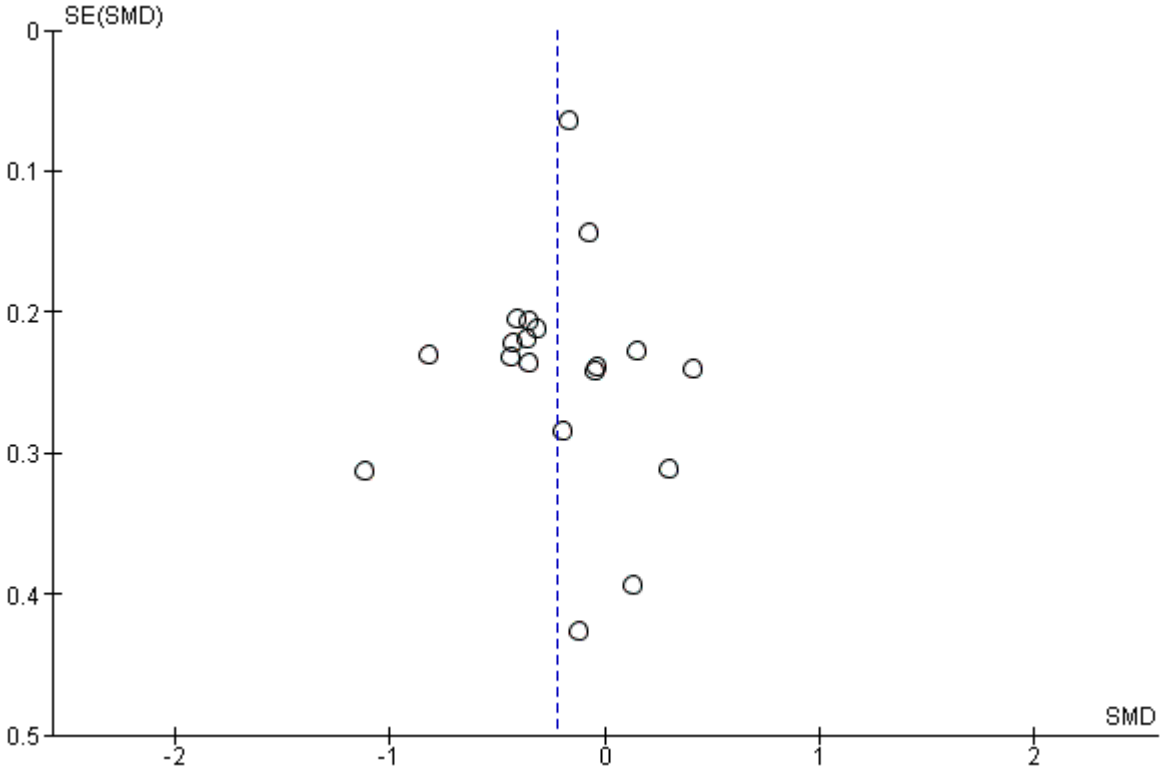
SUPPLEMENTARY

A2.2: Risk of bias summary

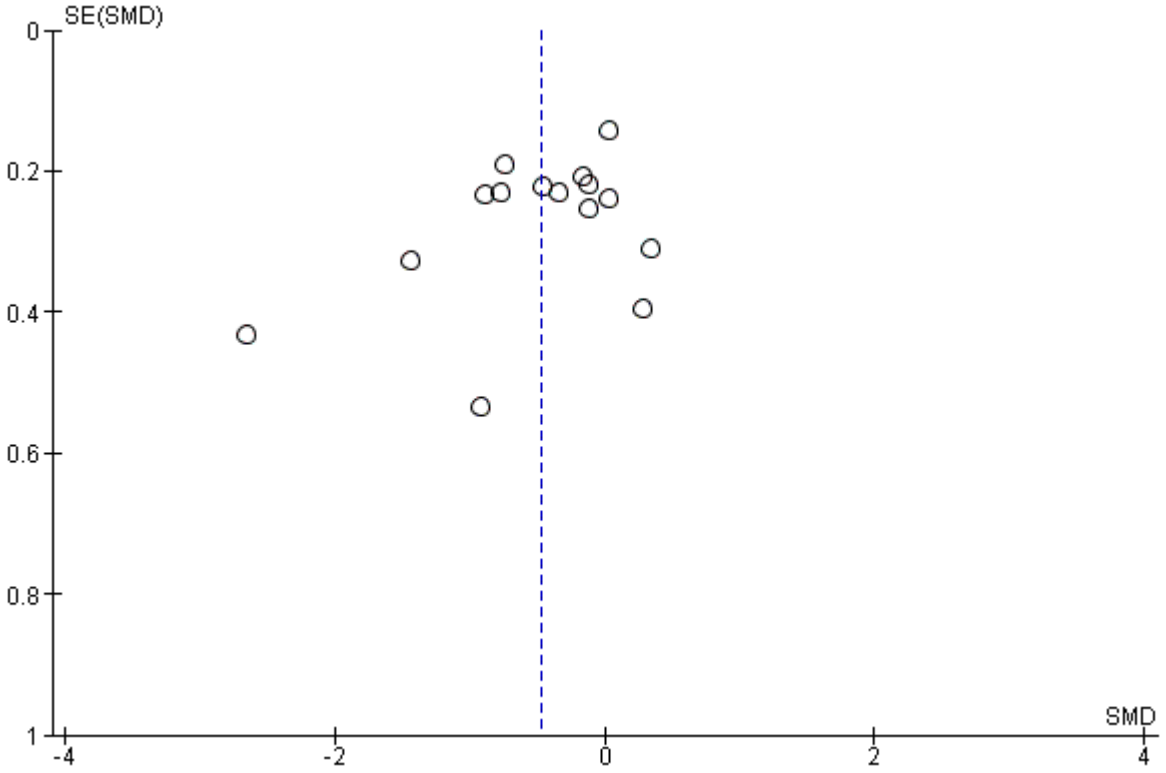


Appendix 3: Funnel plots

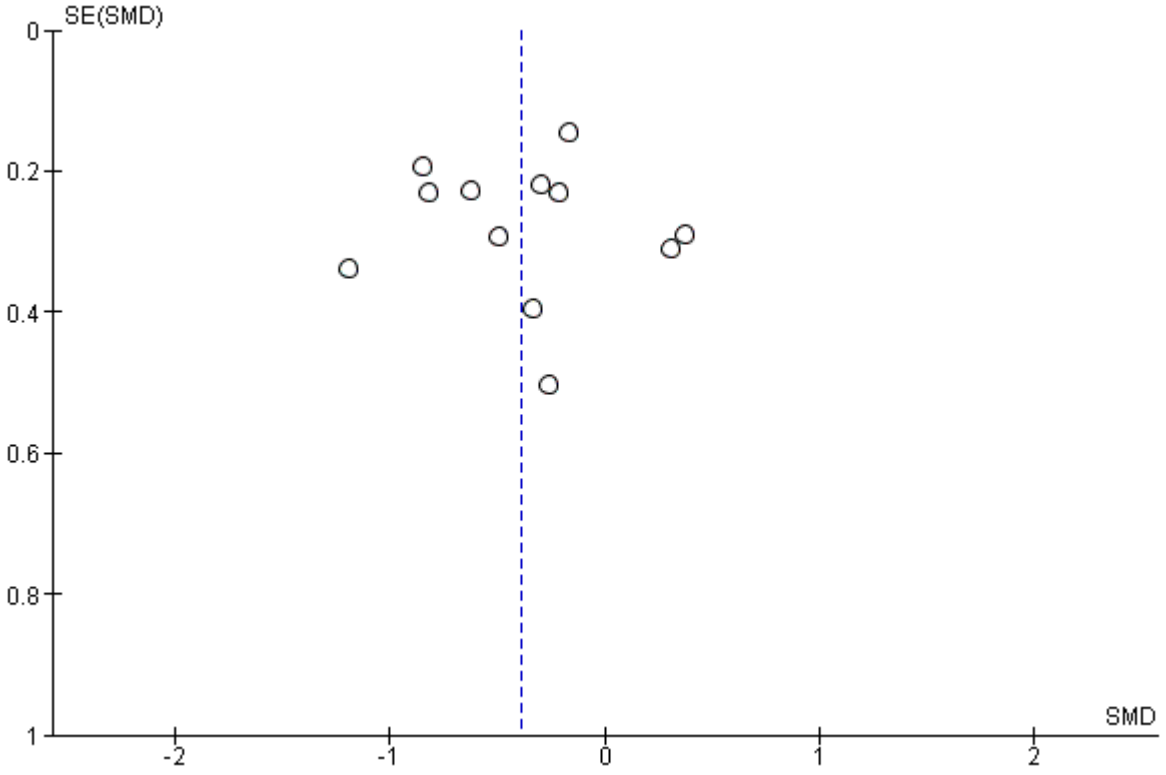
A3.1: Culturally-adapted intervention vs control. Total symptoms post-treatment (0-3 months)



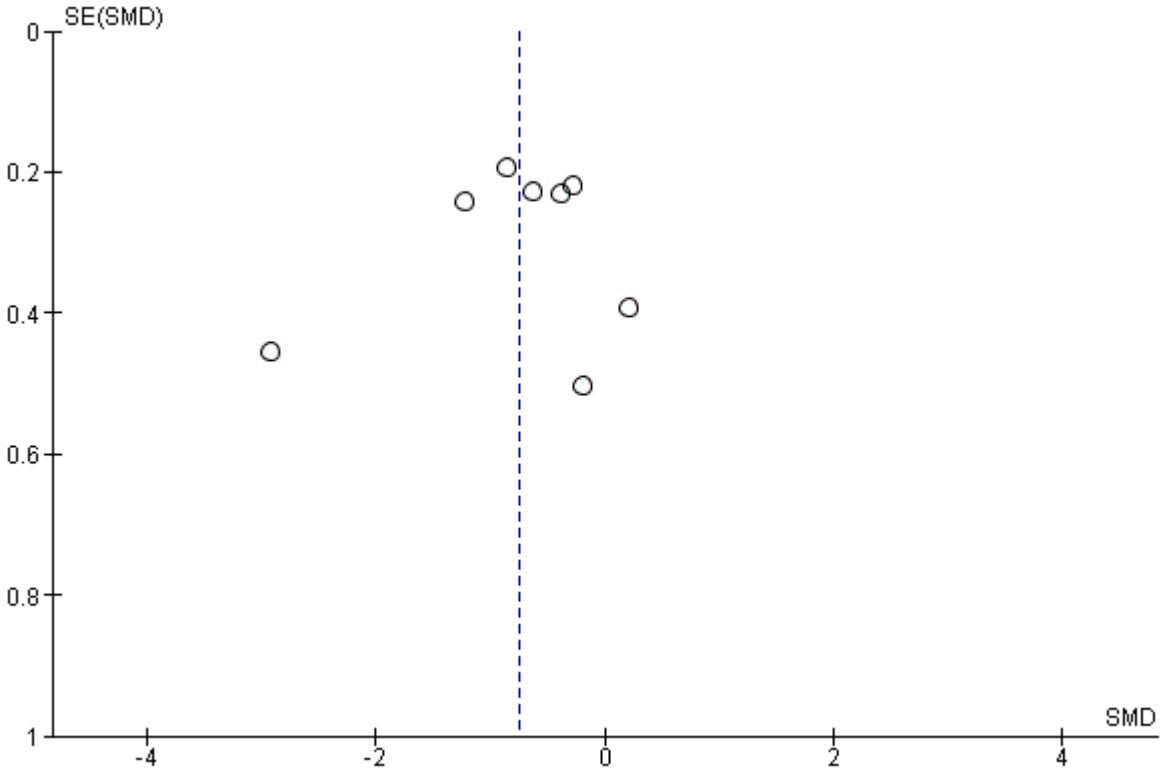
A3.2: Culturally-adapted intervention vs control. Positive symptoms post-treatment (0-3 months)



A3.3: Culturally-adapted intervention vs control. Negative symptoms post-treatment



A3.4: Culturally-adapted intervention vs control. General symptoms post-treatment



Appendix 4

Table A4: *Characteristics of studies included in the systematic review of culturally-adapted interventions (n=46)*

Author (year)	Study arms (N)		Sample characteristics				Study setting	Study design	Patient outcome measures (time point)	Attrition: timepoint N(%)	Key findings
	Adapted intervention(s)	Comparison group(s)	Gender N (M/F)	Mean age	Diagnosis (diagnostic tool)	Chronicity/ duration illness (yrs)					
Bradley et al. (2006)	MFGT: 30	Standard care – enhanced: 29	Total: 50 (15/35); MFGT: 25 (7/18); CG: 25 (8/17)	MFGT: 33.6; CG: 34	DSM-IV outpatient diagnosis schizophrenia by psychiatrist	HAs 12 mths pre-intervention: MFG: 0.60; CG: 0.29	Community mental health programme of the inner west mental health service- royal Melbourne hospital and participant home	RCT	BPRS; SANS; HoNOS; QOL (B, P-I); Relapse rates (P-I, 18 mth P-I)	18 mth P-I: Total: 9/59 (15.3) MFGT: 5/30 (16.7) CG: 4/29 (13.8)	Sig reduction found between baseline and P-I BPRS symptom scores for MFGT but no difference for CG Relapse rates at end and 18 months P-I were sig lower for MFGT compared to CG.
Carra et al. (2007)	IG: 50; IG+SG: 26	Standard care: 25	Total: 101 (73/28); IG: 50 (35/15); IG + SG: 26 (22/4); CG: 25 (16/9)	IG: 29.9; IG + SG: 29.6; CG: 29.9	DSM-IV schizophrenia casenotes screened by RAs	IG: 9.6; IG + SG: 11.3; CG: 10.3	Family advocacy and support agency, association for research on schizophrenia (ARS), Milan.	RCT	Treatment compliance; relapse rates, HA rates GAS; employment rates (B, 12 mth & 24 mth P-I)	24 mth P-I: Total: 6/101(5.9); IG: 3/50 (6); IG + SG: 2/26 (8); CG: 1/25 (4)	Compliance with standard community care sig higher at 12 month P-I in the IG+SG group than CG.
Chan et al. (2009)	PE: 36	Standard care – enhanced: 37	Total: 73 (48/25); PE: 36 (26/10); CG: 37 (22/15)	PE: 34.2; CG: 36.3	DSM-IV outpatient diagnosis schizophrenia by psychiatrist	PE: 10.2; CG: 10.5	Psychiatric out-patient department of a regional mental health hospital in Hong Kong	Cluster RCT	BPRS; ROMI; ITAQ; SES (B, P-I, 6 mth & 12 mth P-I)	No attrition	Sig improvements over time found for the PE group in BPRS, ROMI, and ITAQ scores. Sig group differences were found for BPRS at 6 mth, ROMI at P-I and at 6 mth P-I, and the ITAQ at 6 & 12-mths P-I.
Chien (2008)	PESG: 34	Standard care – enhanced: 34	Total: 68 NR	PESG: 37.3; CG: 28.8	DSM-IV schizophrenia diagnosis	2.5	Two psychiatric outpatient clinics, Hong Kong	Cluster RCT	SLOF (B , 1 & 12 mths P-I) No. & duration HA (6 mth pre-intervention, over 9 mth intervention period, 12-mth P-I)	12 mth P-I: Total: 5/68 (7.4); PESG: 3/34 (8.8); CG: 2/34 (5.9)	PESG showed sig improved level of functioning (SLOF) from B to 6 mth P-I when compared to CG.

SUPPLEMENTARY

Chien & Chan (2004)*	MSG: 32; PE: 33	Standard care – enhanced: 31	Total: 96 (62/34); MSG: 32 (20/12); PE: 33 (20/13); CG: 31 (22/9)	MSG: 32.3; PE: 29.1; CG: 33.8	DSM-IV schizophrenia diagnosis	Just over two years (range: 6mths-5yrs)	Two psychiatric outpatient clinics, Hong Kong	Cluster RCT	BPRS; SLOF; (B, 1wk & 12 mth P-I) No. & duration of HA (pre-intervention, over 6 mth intervention period, 12 mth P-I)	12 mth P-I: Total: 7/96 (7.3); MSG: 4/32 (12.5); PG: 2/33 (6.1); CG: 1/31 (3.2)	MSG participants reported sig reduction in rehospitalisation compared to the PE and CG groups and greater improvement in all three subscales of SLOF (self-maintenance, social functioning, and community living skills)
Chien & Chan (2013)	MSG: 45; PE: 45	Standard care – enhanced: 45	Total: 135 (84/51); MSG: 45 (28/17); PE: 45 (27/18); CG: 45 (29/16)	MSG: 24.3; PE: 25.2; CG: 26.2	DSM-IV schizophrenia diagnosis	Majority 1-2 yrs for all 3 groups	Two psychiatric outpatient clinics, Hong Kong	Cluster RCT	BPRS; SLOF (B, 1 wk, 12 & 24 mth P-I) No. & duration of HA (9 mth pre-intervention, 1 wk, 12 & 24 mth P-I).	24 mth P-I: Total: 7/135 (5.2); MSG: 2/45 (4.4); PG: 3/45 (6.7); CG: 2/45 (4.4)	At 12 mth and 24 mth P-I time points compared with the CG group, BPRS score decreased sig and the SLOF score for the MSG increased sig. Scores also decreased at 12 mth and 24 mth P-I when compared with PE group. The average length of re-hospitalisations was sig lower in the MSG than CG at all P-I time points.
Chien, Chan & Thompson (2006)*	MSG: 32; PE: 33	Standard care – enhanced: 31	Total: 96 (64/32); MSG: 32 (20/12); PE: 33 (22/11); CG: 31 (22/9)	MS: 27.3; PE: 27.8; CG: 28.8	DSM-IV outpatients casenote diagnosis schizophrenia	About 2 yrs (range: 6 mths-3 yrs)	Two psychiatric outpatient clinics, Hong Kong	Cluster RCT	BPRS; SLOF; (B, 6 mth & 18 mth P-I) No. and duration of HA (6 mth pre-intervention, 6 mth & 18 mth P-I)	18 mth P-I: Total: 7/96 (7.3); MSG: 2/32 (6.3); PE: 2/33 (6.1); CG 3/31 (9.7)	Readmissions to hospital in the MSG reduced sig more than the other two groups from baseline to 18 mths P-I. Level of functioning in MSG improved sig from baseline to 18 mth P-I compared to the other two groups. Patient functioning in the PE group also improved over time and sig more than the CG group.
Chien & Lee (2010)	SCMP: 46	Standard care – enhanced: 46	Total: 92 NR	NR	DSM-IV schizophrenia diagnosis	NR	Three psychiatric outpatient clinics, Hong Kong	RCT	BPRS; SLOF; (B, 1 mth & 15 mth P-I) No. & duration of HA (6 mth preceding intervention, 1	15 mth P-I: Total: 3/92 (3.3) SCMP: 2/46 (4.3); CG: 1/46 (2.2)	There were sig differences between the SCMP and CG with patients' functioning and number and length of re-hospitalisations at 1 mth and 15 mth P-I, although

									mth & 15 mth P-I)		patients' functioning and no. and length of re-hospitalisations in the SCMP group only sig improved at 15 mth P-I timepoint.
Chien & Lee (2013)	MBPP: 48	Standard care – enhanced: 48	Total: 96 (53/43)	25.8	DSM-IV schizophrenia diagnosis	NR	Three psychiatric outpatient clinics, Hong Kong	RCT	BPRS; SLOF; SSQS; ITAQ (baseline, 3 mth & 18 mth P-I) No. & duration HA (6 mths preceding intervention, 3 mth & 18 mth P-I)	18 mth P-I: Total: 6/96 (6.3); MBPP: 3/48 (6.3); CG: 3/48 (6.3)	There were sig differences between MBPP and CG related to patients' insight into illness, symptom severity, functioning and number and length of rehospitalisation at 3 mth and 18 mth P-I. MBPP participants' symptom severity, illness insight and length of rehospitalisation improved sig at 3 mth and 18 mth P-I but functioning and number of rehospitalisation only sig improved 18 mth P-I.
Chien, Norman & Thompson (2004)	MSG: 24	Standard care – enhanced: 24	Total: 48 (27/21); MSG: 24 (14/10); CG: 24 (13/11)	MSG: 39.9; CG: 36.3	DSM-IV schizophrenia diagnosis	Approx 2 yrs	Two psychiatric outpatient clinics	Cluster RCT	Duration of HA (3 mths preceding intervention, over the 3-mth intervention period & 3 mth P-I)	No attrition	In the MSG there was a sig decrease in the duration of patient rehospitalisation at 3 mth P-I compared to the CG.
Chien & Thompson (2013)	FPGP: 35	CG1: Standard care – enhanced: 35; CG2: psycho-education: 36	Total: 106 (66/40); FPGP: 35 (21/14); CG1: 36 (23/13); CG2: 35 (22/13)	FPGP: 26.3; CG1: 28.2; CG2: 27.2	DSM-IV schizophrenia diagnosis	2.5 yrs (range: 6 mths -6 yrs)	Three psychiatric outpatient clinics, Hong Kong	RCT	BPRS; SLOF; (B, 1 wk, 18 mth & 36 mth P-I) No. & duration of HA (6 mths preceding intervention, 1 wk, 18 mth & 36 mth P-I)	36 mth P-I: 12/106 (11.3); FPGP: 4/35 (11.4); CG1: 3/36 (8.3); CG2: 5/35 (14.3)	Functioning improved sig at 1 wk and 18 mth P-I. Re-hospitalisation of FPGP patients decreased sig at the three respective time points in number and duration compared with CG1 and decreased sig at 1 wk and 18 mth P-I when compared with CG2. In the FPGP there was a sig difference between patients SLOF score compared to PE &

											CG.
Chien, Thompson & Norman (2008)	MSG: 38	Standard care – enhanced: 38	Total: 76 (32/44); MSG: 38 (17/21); CG: 38 (15/23)	MSG: 25.3; CG: 25.6	DSM-IV schizophrenia diagnosis	MSG: 2.7; CG: 2.6	Two psychiatric outpatient clinics, Hong Kong	RCT	BPRS (B, 1 wk & 12 mth P-I) No.& duration of HA (6 mths preceding intervention, 1 wk & 12 mth P-I)	No attrition	In the MSG the duration of patients' rehospitalisation decreased sig at 12 mth P-I.
Chien & Wong (2007)	PE: 42	Standard care – enhanced: 42	Total: 84 (51/33)	28.8	DSM-IV schizophrenia diagnosis	3.6	Two psychiatric outpatient clinics, Hong Kong	RCT	BPRS; SLOF; (B, 1 wk & 12 mth P-I) No. & duration of HA (6 mths preceding intervention, 1 wk & 12 mth P-I)	12 mths P-I: Total: 7/84 (8.3); PE: 3/42 (7.1); CG: 4/42 (9.5)	In the PE group number of patients' rehospitalisation improved sig at 1 wk and 12 mth P-I. However patients' functioning and length of rehospitalisation only sig improved at 12 mth P-I.
Gohar et al. (2013)	SCST: 22	Non-adapted SCST	Total: 42 (34/8); SCST: 22 (16/6); CG: 20 (18/2)	SCST: 33.0; CG: 31.0	DSM-IV SCID I schizophrenia diagnosis	SCST: 11.8; CG: 8.4	Outpatient clinic of the psychiatry and addiction hospital of Kasr Al-Ainy hospitals, Cairo university, Egypt	RCT	PANSS; MSCEIT; TMT Part A and Digit Symbol Substitution Test; The Digit span task from the Wechsler Memory Scale; The Proteus Mazes task; (B, P-I)	NR – but tables suggest no attrition	SCST showed sig improvements in social cognition compared to CG. On the MSCEIT, the SCST group showed sig improvements on the total score and Branches 1 (Emotion perception) and 4 (Managing emotions)
Guo et al. (2010)	CT: 633	Medication: 635	Total: 1268 (698/570); CT: 633 (344/289); CG: 635 (354/281)	CT: 26.1; CG: 26.4	DSM-IV SCID I schizophrenia /schizophreniform diagnosis rated by investigators or trained staff; PANSS total score <60	CT: 2.1; CG: 2	Ten clinical sites in China (six university clinics and four province mental health agencies).	RCT	PANSS; ITAQ, GAS, ADL, SF-36 (B; 3 mth & 6 mth P-I) Rates of treatment discontinuation (assessed every 2 wks by a RA and monthly by a psychiatrist)	12 mth P-I: Total: 524/1268 (41.3); CT: 227/633 (35.9); CG: 338/635 (46.8)	Risk of relapse and readmission was lower in CT group. Change in ITAQ scores was greater in the CT group than CG. GAS and ADL scores were also greater over time for CT. CT also scored higher on 4 domains of the SF-36 (role-physical, general health, vitality, and role-emotional.)

Habib et al. (2015)	CaCBTp: 21	Standard care – medical consultation: 21	Total 42 (25/17); CaCBTp: 21(11/10); CG: 21 (14/7)	CaCBTp: 33.5; CG: 30.2	DSM-IV-TR inpatient diagnosis schizophrenia	CaCBTp: 8.8; CG: 8.6	Psychiatric inpatient clinic, Lahore Pakistan	RCT	PANSS; PSYRATS; SAI (B, P-I)	NR	CaCBTp group demonstrated sig greater improvement on PANSS pos, neg and general symptoms and PSYRATS hallucinations, delusions and insight P-I
Koolaee & Etemadi (2010)	BFM: 21 PE : 21	Standard care – enhanced: 20	Total: 55 (40/15)	NR	DSM-IV schizophrenia diagnosis	3 yrs or less	Psychiatric outpatient clinic in Tehran, Iran	RCT	BPRS (B, 3 & 6 mths P-I) Number & duration of HA(preceding 3 mths, B, 3 & 6 mths P-I)	P-I: Total: 7/62 (11.3) BFMG: 3/21 (14.3) PE: 2/21 (9.5) CG: 2/20 (10).	PE and BFM groups exhibited sig greater reduction in pos symptoms at 3 and 6 mths P-I compared to CG. PE pos symptoms reduced sig from B to 6 mths P-I when compared to BFM. Hospitalisation data NR.
Kopelowicz et al. (2003)	ST: 45	Standard care: 47	Total: 92 (62/30); ST: 45 (30/15); CG: 47 (32/15)	ST: 37.6; CG: 39.1	DSM-IV schizophrenia/ schizoaffective diagnosis; ≥1 episode of treatment in an inpatient facility ≥1 wk duration in previous 12 mths	NR	Community mental health centre, Los Angeles	RCT	PANSS; HA rates; ILSS; QOLI; ROMI; MMM + generalisation assessments; SMM + generalisation assessments (B, P-I & 6 mth P-I) Medication adherence (monthly)	6 mth P-I: Total: 8/102 (7.8) ST: 6/45 (13.3); CG: 2/47 (4.3)	ST participants showed sig reduced pos, negative and total symptoms post intervention which were maintained at 6-mth P-I. In the ST group there was also a sig main effect on skill acquisition for medication and symptom management skills. ST showed sigly improved level of functioning compared to CG at P-I. There was also sig lower rehospitalisation rates in the ST group from B to follow-up compared to the CG.
Kopelowicz et al. (2012)	MFG-A: 64 MFG-S: 54	Standard care: 60	Total: 174 (114/60); MFG-A: 64 (43/21); MFG-S: 53 (36/17); CG: 57 (35/22)	MFG-A: 32.6; MFG-S: 29.6 CG: 32.8	DSM-IV structured clinical interview schizophrenia/ schizoaffective diagnosis	NR	Two community mental health centres, Los Angeles	RCT	BPRS (B, P-I & 12-mth P-I; medication compliance (B, 4 mth & 8 mth P-B, P-I, 6 mth & 12 mth P-I) HA rates (4	12 mth P-I? Total: 33/178 (18.4) MFG-A: 10/64 (15.6); MFG-S:	At P-I, MFG-A demonstrated sig higher medication adherence than MFG-S or the CG. The MFG-A participants had a longer time to first hospitalization and were less likely to be

									mth & 8 mth P-B, P-I, 6 mth & 12 mth P-I)	13/54 (24.1); CG: 10/60 = (16.7)	hospitalized than those in MFG-S and the CG.
Kulhara et al. (2009)	PE: 38	Standard care – enhanced: 38	Total: 76 (42/34); PE: 38 (17/21); CG: 38 (25/13)	PE: 31.1; CG: 31.6	DSM-IV structured interview schizophrenia diagnosis	PE: 4.7; CG: 5.1	Department of psychiatry of a tertiary-care hospital in north-India	RCT	PANSS; WHODAS (B, 1, 2, 3, 4, 5, 6 & 7 mth P-B; P-I) Relapse (over the 9 mth intervention period).	P-I: Total: 33/76 (43.4) PE: 15/38 (39.5); CG: 18/38 (47.4).	There was a sig greater decline in monthly PANSS scores in the PE group on all three subscales in comparison to the CG group. The only patient outcome showing a sig difference from B to P-I was disability level, with the PE group showing sig lower levels of disability at P-I than the CG group.
Kumar et al. (2010)	HMCT: 8	Standard care: 8	Total: 16/0 HMCT: 8/0; CG: 8/0	HMCT: 31.5; CG: 34.1	ICD-10 patient diagnosis paranoid schizophrenia	HMCT: 7.6; CG: 6.5	Inpatient hospital, central institute of psychiatry, Ranchi, India	RCT	PANSS; (B, 2 wk P-B, P-I)	NR	The HMCT group demonstrated a sig greater reduction in positive symptoms P-I compared to CG.
Kung et al. (2012)	FP	'Comparison group'- no details	Total: 12; FP: 9; CG: 3	MFPG: 34.2; CG: 50.6	'schizophrenic form of disorder'	NR	Psychiatric outpatient clinics	Non-RCT	BPRS; SANS; SLOF; WQOL) (baseline, 3 mth post-baseline, post-intervention; 3 mth post-intervention)	No attrition	In the MFPG group BPRS and SANS scores showed sig improvement at post-intervention and 3mth post-intervention. The SLOF score was in the opposite direction than expected which was consistent with the previous within group baseline, 3 mth baseline, post-intervention and 3 mth post-intervention.
Lak et al. (2010)	CBCSM + SGT: 35 CBCSM: 35	'Placebo' education & rehab programme: 36	Total 106 (53/53); CBCSM + SGT: 35 (18/17); CBCSM: 35 (17/18); CG: 36 (18/18)	CBCSM + SGT: 38.3; CBCSM: 44.5; CG: 43.2	ICD-10 schizophrenia diagnosis, free from positive symptoms as indicated by (BPRS score > 72)	CBCSM + SGT: 15.6; CBCSM: 18.3; CG: 18.9	NR	RCT	BPRS; GAF; VSSS; ASSEI; PWI (B, P-I , 3 mth & 6 mth P-I)	6 mth P-I: Total: 10/106 (9.4); CBCSM + SGT: 4/35 (11.4); CBCSM: 6/35 (17.1); CG: 0/36	P-I, the CBCSM + SGT and the CBCSM group scored sig higher than the CG in social skills. At 6 mth P-I, social skill of CBCSM + SGT was better than the CBCSM group and the CG.

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Li & Arthur (2005)	FE: 46	Standard care: 55	Total: 101 (43/58); FE: 46 (18/28); CG: 55 (25/30)	NR	CCMD-II-R inpatient diagnosis schizophrenia	NR	Non-acute Inpatient hospital, Beijing, China	Cluster RCT	BPRS; GAS; KASI; NOSIE; relapse rates; medication compliance (B, P-I, 3 mth & 9 mth P-I)	9 mth P-I: 12/101 (11.9); FE 3/46 (6.5); CG: 9/55 (16.4)	FE group showed sig greater improvements in symptom severity, knowledge and overall functioning at 9 mth P-I compared to the CG.
Li et al. (2015)	CBT: 96	Supportive therapy (TE): 96	Total: 192 (72/120); CBT: 96 (32/64); CG: 96 (40/56)	CBT: 29.3; CG: 33.4	SCID DSM-IV Axis I schizophrenia by research psychiatrists	CBT: 7.6; CG: 8.8	Three specialised psychiatric hospitals, Beijing	Cluster RCT	PANSS; SAI; PSP (B, 12, 24, 36, 60 & 84 wk P-B)	84 wk P-B: Total: 25/192 (14.6); CBT: 11/96 (11.5); CG: 14/96 (14.6)	Both groups had sig decrease in all PANSS symptoms, SAI insight and PSP social functioning P-I (24 wks) which were maintained up to 84 wks P-B. Compared with CG, CBT showed sig greater reductions in PANSS total and pos symptoms and PSP functioning scores from 36 wk P-B.
Lin et al. (2013)	IMR: 48	Standard care: 49	Total: 97 (62/35); IMR: 48 (30/18); CG: 49 (32/17)	IMR: 35.3; CG: 35.2	DSM-IV - schizophrenia/ schizoaffective diagnosis	IMR: 11.8; CG: 11.2	Acute inpatient ward in two hospitals in Taiwan	RCT	BPRS; KI; DAI-30; SAI-E;. (B, P-I & 1 mth P-I)	1 mth P-I: Total: 14/97 (14.4); IMR: 4/48 (8.3); CG 10/49 (20.4)	The IMR group showed sig greater improvements at P-I and 1-mth P-I than the CG in BPRS neg symptoms, insight, illness-management knowledge and attitudes toward medication.
Lin et al. (2013)	IMR	NA	Total: IMR: 26 (18/8)	36.38	DSM-IV schizophrenia/ schizoaffective diagnosis	NR	Six psychiatric acute wards at a psychiatric hospital in the department of psychiatry, Taiwan	Non-RCT	BPRS; KFI; DAI-30; SAI-E (B, P-I)	NR	Participants improved in each psychopathology domain P-I, however only the change in the affective domain was sig.
Mann & Chong (2004)	SCP: 25	Education programme: 25	Total: 50 (38/12)	44.4	DSM-IV – schizophrenia diagnosis with active positive psychotic	Average length of stay in hospital: 26.2 (range: 12-68 mths)	Inpatient psychiatric hospital, Hong Kong	RCT	PANSS & LSP (B, P-I & 1 mth P-I)	NR	At P-I there was a sig. improvement between SCP and CG in PANSS scores. However this returned back to

					symptoms ≥1 yr assessed by psychiatrist						baseline level at 1 mth P-I.
Mausbach et al. (2008)+	PEDAL: 21	CG1: FAST (non-adapted PEDAL): 15 CG2: Support group (TE): 23	Total: 59 (35/24); PEDAL: 21 (11/10); CG1: 15 (10/5); CG2: 23 (14/9)	PEDAL: 50.7; CG1: 47.4; CG2: 47.3	DSM-IV diagnosis schizophrenia, schizoaffective or psychotic mood disorder	PEDAL: 23.5; CG1: 24.5; CG2: 23.8	Board & care (B&C) facilities, San Diego country and mental health clinics near the USA-Mexico border	Block RCT	PANSS; UPSA; SSPA; MMAA;; QWB (B, P-I)	P-I: Total: 10/59 (16.9) PEDAL: 3/21 (14.3); CG1: 2/15 (13.3); CG2: 5/23 (21.7)	PEDAL group showed a sig improvement on the UPSA compared to those in CG1 and CG2 groups. The PEDAL group had sig higher SSPA scores at P-I compared with the CG1but not the CG2.The PEDAL group also made sig fewer medication errors at P-I than the CG2 group.
Naeem et al. (2015)	CaCBTp: 59	Standard care: 57	Total: 116 (70/46); CaCBTp: 57 (39/18); CG: 59 (31/28)	CaCBTp: 31.7; CG: 31.1	ICD-10 RDC diagnosis schizophrenia or related disorder	CaCBTp: 4.7; CG:5.8	Psychiatric outpatient clinics, Karachi	RCT	PANSS; PSYRATS; SAI (B, P-I)	P-I Total: 14/116 (12.1); CaCBT: 6/ 59 (10.1); CG: 8/57 (14)	At P-I the CaCBTp group showed sig greater improvements compared with the CG in PANSS pos and neg symptoms and general psychopathology, PSYRATS delusions and hallucinations and insight.
Patterson et al. (2005)+	PEDAL: 21	Support group (TE): 8	Total: 29 (14/15); PEDAL: 21 (11/10); CG: 8 (3/5)	PEDAL: 46.8; CG: 57.3	DSM-IV case note diagnosis schizophrenia/ schizoaffective disorder	Age of illness onset (yrs): PEDAL: 28.3; SG: 43.5	Psychiatric clinics, San Diego	Cluster RCT	PANSS; UPSA; MMAA; SSPA;; QWB (B, P-I, 6 mth & 12 mth P-I)	12 mth P-I: Total: 5/21 (23.8) PEDAL: 5/21 (23.8); CG: No attrition	At 6 mth P-I the PEDAL had a sig greater UPSA score than the CG. However no sig differences were found between the groups at 6 mth and 12 mth P-I. At 12 mth P-I, the PEDAL group performed sig better than the CG. CG also had sig lower PANSS ratings than the PEDAL group at 12 mth P-I.
Ran et al. (2003)	FIG: 132	CG1: Medication treatment: 110 CG2: No	Total: 326 (128/198); FIG: 126 (44/82); CG1: 103 (48/55);	FIG: 43.5; CG1: 42.4; CG2: 44.8	ICD-10 & CCMD-2-R schizophrenia diagnosis	FIG: 11.6; CG1: 10.6; CG2: 12.3	NR	Cluster RCT	PSE; GPISS; SDSS; medication compliance; relapse rate (B, P-I)	P-I: Total: 22/326 (6.7); FIG: 1/127 (0.8): CG1: 2/105	At P-I, FIG treatment compliance was sig higher than that in the CG1 and CG2. There was no sig difference of clinical outcomes

		intervention: 115	CG2: 97 (36/61)							(1.9); CG2: 18/115 (15.7)	between FIG group and the CG1 while the percentage of full recovery and sig improvement in FIG & CG1 was sig higher than that in the CG2. The relapse rate in FI was sig lower than CG1.
Razali et al. (2000)	CMFT: 80	BFT: 86	NR	NR	DSM-IV diagnosis schizophrenia	CMFT: 13.7; CG:14.2	Outpatient hospital, University Hospital (USM) Kota Bharu, West Malaysia	RCT	BPRS; GAF; SBS; relapse rates; HA rates; medication compliance (B, 6 mth & 12 mth P-B)	6 & 12 mth P-B Total: 23/166 (13.9) CMFT: 6/80 (7.5); CG: 17/86 (19.8)	At 12 mth P-B the CMFT group showed sig improvements in all variables compared to the CG.
Shin & Lukens (2002)	PE: 24	Supportive therapy (TE): 24	Total: 48 (20/28); PE: 24 (7/17); CG: 24 (13/11)	PE: 39.5; CG: 34.7	DSM-IV diagnosis schizophrenia, schizoaffective, or shizophreniform disorder rated by psychiatrist	Number of hospitalisations: PE: 2.7; CG: 1.2 Time since last hospitalisation (mths): PE: 7.2; CG: 12.7	Outpatient mental health clinic, Queens	RCT	BPRS; SDS (B, P-I)	NR (tables suggest no attrition)	At P-I, the PE group demonstrated sig reduced symptom severity and perception of stigma in comparison to the CG group.
So et al. (2015)	MCTd: 23	Standard care - medication consultations: 21	Total: 44 (24/20); MCTd: 23 (12/11); CG: 21 (12/9)	MCTd: 32.4; CG: 35.6	Casenote diagnosis schizophrenia, ≥4 PANSS delusions items	Number of hospitalisations: MCTd: 1.6; CG: 0.9	Outpatient clinic, Hong Kong	RCT	PANSS; PSYRATS; (B, P-I & 1 mth P-I) WAIS (B or pre-intervention only)	1 mth P-I: Total: 18/44 (40.9) MCTd: 10/23 (43.5); CG: 8/21 (38.1)	At P-I there was a large effect size of improvement for the MCTd group's PANSS pos scores, PANSS delusions score, PSYRATS delusions and PSYRATS delusional conviction.
Valencia et al. (2007)	PSST: 49	Standard care - medication consultations: 49	Total: 82 (64/18); PSST: 43 (31/12); CG: 39 (33/6)	PSST: 29.7; CG: 30.1	DSM-IV & CIDI schizophrenia diagnosis with clinically stable psychotic symptoms (≥60 PANSS score)	Age of illness onset (yrs): PSST: 21.3; CG: 21.2	Psychiatric outpatient hospital, Mexico	RCT	PANSS; PSFS; GAF (B, P-I) Relapse rates; HA rates; medication compliance; therapeutic adherence (Over 12 mth	P-I: Total: 16/98 (16.3) PSST: 6/49 (12.2); CG: 10/49 (20.4)	At P-I, the PSST group showed sig improved symptomatology scores on total score, pos and neg symptoms and GPS compared with the CG, with large effect sizes for both groups. Sig. improvements were also observed in the PSST

									intervention period)		group for all areas of psychosocial functioning and in the GPFS compared with the CG and also with global functioning. During the intervention the PSST group had a sig higher level of compliance with medication, therapeutic adherence and sig lower relapse rate than the CG.
Valencia et al. (2010)	PSST: 54	Standard care - medication consultations: 53	Total: 83 (60/23); PSST: 47 (34/13); CG: 36 (26/10)	PSST: 29.9; CG: 29.5	DSM-IV & CIDI schizophrenia diagnosis	Age of illness onset (yrs) PSST: 22.4; CG: 21.1	National institute of psychiatry outpatient clinic, Mexico city	RCT	PANSS; GAF (B, P-I) Relapse rates; HA rates, adherence to medication (over 12 mth intervention period)	P-I: Total: 24/108 (22.2); PSST: 7/54 (13); CG 17/54 (31.5)	At P-I, the PSST group exhibited sig improved symptomatology, adherence to medication, attendance at appointments, social functioning, relapse and rehospitalisation rates.
Wahass & Kent (1997)	MPI: 3	Standard care - medication consultations: 3	Total: 6 (6/0); MPI: 3 (3/0); CG: 3 (3/0)	MPI: 31.3; CG: 34.0	ICD-10 schizophrenia diagnosis	Experiencing persistent auditory hallucinations for at least 4 yrs	NR	RCT	SAHI; 10cm VAS to measure hallucination severity; Two VAS to measure anxiety and depression in response to voices (B, P-I, 3 mth P-I)	NR – tables suggest no attrition	Symptom ratings improved for two participants in the MPI group but there were no changes in the third participant. The third patient also reported that the loudness of his voices increased over time.
Wang et al. (2013)	SCIT: 22	Standard care - medication consultations: 17	Total: 39 (20/19); SCIT: 22 (12/10); CG: 17 (8/9)	SCIT: 43.9; CG: 40.9	DSM-IV schizophrenia diagnosis	NR	NR	RCT	PANSS; WAIS; PSP; FEIT; Computerised version of the Eyes Task; Attributional Style Questionnaire (B, 6 mth P-I)	6 mth P-I: Total: 4/43 (9.3) SCIT: 0/22 (0); CG: 4/21 (19)	The SCIT group showed a sig improvement in emotion perception, theory of mind, attributional style and social functioning compared with the CG.
Weng et al. (2005)	MRP: 62	Standard care –	Total: 124; MRP: NR;	NR	DSM-III-R schizophrenia	NR	An-ding psychiatric	RCT	BPRS; NOSIE; SDSS; relapse	12 mth P-I: Total:	BPRS, NOSIE, SDSS relapse and

		enhanced: 62	CG: NR		diagnosis		hospital inpatient ward, Beijing		& HA rates (every 2 wks during intervention; monthly P-I up to 12 P-I)	2/124 (1.6) MRP: 1/62 (1.61); CG: 1/62 (1.61)	rehospitalisation rates improved sig in the MRP group from B to P-I and from P-I to 12 mth P-I.
Xiang et al. (1994)	PFI: 36	Medication treatment: 41	Total: 77 PFI: 36; CG: 41	PFI: 40.5; CG: 41.2	Schizophrenia & affective psychoses	15.3	Three rural townships of Xinjin county, China	RCT	PSE; SDSS; med compliance rates (B, P-I	NR	Med compliance sig higher in the PFI group than in the CG P-I, in addition the total rate of improvement in clinical state and level of social functioning was sig higher in the PFI group than in the CG group P-I.
Xiong et al. (1994)	FIG: 34	Standard care - medication treatment: 29	Total: 63 (43/20)	31	DSM-III-R schizophrenia assessed on admission	7.5	Psychiatric outpatient clinic & home visits	RCT	BPRS; SAPS; SANS; GAF; SDSS; no. & duration of HA; relapse rates; meds compliance (B, 6, 12 & 18 mths P-I)	18 mths P-I: Total: 4/63 (6.3) FIG: 2/34 (5.9) CG: 2/29 (6.9)	Duration of rehospitalisation sig shorter for FIG group at 12 and 18 mths, and fewer relapsed at 12 mths than CG. BPRS, GAF and SDSS scores at 12 mths and SAPS, BPRS, GAF and SDSS scores at 18 mths showed sig greater improvements in FIG group.
Zhang & Heqin (1993) ^	FE: 2076	Standard care: 1016	Total: 3,082 (1,821/1,261); FE: 2,076 (1,239/837); CG: 1,016 (582/424)	FE: 40.3; CG: 40.8	CCMD-2 schizophrenia diagnosis	FE: 15.1; CG: 15.5	NR	Cluster RCT	Study-specific questionnaire; symptoms, recovery, relapse & duration hospitalisation; WHO- DAS (B, 6 & 12 mth P-I)	NR	At P-I, participants in the FE group showed a higher rate of recovery or stabilization of condition; a greater reduction in exacerbation of both pos and neg symptoms, relapse rates, number institutionalized, duration of hospitalization, plus total and factor score on the DAS.
Zhang et al. (1994)	FIG: 42	Standard care: 41	NR	FIG: 23.5; CG: 24.1	Chinese medical association (1985) first admission patients with a	NR	Psychiatric outpatient clinic and family home	RCT	BPRS; GAS; HA rates (baseline; P-I, 3, 6, 9, 12, 15 & 18 mth P-I)	18 mth post-intervention Total: 5/83 (6); FIG:	At 18 mth P-I, participants in the FI group who were not readmitted had less severe psychiatric

					diagnosis of schizophrenia					3/42 (7.1) ; CG: 2/41 (4.9)	functioning and higher overall functioning compared to members of the CG who were not readmitted. The proportion of patients who were readmitted to hospital was sig greater among those in the CG in comparison to participants who received the FI.
Zhang et al. (1998) ^	FE: 682	Standard care: 355	Total: 1037 (642/395); FE: 682 (420/262); CG: 355 (222/133)	FE: 38.3; CG: 39.0	CCMD-2 schizophrenia diagnosis	FE: 7.3; CG: 7.7	NR	Cluster RCT	Study-specific questionnaire; to assess severity of the illness and symptoms, relapse, duration of HA; WHO-DAS (B, 6, 12 & 24 mth P-B)	24 mth P-B Total: 236/ 1284 (18.4) FE: 169/851 (19.9); CG: 67/433 (15.5).	At 24 mth P-B, those in the FE group showed a higher rate of recovery and stabilisation of the condition; a lower rate of exacerbation of symptoms and a reduction in annual relapse rates and annual times institutionalised in comparison to the CG.
Zimmer et al. (2007)	IPT: 23	Standard care - medication consultation: 43	Total: 56 (42/14); IPT: 20 (17/3); CG: 36 (25/11)	IPT: 36.1; CG: 39.3	'Schizophrenia outpatient database'	IPT: 15.3; CG: 17.1	Schizophrenia outpatient program of the hospital de clinicas de porto alegre (HCPA)	RCT	MMSE; GAF; SOFAS; WHOQOL-BREF; SAS (B, P-I)	Total: 4/56 (7.1) NR by group	At P-I, the IPT group demonstrated sig improved scores on cognition in the domains of spatiotemporal orientation, memory, social adjustment, leisure/social life, family relations, overall functioning, social occupational functioning and quality of life in the psychological domain

Note:

* Same sample – Chien, Chan & Thompson. (2006) reports 18 follow-up data for participants in Chien & Chan (2004)

+ Same sample – Mausbach et al. (2008) uses same participants as Patterson et al. (2005) in addition to participants from a second wave of recruitment (SG: n=15; FAST: n=15)

^ Same sample – Zhang et al. (1998) reports 24 month follow-up for subsample of participants (2/5 catchment areas) in Zhang & Hequin (1993)

Standard care = usual care package with case management/care coordinator and psychiatrist visits to monitor medication

SUPPLEMENTARY

Standard care enhanced = offered additional education or counselling to usual case management intervention.

Timepoints: B = baseline; P-I= post-intervention; P-B = post-baseline; RA = research assistant; HA = hospital admission; TE = time equivalent

Bold text = included in meta-analysis on symptoms

Study arms: BCSM = Basic conversation skills module; BFM = Behavioural family management; BFT = Behaviour family therapy; CaCBTp = Culturally-adapted cognitive-behavioural therapy for psychosis; CBCSM = Chinese basic conversation skill module; CBT = Cognitive-behavioural therapy; CMFT = Culturally modified family therapy; CSPE = Culturally-sensitive psychoeducational group program; CT = Combined treatment; FAST = Functional adaptation skills training; FE= Family education programme; FIG = Psychoeducational family intervention group; FPGP = Family-led peer support group programme; HMCT=Hindi meta-cognitive training; IG + SG = Information group programme and additional support programme; IMR = Adapted illness management and recovery programme; IPT = Integrated psychological therapy; IST = Individual supportive therapy; MBPP = Mindfulness-based psychoeducation programme; MCTd= Metacognitive training for delusions; MFG = Multiple-family group; MFG-A = Adherence-focused MFG therapy; MFG-S = Standard MFG therapy; MFGT = Multiple-family group intervention; MFPG = Family psychoeducation programme; MPI = Modified psychological intervention; MRP = Multimodal rehabilitation program; MSG = Mutual support group family intervention; PE = Psychoeducation programme; PFI = Psychoeducational family intervention; PEDAL = Programa de entrenamiento para el desarrollo de aptitudes para latinos; PESG = Psychoeducation and mutual support group program; PSST = Psychosocial skills training; SCIT = Social cognition and interaction training; SCP = Symptoms coping programme; SCMP = Schizophrenia care management programme; SCST = Social cognitive skills training; SST = Social skills training; ST = Skills training; TIPSS = Training in interpersonal problem-solving skills

Diagnostic criteria: CCMD = Chinese classification and diagnostic criteria of mental disorders; CIDI = The Composite International Diagnostic Interview; ICD = International statistical classification of diseases and related health Problems; DSM = Diagnostic and Statistical Manual of Mental Disorder; PANSS = The positive and negative syndrome scale; SCID I = Structured clinical interview for DSM-IV disorders

Outcome measures: ADL = Activities of Daily Living Scale; ASSEI = Adult Sources of Self-Esteem Inventory; BPRS = Brief Psychiatric Rating Scale; DAI-30 = Drug Attitude Inventory-30; DAS = The Psychiatric Disability Assessment Schedule; FEIT = Face Emotion Identification Task; GAF = Global Assessment of Functioning Scale; GAS = Global Assessment Scale; GPISS = General Psychiatric Interview Schedule and Summary Form; HoNOS = Health of the Nation Outcome Scale; ILSS = Independent Living Skills Survey; ITAQ = Insight and Treatment Attitudes Questionnaire; KASI = Knowledge About Schizophrenia Interview; KFI = Knowledge of Illness Scale; LSP = The Life Skill Profile; MMAA = Medication Management Ability Assessment; MMM = Medication Management Module; MMSE = Mini-Mental State Examination; MSCEIT = Mayer–Salovey–Caruso Emotional Intelligence Test 2.0; NOSIE = Nurses' Observation Scale; PANSS = The Positive and Negative Syndrome Scale; PSE = Present State Examination; PSFS = Psychosocial Functioning Scale; PSP = Personal and Social Performance Scale; PSYRATS = Psychotic Symptom Rating Scales; PWI = Personal Wellbeing Index; QOL = Quality of Life Scale; QOLI = Quality of Life Interview; QWB = Quality of Well-Being Scale; ROMI = The Rating of Medication Influences; SAHI = Structured Auditory Hallucinations Interview; SAI = Schedule for Assessment of Insight; SAI-E = Schedule for Assessment of Insight-Expanded Version (including treatment adherence); SANS = Scale for Assessment of Negative Symptoms; SAPS = Scale for Assessment of Positive Symptoms; SAS = Social Adjustment Scale; SBS = Social Behaviour Schedule; SDS = Stigma-Devaluation Scale; SDSS = Social Disability Screening Schedule; SES = The General Perceived Self-Efficacy Scale; SF-36 = 36-Item Short Form Health Survey; SLOF = Specific Level of Functioning Scale; SMM = Symptom Management Module; SOFAS = Social and Occupational Assessment Scale; SSPA = Social Skills Performance Assessment; UPSA= UCSD Performance-Based Skills Assessment; VAS = Visual Analogue Scale; VSSS = Vocational Social Skill Assessment Scale; WAIS = Wechsler Adult Intelligence Scale; WHO-DAS = World Health Organisation Psychiatric Disability Assessment Schedule; WQOL = Wisconsin Quality of Life Index; WHOQOL-BREF = World Health Organisation Brief Quality of Life Assessment Instrument

Appendix 5

Table *A5. Characteristics of interventions included in the systematic review of culturally-adapted psychosocial interventions for psychosis (n=46)*

	Target population			Intervention model				Intervention delivery			
Author (year)	Country	Adapted for (minority/ majority)	Subculture	Adapted from (western model/theory)	Intervention type	Intervention attendees	Modality (individual/ group)	Number of sessions, frequency, & duration	Duration of intervention	Therapy setting	Therapist training
Bradley et al. (2006)	Australia	Minority	Vietnamese	Multiple-family psychoeducational group treatment manual (McFarlane et al., 1991)	Family intervention (MFGT)	Caregivers and patients	Group	26 sessions, every 2 wks	12 mths	Clinical + community	Primary therapists & support facilitators. Training initially provided by a three-day national workshop conducted by William McFarlane
Carrà et al (2006)	Italy	Majority	Italian	Psychoeducational multifamily groups (McFarlane et al. 2002)	Family intervention (IG; IG + SG)	Caregivers	Group	IG: 24 wkly meetings (1.75 hrs duration); SG: 48 wkly sessions (1.5 hrs duration)	24 mths	Community	Two specifically trained psychiatrists not involved in patients' community standard care
Chan et al. (2009)	China	Majority	Chinese	Care management in early psychosis handbook (Early psychosis prevention and intervention centre, 2001)	Family intervention (PE)	Family caregivers and patients	Group	10 wkly sessions	3 mths	Clinical	A mental health nurse with more than 15 years of working experience in community mental health setting.
Chien (2008)	China	Majority	Chinese	Psychoeducation: family psychoeducational	Family intervention (PESG)	Primary caregiver, patient and	Group	18 sessions (2 hrs duration)	9 mths	Clinical	Research psychiatric nurse, psychiatrist, research nurse,

				support groups (Posner, 1992); Mutual support: support groups theory & practise (Galinsky & Schopler,1995) & how to work with self-help group guidelines (Wilson, 1995)		other family members					clinical psychologist & nurse researcher
Chien & Chan (2004)*	China	Majority	Chinese	Psychoeducation: Multiple-family groups and psychoeducation (McFarlane et al. 1995) Mutual support: Family intervention for Asian Americans (Bae & Kung, 2000)	Family intervention (MSG; PE)	Family caregivers and patients	Group	MSG: 12 sessions every 2 wks (2 hrs duration); PE: 12 sessions bi wkly (2 hrs duration)	6 mths	Clinical	MSG: peer leader trained by researchers; PE: Two psychiatric nurses experienced in psychiatric rehabilitation programs.
Chien & Chan (2013)*	China	Majority	Chinese	Psychoeducation: Multiple-family groups and psychoeducation (McFarlane et al. 1995); Mutual support: Family intervention for Asian Americans (Bae & Kung, 2000).	Family intervention (MSG; PE)	Family caregivers and patients	Group	MSG, PE: 14 sessions, every 2-3 wks (2 hrs duration)	9 mths	Clinical	MSG: A peer leader trained by researchers; PE: psychiatric nurse experienced in psychoeducation and group therapy or guest speakers (i.e. mental health professionals)
Chien, Chan & Thompson (2006)*	China	Majority	Chinese	Psychoeducation: Practitioner's guide to Psychoeducation & management (Anderson et al., 1986); Mutual support: support groups theory & practise (Galinsky & Schopler, 1994) Family intervention for Asian Americans (Bae & Kung, 2000)	Family intervention (MSG; PE)	MSG: Family caregivers; PE: family caregivers and patients	Group	MSG; PE: 12 bi-wkly sessions (2 hrs duration)	6 mths	Clinical	MSG: family carer assisted by a group facilitator (a trained psychiatric nurse) PE: two trained psychiatric nurses
Chien &	China	Majority	Chinese	Multifamily groups	Family	Family	Individual	14 sessions,	7 mths	Clinical	A case manager who

Lee (2010)				(McFarlane, 2002)	intervention (SCMP)	caregivers and patients		every 2 wks (2 hrs duration)			received three days of formal training from the researchers.
Chien & Lee (2013)	China	Majority	Chinese	Meditation-based stress reduction program (Kabat-Zinn et al., 1992); Practise guidelines (Lehman & Lieberman, 2004)	Psychoeducation – mindfulness based (MBPP)	Patients	Group	12 sessions bi-wkly (2 hrs duration)	4 mths	Clinical	NR
Chien, Norman & Thompson (2004)*	China	Majority	Chinese	Support group intervention studies for family caregivers (Galinsky and Schopler, 1995; Meissen and Volk, 1995; Toseland and Rossiter, 1989), with the phased development reflecting accepted good practice (Powell, 1994; Wilson, 1995).	Family intervention (MSG)	Family caregivers and patients	Group	12 wkly sessions (2 hrs duration)	3 mths	Clinical	The principal researcher, an experienced psychiatric nurse and group worker and a peer leader, elected by the group participants
Chien & Thompson (2013)	China	Majority	Chinese	Modified from author's previous work (Chien & Chan, 2004; Chien, Thompson & Norman, 2008; Chien, Chan & Thompson, 2006).	Family intervention (FPGP)	Family caregivers and patients	Group	14 sessions every 2-3 wks (2 hrs duration)	9 mths	Clinical	Trained research nurse
Chien, Thompson & Norman* (2008b)	China	Majority	Chinese	Support groups theory & practise (Galinsky & Schopler, 1994); how to work with self-help group guidelines (Wilson, 1995)	Family intervention (MSG)	Family caregivers and patients	Group	12 sessions (2 hrs duration)	6 mths	Clinical	Two family carers. One researcher who was a registered psychiatric nurse and an experienced group worker, acted as a participant and resource person for the group
Chien & Wong	China	Majority	Chinese	Multifamily groups (McFarlane, 2002)	Family intervention	Family caregivers	Group	18 sessions every 2 wks	9 mths	Clinical	Psychiatric nurse trained in a three-day

(2007)					(FPGP)	and patients		(2 hrs duration)			workshop that was held by a family therapist and the researchers
Gohar et al. (2013)	Egypt	Majority	Egyptian	Social cognitive skills training (Horan, 2011)	Social cognitive skills training (SCST)	Patients	Group	16 sessions, twice per wk (1 hr duration-separated by a break)	2 mths	Clinical	Group leader (first author) who received in-person, supervised training from the developers of SCST in the United States
Guo et al. (2010)	China	Majority	Chinese	The schizophrenia patient outcomes research team (PORT) manual (Lehman et al. 2004)	Combined intervention - family (CT)	Family caregivers and patients	Group	48 sessions, once per mth. 4 group treatments on the same day (1 hr duration)	12 mths	Clinical	Therapists, MD or PhD qualified with clinical experience
Habib et al. (2015)*	Pakistan	Majority	Pakistani	Cognitive-behavioural therapy manual (Kingdon & Turkington, 1994)	Cognitive - family (CaCBTp)	Patients and family members	Individual	16 sessions, once or twice per wk (approx. 1 hr duration)	4-6 mths	Clinical	The first author, a psychologist with a post-graduate diploma and training in CBTp
Koolaee & Etemadi (2009)	Iran	Majority	Iranian	Psychoeducation guidelines (Anderson et al.,1986; Stengard, 2003); Behavioural family management group intervention adapted from communication and problem-solving skills training (Falloon,1981)	Family intervention (BFM; PE)	Mothers of the patients	Group	BFM; PE: 12 sessions, once per wk (2 hrs duration)	3 mths	Clinical	A researcher
Kopelowicz et al. (2003)	USA	Minority	Mexican-American, other Central American, Caribbean	Social skills training (Liberman and Corrigan 1993; Liberman et al. 1993)	Skills training - family (ST)	Family members and patients	Group	4 sessions per wk. (1 hr 30 mins duration)	3 mths	Community (CMHC)	Trainers (whose disciplines included nursing,psychology, and social work)
Kopelowicz et al. (2012)	USA	Minority	Mexican-American	Multifamily groups (McFarlane, 2002);	Family intervention	Family members and	Group	2 sessions per mth (1 hr	12 mths	Community (CMHC)	Bilingual/ bicultural clinicians.

				Theory of planned behaviour (Ajzen, 1991)	(MFG-S; MFG-A)	patients		30 mins duration)			psychiatrists, psychologists, or social workers with 1 year of experience conducting family groups and trained in the standard MFG and the MFG-A manual
Kulhara et al. (2009)	India	Majority	Indian	Family psychoeducational interventions (e.g. Leff, 2000)	Family intervention (PE)	Caregivers	Group	1 session per mth (40-60 mins. duration)	9 mths	Clinical	Two mental health professionals trained for 2 months by consultant psychiatrists, by didactic lectures and 'hands-on' experience with patients and their families
Kumar et al. (2010)	India	Majority	Indian	Metacogntitive training (MCT) manual (Moritz & Woodward, 2007a)	Cognitive (HMCT)	Patients	Group	2 sessions per wk. (45-60 mins duration)	1 mth	Clinical	NR
Kung et al. (2012)**	USA	Minority	Chinese	Family psychoeducation model (Anderson et al., 1986) & Problem-solving multifamily group (McFarlane, 2002)	Family intervention (MFPG)	Caregivers	Group	12 sessions once every 2 wks (2 hrs duration)	6 mths	Clinical	One agency employer with a master's degree in counselling psychology and 4 years of full-time clinical experience and the PI and first author, with a master's and a doctorate in social work and 9 years of full-time clinical experience.
Lak et al. (2010)	China	Majority	Chinese	UCLA social and independent living skills: basic conversation skills module (Liberman, 1990)	Skills training (CBCSM; CBCSM + SGT)	Patients	Group	15 sessions, 3 per wk (1 hr duration)	5 wks	NR	Trainer who followed the instructions and guidelines of the trainer's manual
Li & Arthur (2005)	China	Majority	Chinese	Family psychoeducational interventions (e.g.	Family intervention (FE)	Patient and family	Individual	8 hrs with the patient and 36 hrs with the	NR	Clinical	First author, a nurse with experience in family intervention

				Anderson et al. 1986; Falloon, 1984; Leff, 1985; Goldstein et al., 1986; Barrowclough & Tarrier, 1994)				family. 2 hrs per mth for 3 mths for patient & family together			and experienced registered nurse research assistants educated to diploma or degree level
Li et al. (2015)	China	Majority	Chinese	Cognitive therapy (Kingdon & Turkington, 2004)	Cognitive (CBT)	Patients	Individual	12 sessions in first 12 wks, 3 booster sessions in subsequent 12 wks (40-50 mins duration)	6 mths	Clinical	Six experienced therapists (psychiatrists or psychologists) experienced using psychotherapy; trained in the application of cognitive therapy for psychosis and had expertise in the application of CBT for psychosis using a translated Kingdon and Turkington manual.
Lin et al. (2013)**	Taiwan	Majority	Taiwanese	The united states substance abuse and mental health administration's evidence-based illness management and recovery (IMR) progam	Illness management and recovery programme (IMR)	Patients	Group	6 sessions twice per wk (1 hr 30 mins duration)	3 wks	Clinical	The first author, an assistant professor and affiliated head nurse
Lin et al. (2013)*	Taiwan	Majority	Taiwanese	Illness management and recovery implementation resource kit (Gingerich & Mueser, 2010)	Illness management and recovery programme (IMR)	Patients	Group	2 sessions per wk (1 hr 30 mins duration)	3 wks	Clinical	A clinician
Mann & Chong (2004)	China	Majority	Chinese	Delusional verbalization (Alford et al., 1982); Cognitive behavioural therapy (Garety et al.,1994); Thought stopping (Lamontague et al., 1983); Attentional control	Combined intervention (SCP)	Patients	Group	6 sessions	NR	Clinical	NR

				Meichenbaum & Cameron, 1973)							
Mausbach et al. (2008)*	USA	Minority	Latino	Social cognitive theory (Bandura, 1989)	Social cognitive skills training (PEDAL)	Patients	Group	Sessions once per wk (approx. 2 hrs duration)	6 mths	Community - Board & care faciilities	NR
Naeem et al. (2015)*	Pakistan	Majority	Pakistani	Cognitive-behavioural therapy manual (Kingdon & Turkington, 1994)	Cognitive - family (CaCBTp)	Family members & patients	Individual	6 sessions for the patient (plus their carer who acted as a co-therapist) plus one session for the whole family.	Approx. 4 mths	Clinical	Three experienced psychology graduates trained by the first author.
Patterson et al. (2005)*	USA	Minority	Latino	Social cognitive theory (Bandura, 1989)	Social cognitive skills training (PEDAL)	Patients	Group	24 semi-wkly, sessions (2 hrs duration)	6 mths	Clinical	Bilingual/bicultural group leader (with masters or doctorate level degree)
Ran et al. (2003)	China	Majority	Chinese	The psychoeducational family approach (Anderson et al.1986) & the vulnerability-stress model (Lalonde, 1995)	Family intervention (FIG)	Family & Patients 'encouraged' to attend	Individual & group. Family education: once per month. Multiple family workshops:once every 3 months	Sessions once per mth (approx. 1.5-3 hrs duration) .	9 mths	Community	Trained psychiatrists and village doctors. Village doctors did not get the same training as psychiatrists, but assisted with the interventions.
Razali et al. (2000)	Malaysia	Majority	Malaysian	Behavioural family therapy (Falloon et al., 1984)	Family intervention (CMFT)	Family members & patients	Individual	30–45 min sessions. Two additional home-visits every 6 mths.	12 mths	Clinical + community. (outpatient hospital and two additional home visits)	Experienced research Psychiatrist/first author with specialised training
Shin & Lukens (2002)	USA	Minority	Korean American	Psychoeducation and family therapy studies (Anderson et al., 1986; McFarlane et al., 1995; Bernheim & Lehman, 1985; Lukens & Thorning, 1998; Falloon et al., 1984)	Family intervention (CSPE)	Patients & family members (were offered parallel sessions)	Group	10 sessions, once per wk (90 min duration)	10 wks	NR	First author, a Korean-speaking psychiatric social worker

SUPPLEMENTARY

So et al. (2015)	China	Majority	Chinese	Metacognitive training (Moritz & Woodward, 2007)	Cognitive (MCTd)	Patients	Group	4 sessions, once per wk (1 hr duration)	1 mth	NR	A clinical psychologist who specialises in psychosis and received MCT training from the original authors of MCT.
Valencia et al. (2007)*	Mexico	Majority	Mexican	Psychosocial treatments (Liberman & Corrigan, 1993); social and instrumental skills modules (Wallace et al., 1992)	Skills training + FI (PSST)	Patients & family members	Group	48 sessions (time limit of 1 hr 15 per wk)	12 mths	NR	Two psychologists (postgraduates in clinical psychology)
Valencia et al. (2010)*	Mexico	Majority	Mexican	Psychosocial treatments (Liberman & Corrigan, (1993) & Liberman (2008)	Skills training + FI (PSST)	Patients & family members	Group	40 sessions (1 hr 30 mins duration)	12 mths	Clinical	Two clinical psychologists at the master's and doctorate levels
Wahass & Kent (1997)	Saudi Arabia	Majority	Saudi Arabian	Coping strategy enhancement (e.g. Barrowclough & Tarrier, 1992); Focusing strategy (e.g. Bentall & Slade, 1996); distraction techniques (e.g. Nelson et al., 1991)	Combined intervention (MPI)	Patients	Individual	Maximum of 25 sessions, 3 times per wk. (1 hr duration)	9 wks	NR	A therapist who has attended several courses and workshops organised in the UK
Wang et al. (2013)	China	Majority	Chinese	Social Cognition and Interaction Training Manual (Roberts et al., 2015).	Social cognitive skills training (SCIT)	Patients	Group	20 sessions, once per wk	20 wks	NR	Six qualified psychiatric counsellors who had been trained by one of SCIT's developers (DR)
Weng et al. (2005)	China	Majority	Chinese	Social skills training for psychiatric patients (Liberman et al., 1989)	Skills training (MRP)	Patients & key family members (for some sessions)	Group	NR	2 mths	Clinical	NR
Xiang et al.	China	Majority	Chinese	Family interventions	Family	Family	Group	NR	4 mths	Community	Village doctors

(1994)				(e.g. Brown et al, 1972; Leff et al., 1985; Falloon et al. 1987)	intervention (PFI)	members					
Xiong et al. (1994)	China	Majority	Chinese	Educational approaches (Abramowitz & Coursey, 1989); relatives' groups (Vaughan et al, 1992); family therapy (Leff et al, 1990); behavioural treatments (Falloon et al, 1985; Tarrier et al, 1989); multi-component psychosocial treatment (Leff et al, 1985).	Family intervention (FIG)	Family members & patients (if clinical condition stable enough)	Individual and group	Counselling sessions, once per mth (45 mins duration); Family group, once per mth (90 mins duration); Plus individual sessions with patient, leaders of patient work staff & family members	12-24 mths	Clinical and community (clinic + home visits)	A therapist
Zhang & Heqin (1993)*	China	Majority	Chinese	Family psychoeducation approaches (e.g. Brown et al., 1972; Leff et al. 1982; Vaughn & Leff, 1976)	Family intervention (FE)	Family members	Group	First 5 wks: 4 lectures & one group discussion (wkly); 2-6 mths: 4 lectures and one group discussion. (mthly) 7-12 mths: 2 lectures and one group discussion (every 2 mths)	24 mths	NR	Trained psychiatrists or nurses
Zhang et al. (1994)	China	Majority	Chinese	Family psychoeducation approaches (e.g. McFarlane, 1982; Goldstein, 1984)	Family intervention (FIG)	Family members & patients	Individual & group	Family group session: 3 mths after discharge; Families subsequently offered individual or group	18 mths	Clinical and community (clinic + home visits)	Counsellors

								sessions every 3 mths depending on whether they had 'complex or common problems'			
Zhang et al. (1998)*	China	Majority	Chinese	Family psychoeducation approaches (e.g. Brown et al., 1972; Leff et al. 1982; Vaughn & Leff, 1976)	Family intervention (FE)	Family members	Group	14 sessions (1 hr duration) 10 in the first year, 4 in the second year	24 mths	NR	Trained psychiatrists or nurses
Zimmer el al. (2007)	Brazil	Majority	Brazilian	Integrated Psychological Therapy (Muller et al., 2005)	Cognitive (IPT)	Patients	Group	12 sessions, once per wk (1 hr duration)	3 mths	NR	A clinical psychologist previously trained by the IPT author

Note:

**Studies with the same culturally-adapted intervention(s):*

PE + MSG: Chien & Chan (2004); Chien & Chan (2013); Chien Chan & Thompson (2006); Chien, Norman & Thompson (2004); Chien, Thompson & Norman (2008)

CaCBTp: Habib et al. (2015) & Naeem et al. (2015)

IMR: Lin et al. (2013) pilot study & Lin et al. (2013) RCT

PEDAL: Mausbach et al. (2008) & Patterson et al. (2005)

PSST: Valencia et al. (2007) & Valencia et al. (2010)

FE: Zhang & Heqin (1993) & Zhang et al. (1998)

** *Non-RCT pilot studies:* Kung et al. (2012); Lin et al. (2013)

Study arms: BCSM = Basic conversation skills module; BFM = Behavioural family management; CaCBTp = Culturally-adapted cognitive-behavioural therapy for psychosis; CBCSM = Chinese basic conversation skill module; CBT = Cognitive-behavioural therapy; CMFT = Culturally modified family therapy; CMHC = Community mental health centre; CSPE = Culturally-sensitive psychoeducational group program; CT = Combined treatment; FE= Family education programme; FIG = Psychoeducational family intervention group; FPGP= Family-led peer support group programme; HMCT=Hindi meta-cognitive training; IG + SG = Information group programme and additional support programme; IMR = Adapted illness management and recovery programme; IPT = Integrated psychological therapy; MBPP = Mindfulness-based psychoeducation programme; MCTd= Metacognitive training for delusions; MFG = Multiple-family group; MFG-A = Adherence-focused MFG therapy; MFG-S = Standard MFG therapy; MFGT = Multiple-family group intervention; MFPG = Family psychoeducation programme; MPI = Modified psychological intervention; MRP = Multimodal rehabilitation program; MSG = Mutual support group family intervention; PE = Psychoeducation programme; PFI = Psychoeducational family intervention; PEDAL = Programa de entrenamiento para el desarrollo de aptitudes para latinos; PESG = Psychoeducation and mutual support group program; PSST = Psychosocial skills training; SCIT = Social cognition and interaction training; SCP= Symptoms coping programme; SCMP = Schizophrenia care management programme; SCST = Social cognitive skills training; SGT = Skills generalisation training; SST = Social skills training; ST = Skills training; TIPSS = Training in interpersonal problem-solving skills

SUPPLEMENTARY

Appendix 6

Table A6: *Description and examples of themes of cultural adaptation*

Theme	Sub-themes	Description	Examples
Language Incorporating literal translation and culturally-specific forms of expression and dialect	Direct translation	Translation of materials into national language or use of interpreters	'The plain-language statement and consent form was translated for Vietnamese- speaking consumers and caregivers.' (Bradley et al., 2006, p.523) Use of an interpreter: 'Because 20 of the Vietnamese consumer-caregiver participants (80 percent) were not fluent in English and an interpreter was required for basic communication, the sample was considered to have a low level of acculturation.' (Bradley et al., 2006, p.523) The intervention: 'was translated into Chinese language and validated by the researchers.' (Chien, 2008, p.32) 'The training sessions were translated and adapted into Arabic by the first author who received in-person, supervised training from the developers of SCST (WPH, MFG) in the United States.' (Gohar et al., 2013, p.13) 'Translated into Persian with a high level of equivalence to the original English version.' (Koolaee & Etemadi, 2010, p.5) The intervention: 'was conducted in elementary school–level Spanish by 2 clinicians and one of us (A.K.).' (Kopelowicz et al., 2012, p.267) 'The original MCT has been translated in Hindi and adapted for Hindi speaking patients at the Central Institute of Psychiatry, Ranchi.' (Kumar et al., 2010, p.153) 'All materials were translated into Spanish and back-translated by two different persons of Mexican origins.' (Patterson et al., 2005, p.925) 'All written material was provided in both Korean and English, and the oral presentations were in Korean.' (Shin & Lukens, 2002, p.1127) 'The SCIT manual was translated into Chinese by one of the authors (MY) who is a native speaker of Chinese and has been living in England for 3 years.' (Wang et al., 2013, p.752)
	Local dialect	Incorporating local, dialect, colloquialisms and idioms	'For exercises involving written vignettes, some translational adjustments were made to better fit the local vernacular (e.g., using the term "girlfriend" or "boyfriend" instead of "fiancée")' (Gohar et al., 2013, p.14) Adaptations included: 'Integrating culture-specific icons and idioms in the materials.' (Mausbach et al., 2008, p.66) 'Urdu equivalents of CBT jargons were used in the therapy.' (Naeem et al., 2015, p. 146) 'Adaptations made to substitute formal wordings on presentations and handouts for more colloquial

			Cantonese words.' (So et al., 2015, p.5) 'We did not use the term module because this word in Spanish is never used in clinical and therapeutic environments. As an equivalent of 'modules' we used the term 'treatment areas'' (Valencia et al., 2007, p.1400)
Concepts and illness models Culturally-appropriate presentation of concepts, with consideration of culture-specific belief systems, mental health stigma and levels of education	Explanatory models	Adapting intervention to work with culture-specific explanatory models of mental illness	'Psychoeducation sessions acknowledged common ethnospecific explanatory models of illness before the biopsychosocial model of illness was outlined.' (Bradley et al., 2006, p.525) 'Each topic was also specifically related to the local culture. For example, when discussing early intervention for schizophrenia, some caregivers attributed the cause of their relatives' mental illness to their delay in accompanying the client to see a doctor and/or to the client's eating too much meat, which had led to an imbalance of yin and yang forces during adolescence. These beliefs were clarified by the researcher.' (Chan et al., 2009, p.74) 'One of the patients in our study said that his illness was because of excess of phlegm (Greek concept), while another believed his illness was due to excessive heat in liver (Chinese concept). Therapy therefore included spiritual factors in formulation and understanding of locally held beliefs related to health, religion and culture.' (Habib et al., 2015, p.205) 'Iranian families see mental illness from the perspective of determinism – i.e. as predestination and fate. There are few attempts in Iran to follow up therapeutic interventions (Khodabakhshi & Koolaee, 2009); hence the reluctance of many mothers to participate in the study' (Koolaee & Etemadi, 2009, p.11) 'Iranian people think that one of the reasons of mental illness in their children was bad fate or wrongdoing in life so God was punishing them with their ill children. Therefore, in psychoeducation model, I added the knowledge of illness and emphasized biological aspects.' (Koolee & Etemadi, 2009, author email) 'Pictorial representations were used with illiterate relatives. The use of praise was thoroughly explained, modelled, and practiced using role-plays.' (Kopelowicz et al., 2003, p.214) 'Patients often denied the value of medications, commonly expressing folk explanations (e.g, supernatural causes) and corresponding remedies (eg, prayer) for psychotic symptoms. The MFG-A clinicians sensitively addressed these attitudes by inviting relatives and other patients in the group, who initially may have held the same folk beliefs, to describe their salutary experiences with antipsychotic medications (eg, symptom reduction and preventing hospitalizations). This approach was instrumental in facilitating their consideration of alternative beliefs in a non-confrontational, peer to peer manner.' (Kopelowicz et al., 2012, p.268) 'The content of the intervention also reflected issues that are felt to be more relevant for Indian families such as belief in supernatural causation, the role of indigenous treatments, cultural attitudes towards medication, marriage etc. On the other hand, there was a much less emphasis on constructs such as expressed emotions.' (Kulhara et al. 2009, author email) 'Also, since the caregivers subscribe highly to both stress and biological illness of the illness, it is fitting to adopt a vulnerability-stress framework instead of a strictly biological explanatory model adopted by many other models.' (Kung et al. 2012, p.388) 'The content was developed on the basis of; cognitive behavioural coping strategies, modifications of beliefs and psycho-educational approach.' (Mann & Chong, 2010, p.72) 'A spiritual dimension was included in formulation, understanding and in therapy plan.' (Naeem et al.,

			2015, p.146) 'The lack of a correct recognition of mental illness is a serious problem for relatives of persons with schizophrenia in rural areas. They usually believe in witchcraft, and accept the notion that mental illness cannot be cured and that medication has no effect on the illness and only wastes family money.' (Ran et al., 2003, p.69) 'Effective patient and family education is needed in Malaysia as many patients attribute mental illness to supernatural agents, and they cannot accept explanations based on the Western Model.' (Razali et al., 2000, p.284). 'In addition, discussion of traditional disease concepts was integrated into the sessions. For example, Korean perspectives on shamanism, ailments, distress, diseases, fortune and misfortune, and life and death were discussed in the context of psychiatric illness. Psyche and soma were presented as two complementary aspects of life to encourage participants to understand how emotional functioning is related to physiological functioning.' (Shin & Lukens, 2002, p.1126-1127) 'Zafar et al. (2008) reported that one-third (30%) of the participants of a survey in Karachi, Pakistan, attributed "mental illness" as the main cause of psychotic symptoms. Other causes included "God's will" (32.3%), "superstitious ideas" (33.1%), "loneliness" (24.8%) and "unemployment" (19.3%) (Zafar et al., 2008)' (Habib et al., 2015; Naeem et al., 2015) as cited in Naeem et al., (2016) p.44. 'All the psychologists said therapy needs adapting according to local needs, taking into consideration cultural and religious factors. They also said religious and local beliefs have an effect on patients' understanding of illness and their views on causes and treatment of the illness. Although one psychologist highlighted the positive impact religion can have on patients' mental health, the rest considered it to be a barrier. Some psychologists also talked about keeping therapy separate from religion.' (Habib et al., 2015; Naeem et al., 2015) as cited in Naeem et al., (2016) p.44. 'Patients and their families in Pakistan use a bio-psycho-social model of management of psychosis with additional emphasis on spiritual and religious causes. This can possibly be termed as bio-psycho-spiritual-social model of psychosis.' (Habib et al., 2015; Naeem et al., 2015) as cited in Naeem et al., (2016) p.52. Participants 'preferred their beliefs in witchcraft; did not regard mental illness as disease which needed medical treatment.' (Xiang et al., 1994, p.545)
	Stigma	Addressing issues of mental health stigma in culturally-appropriate ways (e.g. avoiding western/psychiatric diagnostic labels, sharing personal stories for normalisation)	'Specific Chinese and Asian cultural characteristics were emphasized during each group session. These included the high social stigma associated with mental illness and seeking mental health services' (Chien, 2008., p.32) The intervention included: 'discussion of a taboo area (sharing of secret and internal psychological conflicts), commonality or a situation of 'all-in-the-same boat' (feeling in similar situation and working against a common plight), mutual help (reciprocal giving and receiving help and support among members)' (Chien, 2008, p.34) 'Emphasis given to specific Chinese cultural characteristics and issues, including a strong social stigma associated with mental illness and seeking mental health services' (Chien & Chan, 2004, p.1278) 'Mutual support groups may potentially be appropriate for Chinese families, who are often reluctant to seek help due to strong perceptions of stigma and an unwillingness to expose family weaknesses or

			disgrace ('saving face') to outside people (Bae and Kung, 2000; Fung and Ma, 1997).' (Chien & Chan, 2013., p. 1328) Chinese cultural characteristics were considered and discussed, including the stigma towards people with mental illness, and being aware and accepting it. (Chien and Chan, 2013., p. 1331) Intervention included: 'Open sharing and mutual understanding about individual concerns; exploration of cultural issues in families' (Chien & Thompson, 2013, p.1000) This group provided a forum in which to discuss concerns and obtain support from the group to reduce the stigma of mental illness (Guo et al. 2010, p897) 'Many of the people with mental health illness in Asia still combat internal and external stigmatization from deep-rooted negative cultural beliefs about mental illness' (Lin et al, 2013, p.274) Most of those recovery narratives were initiated by inviting people to share their story of living with psychiatric illness. (Lin et al., 2013, author email) 'The greater stigma attached to mental illness, especially schizophrenia, by Latinos in the United States, Mexico, and Central and South America may require alterations in the form and process of evidence-based practices to make them acceptable to patients and their relatives.' (Valencia et al., 2010, p.249) 'Seminars were held for health workers and family members to discuss any issues and suggestions, and to share their experiences of the patients' (Xiang et al., 1994, p.545)
	Mental health knowledge and education	Adapting intervention to acknowledge low education levels and lack of mental health education in different cultural contexts (e.g. due to cultural group norms; and tendencies for lack of schooling and education in local area)	'Interventions are more likely to be more effective if they put more emphasis on the provision of knowledge about schizophrenia, using simple language that can be understood by the families who are in majority from lower social class (Castle Peak Hospital, 1999), than on abstract theoretical concepts of schizophrenia.' (Chien & Chan, 2004; Chien & Chan, 2013; Chien Chan & Thompson, 2006; Chien, Norman & Thompson, 2004; Chien, Thompson & Norman, 2008, author email) 'The mothers lacked knowledge about mental illness. Psychoeducation intervention increased knowledge about schizophrenia with most participants acquiring new information.' (Koolaee & Etemadi, 2010, p.11) 'The clinicians' systematic assessment of the beliefs, attitudes, and resources of each patient, and the integration of those factors in treatment, played a central role in the success of the MFG-A. For example, many of the patients who did not have or were ineligible for medical benefits did not take their medications because they could not afford to purchase them. These patients and their families did not realize they could receive antipsychotic medications at no cost through an indigent medication program available at the mental health center.' (Kopelowicz et al., 2012, author email) 'However, since the majority of Chinese in the United States are immigrants (61%, U.S. Census Bureau, 2010), the caregiver burden would be aggregated when their knowledge of the health care system is limited while they themselves are still adjusting to this migrated land (Chu & Sue, 2011). Thus, the burden of care for these relatives is likely to be greater compared to Caucasian-American families for at least five reasons: (1) intense involvement in the caregiving process; (2) the lack of knowledge of access to resources due to immigrant status; (3) language barrier to negotiate with service systems; (4) limited knowledge about mental disorders and their treatment; and (5) racial discrimination due to minority status (Kung, 2001, 2003, 2004; Sue, 2002). Thus, it is of great importance to educate and support these caregivers to both alleviate their stress and improve treatment outcome of their ill relatives.' (Kung et al., 2012, p.387)

			'Psychoeducation materials were given to caregivers throughout the multifamily group sessions instead of a day-long workshop. Due to the lack of knowledge about mental illness and medication, and the lower educational background of many immigrant Chinese-Americans loading them with too much information at the beginning could be overwhelming.' (Kung et al. 2012, p.388) 'Lower educational background of many immigrant Chinese Americans, loading them with too much information at the beginning could be overwhelming, and the retention of the materials limited (Bae & Kung, 2000).' (Kung et al., 2012, p.388) 'The concept of recovery from psychiatric disorders is still relatively new in Taiwan.' (Lin, Kopelowicz, Chan, & Hsiung, 2008).' (Lin et al., 2013, author email) 'Written communication was altered to accommodate lower educational backgrounds, and in the transportation module education and materials about public transportation services for disabled persons were provided, due to a lack of knowledge because of previous reliance on family members.' (Patterson et al. 2005, p.525) 'Financial management and written communication were altered to accommodate lower educational backgrounds.' (Patterson et al. 2005, p.925) The intervention was: 'modified to take account of the characteristics of Chinese rural areas, such as dispersed residences and a generally low level of education.' (Ran et al. 2003., p.70) 'We also employed health education through the village wired radio network.' (Xiang et al., 1994, p.545) 'Compared with Western interventions, in the early stages of family intervention in China much more effort needs to be placed on transforming family members' perception of the role of the physician from that of a pill-provider to that of an informed family advisor.' (Xiong et al., 1994, p.239-240) 'Some families identify social factors as the cause of the problems and try to protect the patient from the influence of these factors by being too controlling and overprotective. Other families do not believe that the patient has a mental illness and think that the bizarre behaviour is under voluntary control; these families tend to be hostile towards the patient.' (Zhang et al., 1994, p.101) What we did was a reduction in the number of steps, given the complexity of the tasks of the Social Communication subprogram. The stages of this subprogram require a language domain and semantic, grammar, cultural knowledge. In Brazil we have a considerable number of patients with schizophrenia who though illiterate, have little schooling, making it difficult to carrying out steps this subprogram (Zimmer et al. 2007, author email)
Family Consideration of family involvement, structure and dynamics and specific roles and expectations	**Family involvement**	Acknowledging the importance of the family unit in the recovery process and encouraging their active and continued involvement throughout the intervention (e.g. provision extra sessions, extra efforts to engage and maintain contact)	'In Asian cultures the family is a crucial social structure, and the burden of illness becomes a joint family obligation, with multiple members engaged in treatment. In contrast, Western cultural values emphasize individualism—for example, protection of the rights of the individual to privacy and confidentiality as well as independent living.' (Bradley et al., 2006, p.529) 'Family joining sessions were conducted informally on an outreach basis in the homes of the Vietnamese families to maximize the likelihood that families would engage with the service and to provide an opportunity to include as many family members as possible.' (Bradley et al., 2006, p.525) 'In Italy, since the deinstitutionalization of the '70s (de Girolamo and Cozza 2000), the key issue in implementing effective treatment systems for severe psychiatric disorders has been balancing community-and hospital-based mental health care (Thornicroft and Tansella 2004). There has been an

			increasing acknowledgment of the importance of families in terms of the care they give, their therapeutic potential and the burden they carry.' (Carra et al., 2007, p.24) 'The content of the program was designed according to the preference and perceived needs of patient-caregiver dyads, and the case managers put much emphasis on addressing their cultural issues in family caregiving role.' (Chien & Lee, 2010, p.318.) 'Family members are actively involved in patient care in Pakistan, and therefore the intervention involved the family members in the treatment plan from the beginning.' (Habib et al., 2015, p.203) 'We chose a family approach because living with supportive relatives increases medication adherence, and interventions that give relatives information about the illness and teach them coping and problem-solving skills reduce relapses and rehospitalizations.' (Kopelowicz et al., 2012, p.265-266) 'This high level of involvement of Indian families in the patients care is partly because of their preference, and partly because of the inadequacy of the mental-health set-up.' (Kulhara et al., 2009, p.473) 'Most families actively want to be involved in all aspects of their relatives wellbeing and problems.' (Kulhara et al., 2009) as cited in Shankar & Menon, (1993) 'To engage families, especially in the initial stage, in-home single-family sessions were offered in order to involve more relatives.' (Kung et al., 2012, p.388-389) 'Over 80% of Latinos with schizophrenia live with their famailies (Guarnaccia & Parra, 1996)… therefore, including families was relevant to the task of maximizing the generalization of skills to the home environment' (Kopelowicz et al., 2003; Kopelowicz et al., 2012) as cited in Lopez & Kopelowicz (2002) p.15. 'After completing these sessions, skills trainers visited patients and families at their homes to review progress and help solve problems that arose' (Kopelowicz et al., 2003; Kopelowicz et al., 2012) as cited in Lopez & Kopelowicz (2002) p.15. 'Because of the importance of la familia (the family) in Mexican-American culture, the PEDAL intervention was adapted to help individuals work with family members for transportation needs rather than help them to utilize public transportation or to travel independently' (Mausbach et al., 2008, p.72-73) 'The ultimate social goal of family members of people with schizophrenia in china is to develop a sustainable family-based support system for the dysfunctional individual (Xiong et al., 1994), problem solving and communication skills education was emphasized in this study. In this study the aim was to finish the main content of the education programme in the hospital, and connect with the families after the patients were discharged because few nurses work in community settings and the community mental health services were not sufficiently well developed.' (Li & Arthur, 2005) as cited in Li (2003) thesis. 'To reinforce the interventions, parallel sessions, also conducted in Korean, were offered to family members of all participants' (Shin & Lukens., 2002, p.1127) 'Nearly 80% of Hispanic Americans with Schizophrenia live with their families (Guarnaccia & Parra, 1996) in Mexico city, it is over 90%' (Valencia et al., 2003) 'Because of the importance of family cohesion and joint decision making in China, the key family members of patients were involved in some of the training sessions with patients when the topics were

			use of medication and an emergency plan for relapse prevention.' (Weng et al., 2005, p.402) 'The cultural and legal obligations of parents towards disabled children continue until the child is married, when the responsibility is transferred to the patient's spouse. Disabled children who never marry are usually cared for by their parents until the parents die.' (Xiang et al., 1994, p.240) 'Attention must be paid to the needs of family members, for whom care of a mentally ill person may constitute a considerable burden. They need community support, appropriate education, accessibility to professional consultation, and, in some cases, financial aid.' (Zhang & Heqin, 1993, p.48) 'In China, unlike the West, the societal and legal expectations are that the family members will care for these disabled individuals indefinitely, regardless of the emotional and economic burden.' (Zhang et al., 1994, p101)
	Family structure	Adapting for culture-specific family structures. nuclear/individualistic or extended/collectivist family structures	'In treating Chinese families, it is important to recognize, respect and utilize the culture-specific family structures, functions and processes, such as the extended family structure with close linkage and interrelationships, interdependence and a strong sense of filial responsibility, collective identity and tangible support.' (Chien, 2008, p.30) 'The program adopted a few strategies to address traditional Chinese cultural tenets. The first stage (orientation and engagement) focused on understanding strong interdependence, collective actions and decisions about family issues, acceptance of roles, and filial obligation of caregiving, respect for elders, and other traditional Chinese beliefs' (Chien & Lee, 2010, p.318) 'The MBPP also adopted several strategies to address traditional Chinese cultural tenets. For instance, the first stage focuses on understanding strong interdependence.' (Chien & Lee, 2013, p.377) 'The program used a culturally sensitive family intervention model, which considered many of the cultural tenets that were taught by Confucius (for example, valuing collectivism over individualism and giving great importance during the needs assessment to family and kinship ties) in respect to family relationships and value orientation.' (Chien & Wong, 2007, p. 1004) 'Given the centrality of the family unit in decision making for Mexican Americans, (Sabogal et al., 1987) the focus was on the approval or disapproval of family members for taking medication and the patient's motivation to comply with those perceived wishes.' (Kopelowicz et al., 2012, p. 268) 'All 3 groups reinforced the importance of Mexican cultural values and concepts, such as familismo (i.e., placing family over the individual), respeto (i.e., respect for older persons)' (Patterson et al., 2005. p.925) 'In medication management sessions, handling medications involved a sense of 'orgullo' (i.e., pride) for many patients, owing to a desire to alleviate symptoms in order to contribute to the family. Thus, information on adhering to and understanding treatment regimens was modified to include the potential benefits of medication adherence to the family system (versus the benefits of independence)' (Patterson et al., 2005 p.926) 'The success of our programme may also be attributed to the extended family system among the Malays' (Yusof, 1976)' (Razali et al., 2000, p.288) 'Equating mental well-being with autonomy or self-actualization is often vitiated among rural Mexican families in favour of social and family obligation and cohesion (Gonzalez et al., 2001). Commitment to the extended family is often valued more than individual autonomy among first and second generation Mexican-American families. The higher value placed on interdependence by Latinos may clash with

			the norms inherent in evidence-based practices designed in the United States.' (Valencia et al., 2010, p.249)
	Family roles and responsibilities	Demonstrating an awareness of culture-specific family roles and responsibilities (.e.g. hierarchical roles, respect for elders, gender roles, expectations of specific family members)	'Chinese families suggested that the younger generations are not supposed to question or challenge the decisions of their elders, which appear to run contrary the purpose of family intervention in promoting collaboration through mutual concern and discussion. This typical strong parental power in Chinese family may produce resentment and un-cooperation from the elder family member, who would perceive the younger group members or the therapist as a threat to their authority (Fung & Ma, 1997). There is a need to consider and adopt the specific Chinese culture for establishing a helping relationship in family interventions, for example, emphasis on mutual respect and equal position but not be rigidly confined to the passive reception of teaching and information by the families.' (Chien & Chan, 2004; Chien & Chan, 2013; Chien Chan & Thompson, 2006; Chien, Norman & Thompson, 2004; Chien, Thompson & Norman, 2008, author email) 'Mothers were the focus of this study because, in Iranian families, it is usually the mothers who show most interest in patient care. Even when patients are married and then divorce, mothers again take responsibility for the patients and sometimes the grandchildren.' (Koolaee & Etemadi, 2010, p.3) 'In all modules, gender-appropriate activities were substituted, and modifications were made with regard to culturally expected roles in our scenarios and examples (cooking and house chores for women; working on the car and yard maintenance for men).' (Patterson et al., 2005, p.926) 'Proper distance and respectfulness were employed to address the participants who were older than the group facilitators due to Latinos emphasis on respect and hierarchies.' (Patterson et al., 2005, p.926) 'Consideration of Malay cultural values e.g. 'training to communicate assertively and establishing eye contact with the elderly (especially one's parents) are regarded as disrespectful in the Malay culture.' (Razali et al., 2000, p.288) 'Fathers with traditional values and expectations also hew to the macho image as well as to the stigma of mental illness; hence, it takes special efforts, such as phone calls and home visits, by leaders of skills-training groups to gain the support of fathers in reinforcing homework assignments.' (Valencia et al., 2007; Valencia et al., 2010) as cited in Valencia et al., (2015) p.236.

Cultural norms and practices Adapting for cultural-specific values and social norms, religious/ spiritual beliefs and practices, and incorporating culturally-relevant social activities	Culturally-specific practices and coping methods	Adapting intervention to accommodate cultural-specific beliefs, local practices and traditions, and coping methods (e.g. local remedies, prayer, spiritual/ religious leaders, places of worship, experiences of symptoms)	'Traditional alternative healing practices, such as herbal treatments and use of religious leaders, were acknowledged alongside Western approaches.' (Bradley et al., 2006, p. 525) 'It is therefore not surprising that they consult healers from more than one system, for example, faith/spiritual healers and traditional healers as well as consulting doctors. It is also interesting that even those who believed in physical causes contacted different traditional healers, for example faith healers or spiritual healers. Some traditional healers (for example Hakims) use a mixture of Indian, Greek and Chinese medicines.' (Habib et al., 2015, p.204) 'Folk stories and examples from the life of the Prophet Muhammad and Quran were used to clarify issues.' (Habib et al., 2015; Naeem et al., 2015) as cited in Naeem et al., 2010, p.168. Guidelines for therapists: 'Their belief in supernatural causes of mental illness is not challenged; Emphasis on symptomatic treatment regardless of etiology; Counsellor to have positive attitude toward drugs and have confidence in modern treatment rather than traditional healers.' (Razali et al., 2000, p.285) 'Azhar, Varma and Hakin (1993) examined phenomenological differences in hallucinations between schizophrenic patients in various areas of Malaysia. There were significant differences in the experiences of the Malays of Penang and of Kelantan, indicating that culture affects the phenomenology of hallucinations, even among people of the same race but from different regions.' (Wahass & Kent, 1997, p.352) 'The content of the voices was influenced by the patients' cultural background. Most Saudi patients reported that their voices involved religious and superstitious themes, while the British patients were most likely to report the giving of instructions.' (Wahass & Kent, 1997, p.352) 'Considering the important role that religion plays in Islamic cultures, only those strategies that are in harmony with religious beliefs may be accepted by patients and their families. In Islam, for instance, listening to music is not always allowed, so that alternatives may be required for Muslim believers.' (Wahass & Kent, 1997, p.353) Designing the intervention to accommodate religious practice: 'While other strategies required modification, being adapted and enhanced to be appropriate for Islamic patients. These coping strategies mostly involved religious beliefs. Under Islamic doctrine, Muslims are required to engage in prayer on five occasions each day, prayers that involve both physical and mental activities. They are also required to perform ablutions before each prayer session, and they must concentrate on their activities. Before, during and after prayer, Muslims read verses of the Quran. If these requirements are fulfilled, believers will be rewarded by god either in this life, in the hereafter, or both.' (Wahass & Kent, 1997, p.355) 'The therapist encouraged greater engagement with methods such as using prayer, reading the Quran, and regular use of religious practices, as coping methods to control the content and characteristics of the voices. This provided distractions and aided attention switching.' (Wahass & Kent, 1997, p.355-356). 'Coping strategies were based on traditional Islamic beliefs, as held by many people from Islamic backgrounds, which are consistent with the teaching of the Quran. Patients used portable audiocassette players with headphones to listen to a person who was reading the Quran or giving reminders of religious subjects.' (Wahass & Kent, 1997, p.355-356)
	Culturally relevant	Incorporating culturally-	'For 5 sessions, relaxation exercises, including the Chinese Eight Elegant Movements (Baduanjin) were

	activities and scenarios	relevant activities and scenarios (e.g. social activities, local stories, traditional characters)	introduced and practiced at the end of the session.' (Kung et al., 2012, p.390) 'The CBCSM used local cultural scenarios as role-play activities and had video demonstrations performed by local actors. For example, "yum cha" (tea gathering at the Chinese restaurant) was used to replace the party situation as it is a common local gathering activity for practicing conversation.' (Lak et al., 2010, p.140). 'Participants were encouraged to participate in culturally relevant activities like playing Mahjon, doing Tai Chi and singing Karaoke.' (Mann & Chong, 2010, p.73) 'Identified scenarios that were deemed culturally neutral or more relevant to the local Hong Kong Chinese service users.' (So et al., 2015, p.5)
	Community and social networks	Building social networks and actively encouraging social and community support inside and outside of the therapeutic setting (e.g. engaging families through social gatherings and offerings; use of peer led sessions; providing opportunities for bonding).	'Addition of a module to emphasize mutual support and consists of deliberate efforts to mould the group into a social network that can persist for an extended period and satisfy family needs for social contact, support, and on-going monitoring.' (Carra et al. 2006, author email) 'Expansion of the families' social networks occurs through problem solving, direct emotional support, and out-of-group socializing, all involving members of different families in the group.' (Carra et al., 2007, p.24) 'To work effectively for mutual support in the later sessions, the group instructor continuously reinforced the principles of strengthening social support among the participants' (Chien, 2008, p.32) The intervention included: 'discussion of a taboo area (sharing of secret and internal psychological conflicts), commonality or a situation of 'all-in-the-same boat' (feeling in similar situation and working against a common plight), mutual help (reciprocal giving and receiving help and support among members).' (Chien, 2008, p.34) The use of 'peer leaders': family members from the group who were facilitated by a trained mental health professional (Chien & Chan, 2004; Chien & Chan, 2013; Chien Chan & Thompson, 2006; Chien, Norman & Thompson, 2004; Chien, Thompson & Norman, 2008, author email) this increased social support, resulting in an enhanced sense of control over interpersonal skills and family care, and a shared-experience, "all in the same boat" belief, providing effective social learning of patient care for other group members. (Chien, Chan & Thompson, 2006, p.43) The intervention focussed on: 'inviting more practical assistance among group members.' (Chien & Lee, 2013, p.377) 'Family intervention included developing collaboration with the family, socializing about non–illness-related topics, monthly updates on each family's situation, enhancing family communication, teaching patients and their families to cope with stressful situations and the illness' (Guo et al., 2010, p.897) 'Skills trainers used an informal, personal style with patients and relatives that included the sharing of food and encouragement of 'small talk' before and after training sessions, made to encourage warm interactions between trainers, patients and relatives, thereby increasing retention in the study and increasing effectiveness.' (Kopelowicz, 2003, p.214) 'Dinner was provided before multifamily group meetings because food is important in Chinese culture, and many working caregivers came directly after work. The meal together provided group members a natural opportunity for informal socializing and bonding.' (Kung et al., 2012, p.388-389) 'Multiple family workshops were held once every 3 months. During the workshop, general questions

			were discussed, and relatives shared the experiences of caring for patients.' (Ran et al., 2003, p.70) 'Particularly in the earlier sessions, the clinician played an active role in facilitating the group discussion to encourage and support exchange and sharing.' (Shin & Lukens, 2002, p.1127) 'Refreshments were served at every session to encourage attendance' (Shin & Lukens, 2002, p.1127)
Communication Culturally-specific forms of communication, problem solving and learning styles	Openness & disclosure	Adapting for cultural differences in open expression of emotion and/or disclosure of patient's private information (e.g. sharing confidential information, reassurance to openly discuss problems)	'Chinese are less likely to express affection to each other through words and touch, than people from Western countries. They tend to show their concern and feelings for each other through action, for example, by taking care of actual needs rather than communicating those feelings verbally (Hsu, 1995). Therefore, it may be difficult to build rapport between the therapist and the family in the traditional family therapy session (Fung & Ma, 1997).' (Chien & Chan, 2004; Chien & Chan, 2013; Chien Chan & Thompson, 2006; Chien, Norman & Thompson, 2004; Chien, Thompson & Norman, 2008, author email) Group instructor reinforced: 'the principles of strengthening social support among the participants, including: sharing personal data (ensuring confidentiality and disclosing information with trust.' (Chien et al., 2008, p.32-33) 'Chinese families are reluctant to openly disclose their thoughts and feelings in the presence of a therapist, and that intense emotion should be controlled and hidden, not openly discussed.' (Chien & Chan, 2013, p.1328) Intervention consisted of: 'educational workshop, caregiving role, and therapeutic communication, learning about home management and effective communication among family members.' (Chien & Lee, 2010, p.318) 'They are also assisted in reducing their self-consciousness and need to "save face" (to preserve one's dignity and avoid any disgrace), reconstruction of their self-image, and improving their insights into schizophrenia.' (Chien & Lee, 2013., p.377) 'Due to the close nature of Mexican families, therapists did not uphold participant confidentiality and freely shared information about the participants problems and progress with family members.' (Valencia et al. 2007; Valencia et al., 2010, author email)
	Strategies for conflict resolution and problem solving	Adapting for cultural-specific ways of communicating to resolve problems (e.g. preferences for direct/ reparative actions vs. emotional reassurance; practical assistance vs. talking; avoiding confrontation; assertiveness).	'There is a need to adapt the family intervention that has originated in the West to take into account Chinese ways of communication (as characterized by an emphasis on mutual respect and positive action for family members rather than talking.' (Chien, 2008., p.30) 'The content of the program was designed according to the preference and perceived needs of patient-caregiver dyads, and the case managers put much emphasis on addressing their cultural issues in family caregiving role, effective communication, and resolving conflicts, as well as hands-on practical experiences.' (Chien & Lee, 2010, p.318.) 'Chinese people tend to show their mutual concern and support by seeking to meet each other's actual needs (Chan et al., 2006) they are reluctant to seek professional help. Therefore, they tend to value care-giving and therapies which emphasize practical assistance and problem solving rather than psychological reassurance and opportunities for expression of feelings.' (Chien, Thompson & Norman, 2008, p.123) 'Family involvement, differing patterns of communications (for example concept of assertiveness outside the West) should be important in adapting therapy for local clients in Pakistan.' (Habib et al.,

			2015, p.206) 'Patients were excluded from the multifamily group, since caregivers are likely to be inhibited in discussing their frustrations about their ill member due to cultural tendencies to avoid direct family confrontation in front of many non-family members.' (Kung et al., 2012, p.388) 'Problem solving and communication skills education was emphasized in this study.' (Li & Arthur, 2005) as cited in Li (2003) thesis. 'Emphasis on assertiveness in these modules struck a careful balance between respeto/formalidad (i.e., respect and formality) and encouraging patients to clearly state their needs.' (Patterson et al., 2005., p.926) 'The programme such as training to communicate assertively and establishing eye contact with the elderly (especially one's parents) are regarded as disrespectful in the Malay culture.' (Razali et al., 2000, p.288) Addition of coping strategies consistent with Islamic doctrine to the coping strategy enhancement component (Tarrier et al., 1990) of the intervention (Wahass & Kent, 1997, p.355)
	Teaching and learning styles	Adopting approach to teaching and delivery that accommodates culture-specific ways of learning (e.g. directive vs. collaborative; didactic vs. dialectic; active vs. passive)	'Given the Chinese caregivers tendency to prefer a more hands-on and practical experience, they were invited to conduct behavioural rehearsals of coping strategies and skills in resolving conflicts within the family.' (Chien & Lee, 2010, p.318) 'The active-directive teaching style that is the *sine que non* of social skills training was modified to allow for more spontaneity on the part of the patients. Because many patients do not respond to direct questions with direct answers, trainers were instructed to 'stick with the patient' longer that in conventional training sessions.' (Kopelowicz et al., 2003) as cited in Lopez & Kopelowicz (2002) p.14-15. 'Also, the need to be an active participant in treatment was encouraged to overcome the tendency for members of a patriarchal culture to accept without question the counsel of authority figures like physicians (Zea et al., 1997).' (Kopelowicz, 2003; Kopelowicz et al., 2012) as cited in Lopez & Kopelowicz (2002) p.15. 'This study integrated Chinese cultural values and practices into the use of CBT. For example, the more hierarchical approach to the doctor–patient relationship could be geared to the therapist's advantage in the early phase of engagement in CBT. However, the emphasis then needed to shift to a more collaborative relationship, with encouragement of the patient contributing to the therapy' (Ng, 2006) (Li et al., 2015, p.1901) 'One of the psychologists talked about patients not being comfortable with downward arrow technique and Socratic dialogue. Most of them said cultural adaptation of CBT for psychosis patients expect a directive style rather than collaborative style.' (Habib et al., 2015; Naeem et al., 2015) as cited in Naeem et al., 2016, p.50-51. 'Patients also like a directive style and probably don't feel comfortable when a collaborative style is used.' (Habib et al., 2015; Naeem et al., 2015) as cited in Naeem et al., 2010, p.171. 'Korean clients are likely to feel more comfortable with a didactic format than with an interactive situation, because the former is less conducive to experiential types of sharing that require self-disclosure. Their culturally determined respect for experts and authority may help facilitate both the educational process and the therapeutic alliance.' (Shin & Lukens, 2002, p.1126)

			'Visual aids, including charts and handouts, were used to reinforce the didactic materials.' (Shin & Lukens 2002, p.1127) 'Family members reported that their ill relatives were uncomfortable with written material, such as writing exercises during sessions or for homework assignments. Instead, patients considered that therapy was for talking and learning but not for written activities that reminded them of school activity that they believed had nothing to do with therapy. Therefore, the skills trainers switched to oral exercises and assignments, which the patients readily accepted.' (Valencia et al., 2007; Valencia et al., 2010) as cited in Valencia et al., (2015) p.222.
Context and delivery Adapting the delivery of the intervention to accommodate , contextual issues (e.g. lack of commitment, funding or resources) to facilitate feasibility in particular cultural context	Location of intervention	Delivery of sessions at accessible and culturally appropriate location	'Additional adaptations were made because all of the programs were not delivered within standard CMHTs but to overcome organisational barriers we provided these outside.' (Carra et al., 2007, author email) 'Unlike in the United States, the number of psychiatric beds per capita is on the increase in China, and community-based services are extremely limited. It is our belief that active promotion of psychiatric rehabilitation in Chinese psychiatric hospitals at the present time will pave the way for large-scale implementation of community-based rehabilitation in the future.' (Weng et al., 2005, p.402) 'In this study the aim was to finish the main content of the education programme in the hospital, and connect with the families after the patients were discharged because few nurses work in community settings and the community mental health services were not sufficiently well developed.' (Li & Arthur, 2005) as cited in Li (2003) thesis. 'Providing psychological treatment during the inpatient phase might offer improved opportunities, especially in a developing country; this is especially important because the distance from health care facility was reported to be one of the major barriers to receiving therapy regularly (since in Pakistan most patients and their carers travel long distances to see therapists in psychiatric centres, which are mainly in large urban areas) (Naeem, Gobbi, Ayub and Kingdon, 2010)' (Habib et al., 2015, p.201) Delivering the intervention in patients' homes 'as the psychotic patients in the Chinese rural community reside dispersedly and have different individual problems, they need more specifically tailored intervention methods conducted in their homes.' (Ran et al., 2003, p.74) 'The shortage of mental health care in rural China might be tackled by community care.' (Xiang et al., 1994, p.544) 'Intervention is provided by hospital-based physicians and nurses since these are the only mental health professionals available in China.' (Xiong et al., 1994, p.240)
	Flexibility in scheduling sessions	Flexibility in scheduling of therapy sessions to accommodate culture (e.g. frequency, time, intensity)	'To encourage participation, all of the clients and caregivers were phoned once a week to keep them engaged during the 3 months of the PEP. All of the participants were further reminded to attend the next session 1 day in advance; repeat sessions were made available to them; and the program was conducted on the weekends.' (Chan et al., 2009, p.68) 'We designed this comprehensive psychosocial intervention to be delivered on the same day once a month mainly owing to the care structure in China, the potential time and cost burden to patients and their family members, and the feasibility of adoption by other care settings. In China, most patients with schizophrenia live with their family members because of limited social welfare for severely mentally ill patients. Many of these family members also work full time, so it is not convenient for them to take time off every week and bring the patients for therapy. In addition, all our psychosocial interventions were group based, so having many patients and their family members come in once a week at the same time

			was not feasible or practical.' (Guo et al., 2010, p.897) 'Providing psychological treatment during the inpatient phase might offer improved opportunities' (Naeem, Gobbi, Ayub and Kingdon, 2010)' (Habib et al., 2015, p.201) 'Attendance was facilitated by presentation, in each neighbourhood, of each lecture twice, once during the day and the other in the evening. Unlimited time was allowed for discussion and questions after each lecture. (Zhang & Heqin, 1993, p.50)
	Mode of intervention	Modality of treatment to accommodate culture (e.g. group or individual; patient and/or caregiver attendees)	We didn't include the patient, as Italian culture hardly allows an open expression of feelings re the ill relative in front of other people not belonging to the family (Carra, 2007, author email) 'Traditional therapist-led single-family therapy that focuses on the psychological problems of the patient or family members may not be easily accepted by Chinese families because of their reluctance to reveal private thoughts and feelings in front of others, especially a therapist or someone not familiar to them…. Therefore, it may be difficult to build rapport between the therapist and the family in the traditional family therapy session (Fung & Ma, 1997).' (Chien & Chan, 2004; Chien & Chan, 2013; Chien Chan & Thompson, 2006; Chien, Norman & Thompson, 2004; Chien, Thompson & Norman, 2008, author email) 'Multiple family sessions gave them the opportunity to speak about their children with each other, which they felt was needed.' (Koolaee & Etemadi, 2009, p.11) 'Patients were excluded from the multifamily group, which was different from McFarlane's (2002) model since caregivers are likely to be inhibited in discussing their frustrations about the ill member due to cultural tendencies to avoid direct confrontation within family in front of many "outsiders" (Bae & Kung, 2000)' (Kung et al., 2012, p.388) 'Patients were addressed separately, they were not required to attend the intervention sessions, because some caregivers felt that they would be unable to discuss their problems freely in the patient's presence.' (Kulhara et al., 2009, p.474)
	Length of intervention	Duration of treatment to accommodate cultural or contextual barriers	'Although the multiple-family group intervention is generally used for two years, funding constraints necessitated a briefer intervention.' (Bradley et al., 2006, p.524) 'The number of sessions had been reduced from 18 to 14 two-hour sessions.' (Chien & Lee, 2010, p.318) 'Psychosocial interventions have become more popular in recent decades in China, but the number of well-trained therapists remains limited in many Chinese psychiatric settings. More frequent therapy sessions could be not only difficult for patients and family members but also hard for many psychiatric settings to adopt.' (Guo et al., 2010, p. 897) 'The final adaptation was that the duration of the intervention was only 6 months in comparison to the usual 9- 24 months. This is because many Chinese immigrants are reluctant to commit to long-term psycho-social treatments primarily because many of them are involved in low paying jobs with long work hours.' (Kung et al., 2012, p.388-389). 'A similar contextual barrier was the particular difficulty in organisations that are not fully committed to recovery, because IMR redistributes power to clients within a wider recovery paradigm, they suggested that this barrier should be the key priority in IMR implementation. Therefore, instead of fully complying with the standardized 9-month toolkit, a brief IMR was pragmatically developed to benefit patients living

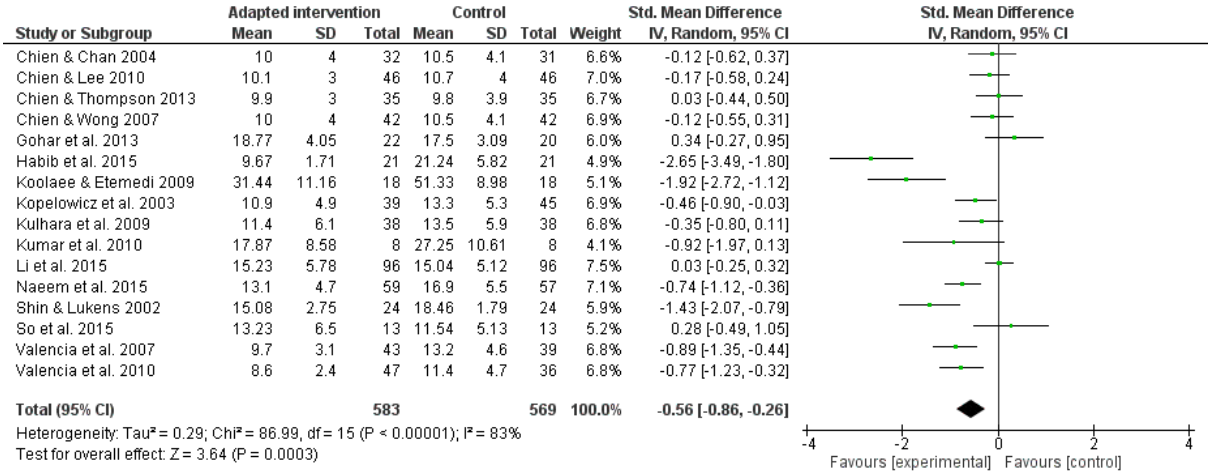
			with various degrees of deinstitutionalization and cultural stigmatization.' (Lin et al., 2013, author email) 'The intervention is ongoing rather than time limited, because stopping it would mean the termination of any regular follow-up care.' (Xiong et al., 1994, p.240)
Content Addition or removal of specific content	Addition of specific content	Adding culturally-relevant content /materials to the intervention manual	Adapted model by adding a further phase for the 'SG' programme for cultural reasons (Carra et al., 2006, author email) Chan et al., (2009) incorporated sessions about diagnostic labels & biochemical factors and laws in relation to mental health care in Hong Kong : 'Session 3: Causes of psychosis, labels and diagnosis; Explore the need for diagnosis, its procedure, complexity, and relationship to treatment. Causes such as genetics, neurological, environmental, psychological, and biochemical factors. Session 8: Laws related to mental health care in Hong Kong Mental Health Ordinance in Hong Kong; Ways of admission to mental hospital.' (p.75) Chien (2008) added a module to their mutual support intervention for family members to discuss 'Chinese culture of family and mental illness' (p.33) Chien & Chan (2013) added 'Discussion about Chinese culture of family and mental illness' (p.1332) Chien, Chan & Thompson (2006) added 'Sharing and understanding of individual concerns and cultural issues' component to the mutual support group programme (p.43) Chien & Thompson (2013) added 'information sharing about schizophrenia and its related illness behavior; discussion about Chinese culture of family and mental illness' (p.1000) 'Finally, we incorporated additional role play exercises to compensate for the absence of Arabic video materials, especially in the mentalizing section.' (Gohar et al., 2013, p.14) The intervention included a session to address 'other cause of mental disorders such as supernatural causes, magico-religious treatments; other issues such as marriage, pregnancy, childbirth, and substance abuse' and emphasised marriage as a primary concern because 'myths prevail that marriage could cure the patient.' 'Therapists dispelled these beliefs and advised the family to wait until the patient is stable before considering marriage.' (Kulhara et al., 2009) as cited in Shankar & Menon (1993) p.10-11. 'The content of the intervention also reflected issues that are felt to be more relevant for Indian families such as belief in supernatural causation, the role of indigenous treatments, cultural attitudes towards medication, marriage etc. On the other hand, there was a much less emphasis on constructs such as expressed emotions.' (Kulhara et al. 2009, author email) 'Accordingly, with permission from the MCT developers (Moritz & Woodward, 2007a), some of the slides were removed and a few changes were introduced.' (Kumar et al., 2010, p.153) 'Falloon et al.'s (1984) BFT model was modified for this study. This culturally modified model included the sociocultural approach of patient and family education and the addition of a new component to tackle poor drug compliance while retaining an emphasis on problem solving skill training.' (Razali et al., 2000, p.284) 'The materials used in the SCIT intervention program (i.e. videos and photographs) were remade using Chinese actors following the original scripts.' (Wang et al., 2013, p. 753)
	Removal of specific	Removing culturally- irrelevant content/ materials from the	'Modified some written vignettes describing emotions as they relate to pets, as it is not common in

	content	intervention manual	Egyptian culture to have a dog or cat in one's home.' (Gohar et al., 2013, p.14) 'We used most of the picture (e.g., faces, social scenarios), video, and auditory stimuli from the original version but excluded some that were not well suited to Egyptian culture. For example, we excluded pictures and videos that depicted unfamiliar recreational activities (e.g., American football or drinking alcohol beverages)' (Gohar et al., 2013., p.13) 'We omitted communication skills training as this is the least important among the three core components of the standard model. This is supported by the finding that generally the carers of Malay schizophrenic patients could tolerate negative symptoms of schizophrenia (Salleh, 1994)' (Razali et al., 2000, p.284) 'For example, JTC was illustrated in the original MCT using the conspiracy theory about Paul McCartney's death. This was substituted by a classic local myth about keeping pregnancy secretive during the first trimester so as to avoid a miscarriage.' (So et al., 2015, p.5) 'Only six of the seven learning activities used in the united states were used for Mexican patients. Video-assisted modelling was not used since skills training technology in Spanish had not been developed in Mexico. To overcome this obstacle, therapists demonstrated the skills to be learned during sessions.' (Valencia et al., 2007; Valencia et al., 2010) as cited in Valencia et al. (2015) p.222. 'Another adaptation was the images used, as in Brazil, they do not have snow, trains and a very small number of patients can travel by plane.' (Zimmer et al., 2007, author email)
Therapeutic alliance Consideration of therapist qualities/ characteristics, approach and cultural competency training to improve engagement and alliance	Therapists and client matched for characteristics	Therapists matched for characteristics (e.g. ethnicity, age, gender, language spoken etc.)	'Vietnamese primary therapists were consistent for two intakes of the two cultural groups' (Bradley et al., 2006, p.524) 'Cultural adaptations of the program included the use of Vietnamese speaking staff for all aspects of service provision within the program.' (Bradley et al., 2006, p.525) Use of a female therapist for Iranian intervention designed for mothers (Koolaee & Etemadi, 2010, author email) 'Additional cultural adaptations included the use of indigenous, bilingual, and bicultural staff of the community mental health center as skills trainers, the participation of family members (rather than clinicians) as "generalization aides"' (Kopelowicz et al., 2003, p.214) 'As the participants in the study spoke either Mandarin or Cantonese, and some were more fluent in English, trilingual clinicians were sought.' (Kung et al., 2012, p.390)
	Therapist 'cultural competency' training	Therapists received some form of cultural competency training and supervision	Trainers 'were all trained to meet cultural sensitivity standards outlined by the State of California and based on sound empirically-based principles (Rogler et al., 1987; Wallen, 1992). (Kopelowicz et al., 2003; Kopelowicz et al., 2012) as cited in Lopez & Kopelowicz (2002) p.24. 'Facilitators of these treatments should be educated and familiar with the relevant cultural values of the consumer.' (Mausbach et al., 2008, p.73) 'The treating clinicians needed special training because psychiatrists and psychiatric nurses in China have no experience in the evaluation and management of the family and social problems faced by mentally ill patients.' (Xiong et al., 1994, p.240)
	Therapeutic approach	Therapeutic approach adapted	'Skills trainers used an informal, personal style with patients and relatives that included the sharing of

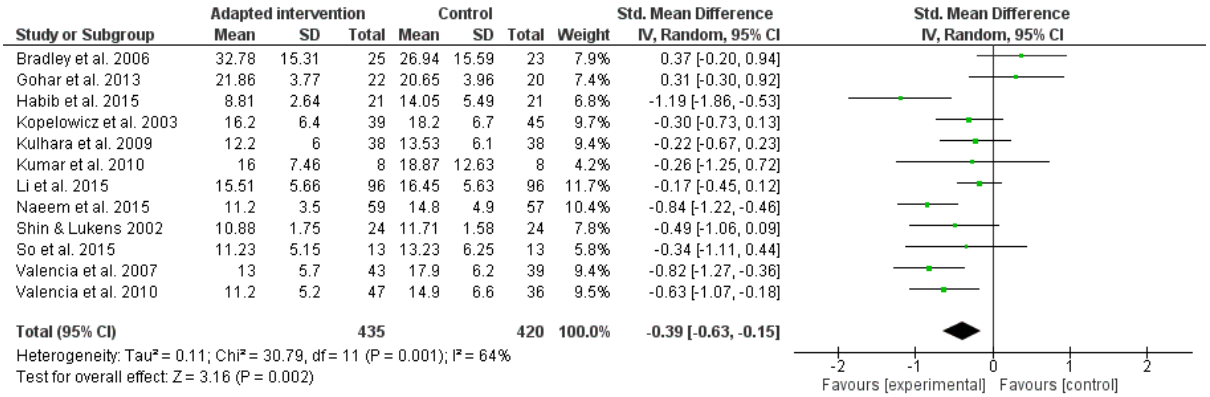
		to build rapport and trust between therapist and patient/family unit (e.g. informal, warm up activities/ice breakers, personalised, general conversation, self-disclosure)	food and encouragement of 'small talk' before and after training sessions, made to encourage warm interactions between trainers, patients and relatives, thereby increasing retention in the study and increasing effectiveness.' (Kopelowicz, 2003, p.214) 'During the engagement, phase attempts were made to build a positive therapeutic alliance with the family. Preliminary information (oral⁄printed) about schizophrenia was provided. All this was done in a no fault atmosphere i.e. without attaching blame to anyone, especially the family.' (Kulhara et al., 2009, p.474) 'Intervention focused on establishing trust relationship with patient and family, before identifying their individual needs.' (Li & Arthur, 2005, p.340) Accepting the patient's interpretation of his or her illness to strengthen the therapeutic relationship. (Razali et al., 2000, p.288) 'Adaptations to Mexican culture included the therapists beginning the sessions by engaging in platica (small talk) with the patients which built trust.' (Valencia et al., 2010, p.253) 'In addition, therapists offered their patients appropriate forms and amounts of self-disclosure from their own lives which generated a sense of personalismo or a personal orientation to therapeutic relationships that has been shown to improve the effectiveness of interventions with Latinos (Sue et al., 1991)' (Valencia et al., 2010, p.253) 'Each session began with a short warm-up activity (about 5 min), which was designed to create a more relaxed atmosphere' (Wang et al, 2013, p.753)
Treatment goals Formulating treatment goals and encouraging outcomes that are realistic, culturally relevant and tailored to the family	Intervention goals and expectations of outcome	Ensuring treatment expectations are realistic and modifying treatment goals to ensure culturally relevant (e.g. collaborative/shared goals; cultural values emphasised)	'Emphasis was given to specific Chinese cultural characteristics and issues, including a strong tendency to expect immediate and practical help' (Chien & Chan, 2004 p.1278) 'Specific Chinese cultural characteristics were emphasised during each group session including the 'high expectation of immediate and practical help from other family members.' (Meredith et al., 1994; Bae & Kung, 2000). (Chien, Chan & Thompson, 2006, p.44) 'Emphasis was given to specific Chinese cultural issues, such as their 'high tendency to expect immediate practical help.' (Chien & Thompson, 2013, p.999) 'Given the centrality of the family unit in decision making for Mexican Americans, (Sabogal et al., 1987) the focus was on the approval or disapproval of family members for taking medication.' (Kopelowicz et al., 2012, p.268) Content of sessions included: ' realistic goal setting' (Kulhara et al., 2009, p.474) 'Basing format, content, and treatment goals on Mexican cultural values such as simpatı´a (the use of polite social relations (Diaz-Guerraro, 1994; Gloria & Peregoy, 1996) and personalismo (emphasizing warm relationships) (Gloria & Peregoy, 1996; Marin, 1989)' (Mausbach et al., 2008, p.66) The treatment goals were based on: 'Mexican values and cultural scripts' (Patterson et al, 2005., p.925) 'Cultural adaptations were made through the identification of personally relevant goals that often concerned improving relationships with family members' (Valencia et al., 2007; Valencia et al., 2010) as cited in Valencia et al., (2015) p.230.

SUPPLEMENTARY

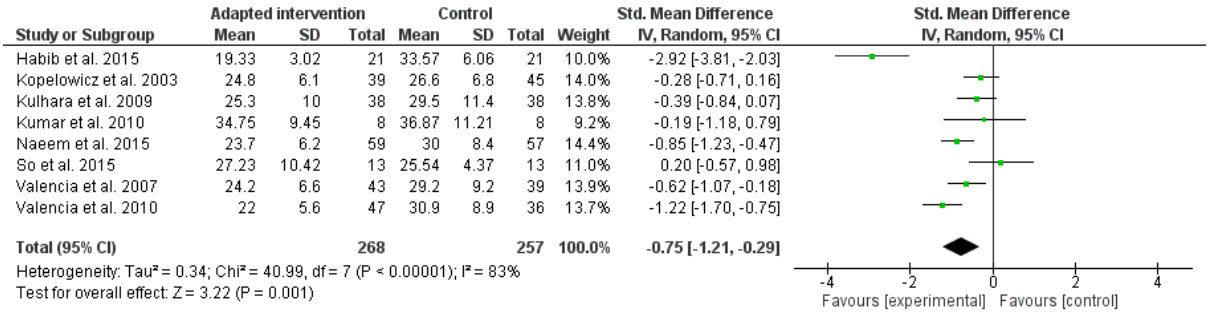
Appendix 7: Forest plots



A7.1. Forest plot of effect of culturally-adapted psychosocial interventions compared to control on positive symptoms post-treatment



A7.2. Forest plot of effect of culturally-adapted psychosocial interventions compared to control on negative symptoms post-treatment



A7.3. Forest plot of effect of culturally-adapted psychosocial interventions compared to control on general symptoms post-treatment

SUPPLEMENTARY

Appendix 8

Table A8.1: *Positive symptoms POST-INTERVENTION 0-3 months (n=16)*

Theme	SMDs			Heterogeneity				Number of studies	Total sample size
	Effect size	95% CI	*p*	Chi^2	df	I^2 (%)	*p*		
Intervention type									
FI	-0.51	-0.94 to -0.08	**0.02**	30.78	6	81	**0.0001**	7	469
Cognitive (CBT, MCT)	-0.75	-1.55 to 0.05	**0.06**	42.99	4	91	**0.00001**	5	392
Skills training (ST, ST + FI)	-0.70	-0.96 to -0.45	**0.00001**	1.92	2	0	0.38	3	249
OR									
Skills training (ST, ST + FI) + SCST	-0.48	-0.95 to -0.01	**0.009**	11.51	3	74	**0.05**	4	291
Other: (ST, ST + FI, SCST, CBT and MCT)	-0.60	-1.04 to -0.16	**0.008**	55.61	8	86	**0.008**	9	683
Control									
Standard care/meds	-0.84	-1.29 to -0.38	**0.0003**	28.15	6	79	**0.0001**	7	449
Enhanced standard care	-0.35	-0.74 to 0.03	0.07	18.82	5	73	**0.002**	6	421
Active control	-0.33	-1.24 to 0.58	0.47	19.53	2	90	**0.0001**	3	282
Region/ Population									
Western country/ Minority	-0.84	-1.19 to -0.49	**0.00001**	6.21	3	52	0.10	4	297
Non-western country/Majority	-0.45	-0.81 to -0.09	**0.01**	66.72	11	84	**0.00001**	12	855
Attendees									
Patient only	0.05	-0.31 to 0.41	0.78	4.53	3	34	0.21	4	726
Family only	-1.10	-2.64 to 0.44	0.16	11.15	1	91	**0.0008**	2	112
Patient & family	-0.66	-1.02 to -0.31	**0.0003**	50.92	9	82	**0.00001**	10	764
Intervention modality									
Group	-0.53	-0.98 to -0.07	**0.02**	56.10	9	84	**0.00001**	10	539
Individual	-0.28	-0.75 to 0.19	0.24	10.46	2	81	**0.005**	3	400
Both	-0.83	-1.15 to -0.51	**0.00001**	0.13	1	0	0.72	2	165
Attrition									
Below 15%	-0.40	-0.73 to -0.07	**0.02**	46.43	9	81	**0.00001**	10	827
Above 15%	-0.51	-0.93 to -0.08	**0.02**	8.29	3	64	**0.04**	4	267
ITT									
Yes/ no attrition	-0.45	-0.82 to -0.07	**0.02**	59.77	9	85	**0.00001**	10	825
No/ 'as treated'	-0.70	-1.38 to -0.03	**0.04**	16.11	3	81	**0.0001**	4	229
Design									
RCT	-0.65	-0.98 to -0.31	**0.0002**	73.04	13	82	**0.00001**	14	897
Cluster RCT	-0.00	-0.25 to 0.24	0.97	0.29	1	0	0.59	2	255
Country									
Chinese	-0.07	-0.29 to 0.14	0.51	1.28	4	0	0.87	5	335
Not Chinese	-0.82	-1.23 to -0.41	**0.0001**	72.03	10	86	**0.00001**	11	817
Pre-treatment differences									
No	-0.65	-1.01 to -0.29	**0.0005**	83.72	12	86	**0.00001**	13	966
Yes	-0.29	-0.64 to 0.07	0.11	2.74	2	27	0.25	3	186
Measure									
PANSS	-0.57	-0.96 to -0.18	**0.005**	55.78	9	84	**0.00001**	10	759
BPRS	-0.55	-1.07 to -0.03	**0.04**	30.78	5	84	**0.0001**	6	393

Note:

CBT=Cognitive Behavioural Therapy; MCT=Metacognitive Therapy; SCST=Social Cognitive Skills Training; IMR=Illness Management and Recovery Programme; PE=Psychoeducation; ST=Skills Training; FI=Family Intervention; PANSS=Positive and Negative Symptom Scale; BPRS=Brief Psychiatric Rating Scale;

SUPPLEMENTARY

Table A8.2: *Negative symptoms POST-INTERVENTION 0-1 months (n=12)*

Theme	SMDs			Heterogeneity				Number of studies	Total sample size
	Effect size	95% CI	*p*	Chi^2	df	I^2 (%)	*p*		
Intervention type									
FI	-0.12	-0.58 to 0.35	0.62	4.61	2	57	0.10	3	172
Other (CBT, MCT, SCST, ST, ST +FI)	-0.48	-0.76 to -0.21	**0.0007**	22.53	8	64	**0.004**	9	683
OR									
Cognitive (CBT, MCT)	-0.57	-1.00 to -0.14	**0.01**	12.98	4	69	**0.01**	5	392
Skills training (ST, ST + FI)	-0.56	-0.79 to -0.33	**0.00001**	2.76	3	0	0.43	3	297
Skills training (ST, ST + FI) + SCST	-0.39	-0.82 to 0.03	0.07	9.52	3	68	**0.02**	4	291
Control									
Standard care/ meds	-0.66	-0.89 to -0.44	**0.00001**	7.79	6	23	0.25	7	449
Enhanced standard care	0.05	-0.53 to 0.63	0.86	2.52	1	60	0.11	2	124
Active control	-0.14	-0.50 to 0.22	0.46	3.52	2	43	0.17	3	282
Region/ Population									
Western country/ Minority	-0.39	-0.76 to -0.02	**0.04**	11.51	4	65	**0.02**	5	345
Non-western country/Majority	-0.39	-0.74 to -0.04	**0.03**	19.10	6	69	**0.004**	7	510
Attendees									
Patient only	-0.09	-0.34 to 0.16	**0.48**	2.02	2	1	0.36	3	250
Patient & family	-0.54	-0.84 to -0.24	**0.0004**	18.92	7	63	0.008	8	529
Intervention modality									
Group	-0.34	-0.66 to -0.03	**0.03**	11.32	6	47	**0.08**	7	334
Individual	-0.49	-1.15 to 0.17	0.15	7.81	1	87	**0.005**	2	308
Both	-0.38	-1.04 to 0.28	0.26	11.07	2	82	**0.004**	3	213
Attrition									
Below 15%	-0.32	-0.67 to 0.02	0.07	12.77	4	69	**0.01**	5	482
Above 15%	-0.35	-0.75 to 0.05	0.09	11.92	4	66	**0.02**	5	315
ITT									
Yes/ no attrition	-0.42	-0.79 to -0.05	**0.03**	19.20	5	74	**0.002**	6	516
No/ 'as treated'	-0.24	-0.66 to 0.18	0.26	7.37	3	59	**0.06**	4	241
Country									
Chinese	-0.19	-0.45 to 0.08	0.17	0.17	1	0	0.68	2	218
Not Chinese	-0.42	-0.71 to -0.14	**0.004**	27.56	9	67	**0.001**	10	637
Pre-treatment differences									
No	-0.43	-0.75 to -0.10	**0.009**	29.87	8	73	**0.0002**	9	669
Yes	-0.27	-0.56 to 0.02	0.06	0.10	2	0	0.95	3	186
Measure									
PANSS	-0.45	-0.70 to -0.20	**0.004**	23.51	9	62	**0.005**	10	759
BPRS + SANS	-0.06	-0.90 to 0.79	0.89	4.34	1	77	**0.04**	2	96

Note:

CBT=Cognitive Behavioural Therapy; MCT=Metacognitive Therapy; SCST=Social Cognitive Skills Training; IMR=Illness Management and Recovery Programme; PE=Psychoeducation; ST=Skills Training; FI=Family Intervention; PANSS=Positive and Negative Symptom Scale; BPRS=Brief Psychiatric Rating Scale;

SUPPLEMENTARY

Table A8.3: *General symptoms POST-INTERVENTION 0-1 months (n=8)*

Theme	SMDs			Heterogeneity				Number of studies	Total sample size
	Effect size	95% CI	*p*	Chi^2	df	I^2 (%)	*p*		
Intervention type									
Cognitive (CBT, MCT)	-0.93	-2.05 to 0.19	0.10	29.55	3	90	**0.00001**	4	200
Other (FI, ST, ST + FI)	-0.62	-1.02 to 0.22	**0.003**	9.65	3	69	**0.02**	4	325
OR									
Skills training (ST, ST + FI)	-0.70	-1.23 to -0.17	**0.01**	8.48	2	76	**0.01**	3	249
Region/ Population									
Western country/ Minority	-0.70	-1.23 to -0.17	**0.01**	8.48	2	76	**0.01**	3	249
Non-western country/Majority	-0.81	-1.60 to -0.02	**0.05**	32.46	4	88	**0.00001**	5	276
Attendees									
Patient only	0.05	-0.55 to 0.66	0.86	0.39	1	0	0.53	2	112
Patient & family	-1.08	-1.68 to -0.48	**0.0004**	30.86	4	87	**0.00001**	5	407
Intervention modality									
Group	-0.68	-1.50 to 0.14	0.11	33.09	4	88	**0.00001**	5	224
Individual & Group	-0.92	-1.50 to -0.33	**0.002**	3.26	1	69	0.07	2	165
Attrition									
Below 15%	-0.57	-1.13 to -0.01	**0.05**	3.84	1	74	**0.05**	2	200
Above 15%	-0.56	-1.07 to -0.05	**0.03**	11.59	3	79	**0.009**	4	267
ITT									
Yes/ no attrition	-1.30	-2.36 to -0.23	**0.02**	24.60	2	92	**0.00001**	3	234
No/ 'as treated'	-0.47	-1.26 to 0.32	0.25	12.95	2	85	**0.002**	3	193
Pre-treatment differences									
No	-1.12	-1.74 to -0.50	**0.0004**	24.52	4	84	**0.0001**	5	339
Yes	-0.25	-0.54 to 0.04	0.09	1.70	2	0	0.43	3	186

Note:

CBT=Cognitive Behavioural Therapy; MCT=Metacognitive Therapy; SCST=Social Cognitive Skills Training; IMR=Illness Management and Recovery Programme; PE=Psychoeducation; ST=Skills Training; FI=Family Intervention; PANSS=Positive and Negative Symptom Scale; BPRS=Brief Psychiatric Rating Scale;

SUPPLEMENTARY

Appendix 9:

Table A9: *Cultural-adaptations emerging from thematic analysis of psychosocial interventions for psychosis (n=46)*

Author/Theme	Language	Concepts & illness models	Family	Cultural norms	Communication	Context & Delivery	Content	Therapeutic alliance	Treatment goals
Bradley et al. (2006)	x	x	x	x		x		x	
Carrà et al. (2006)	x		x	x		x	x		
Chan et al. (2009)	x	x	x			x	x		
Chien (2008)	x	x	x	x	x		x		x
Chien & Chan (2004)*	x	x	x	x	x		x		x
Chien & Chan (2013)*	x	x	x	x	x		x		x
Chien et al. (2006)*	x	x	x	x	x		x		x
Chien & Lee (2010)	x	x	x		x	x			
Chien & Lee (2013)	x			x	x				
Chien et al. (2004)*	x	x	x	x	x		x		x
Chien & Thompson (2013)	x	x	x	x	x		x		x
Chien et al. (2008)*	x	x	x	x	x		x		x
Chien & Wong (2007)	x	x	x						

SUPPLEMENTARY

Author/Theme	Language	Concepts & illness models	Family	Cultural norms	Communication	Context & Delivery	Content	Therapeutic alliance	Treatment goals
Gohar et al. (2013)	x			x		x	x		
Guo et al. (2013)	x	x	x	x		x			
Habib et al. (2015)*	x	x	x	x	x	x			
Koolaee & Etemadi (2009)	x	x	x	x		x		x	
Kopelowicz et al. (2003)	x	x	x	x	x			x	
Kopelowicz et al. (2012)	x	x	x	x	x			x	x
Kulhara et al. (2009)	x	x	x			x	x	x	x
Kumar et al. (2012)	x						x		
Kung et al. (2012)**	x	x	x	x	x	x		x	
Lak et al. (2010)	x			x					
Li & Arthur (2005)	x	x	x		x	x			
Li et al. (2015)	x		x		x				
Lin et al. (2013)*	x	x				x	x		
Lin et al. (2013)**	x	x				x	x		

SUPPLEMENTARY

Author/Theme	Language	Concepts & illness models	Family	Cultural norms	Communication	Context & Delivery	Content	Therapeutic alliance	Treatment goals
Mann & Chong (2004)	x	x		x					
Mausbach et al. (2008)*	x	x	x	x	x			x	x
Naeem et al. (2015)*	x	x	x	x	x	x			
Patterson et al. (2005)*	x	x	x	x	x			x	x
Ran et al. (2003)	x	x	x			x			
Razali et al. (2000)	x	x	x	x	x		x	x	
Shin & Lukens (2002)	x	x	x	x	x				
So et al. (2015)	x			x			x		
Valencia et al. (2007)*	x	x	x		x	x	x	x	x
Valencia et al. (2010)*	x	x	x		x	x	x	x	x
Wahass & Kent (1997)	x			x					
Wang et al. (2013)	x						x	x	
Weng et al. (2005)	x		x	x		x			
Xiang et al. (1994)	x	x	x			x			

SUPPLEMENTARY

Author/Theme	Language	Concepts & illness models	Family	Cultural norms	Communication	Context & Delivery	Content	Therapeutic alliance	Treatment goals
Xiong et al. (1994)	x	x	x			x		x	
Zhang & Heqin (1993)*	x	x	x			x			
Zhang et al. (1994)	x	x	x						
Zhang et al. (1998)*	x	x	x			x			
Zimmer et al. (2007)	x	x					x		
Total	46	36	35	27	22	22	20	13	13