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Psychoeducational Interventions for People Diagnosed with Schizophrenia: Findings from the systematic review

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ABSTRACT

This systematic review examines the effectiveness of the psycho-educational interventions (PEIs) targeted at people diagnosed with schizophrenia (PDwS) on improving knowledge level of schizophrenia and health related outcomes. PEIs for PDwS and their primary caregivers (PCs) show, to some extent, a positive result; however, the majority of studies have significant methodological limitations. The methods described by Centre for Reviews and Dissemination were used to guide this review. Two reviewers were involved in screening articles for inclusion and in the data extraction process. Data were synthesized using the constant comparative method of analysis. Out of the 2507 records identified, 29 papers were considered for full review. The PEIs showed consistently improvement in the knowledge level of schizophrenia among participants for various follow-up intervals. PEIs for this PDwS should be integrated with standard care in the psychiatric clinics.

Keywords: psychoeducation, schizophren, nursing, literature review, systematic review, family caregivers, patients, education, integrative review

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INTRODUCTION

Schizophrenia is one of the most serious mental illnesses. It can be chronic, recurrent, disabling and debilitating among people treated in psychiatric clinics in both developing and developed countries [1]. Schizophrenia creates enormous disruption in the physical, social and psychological life of an individual. The effects and consequences of schizophrenia treatment affect not only physical health but also the psychological and social dimensions of individual health.

Psycho-educational interventions (PEIs) address and enable participants to face various problems associated with schizophrenia. A PEI for persons diagnosed with schizophrenia (PDwS) and their family caregivers may refer to any intervention that enhances the knowledge of PDwS and their family caregivers about schizophrenia, treatment, medication effects and side effects.

The National Institute for Health and Care Excellence (NICE) in the UK recommended the integration of social and educational interventions with pharmacological treatment of PDwS [2]. As a result of the extensive evidence-based literature on schizophrenia, the schizophrenia Patient Outcomes Research Team (PORT) project recommended family PEIs for at least nine-month, for all family caregivers in contact with a relative diagnosed with mental illness, including information about mental illness, crisis intervention and problem-solving skills training [3].

To date, there is a limited systematic review of existing evidence of the efficacy or effectiveness of PEI targeted at PDwS and primary caregivers. Therefore, the purpose of this systematic review was to examine outcomes of PEIs intervention in PDwS. It examines and updates the synthesized evidence regarding the effect of PEIs on a range of PDwS and their family caregivers' outcomes.

Search Method

The literature review addressed studies that implemented PEIs for PDwS using various formats of delivery. For the purposes of this review, the population was defined as adult PDwS. The search was restricted to studies published in English or Arabic during the period of 1999 to 2014. Applying the Population, Interventions, Comparators, Outcomes, and Designs (PICOS) format [4], the search employed the following key and associated terms:

Population—PDwS, schizophrenic patients.

Interventions and Comparators—PEI for PDwS, any format of delivering the intervention in any setting (inpatient, outpatient or community centre or home visits), or intervention delivered by any qualified professional. In addition, **Comparators** were defined as treatment as usual (TAU), standard care, or waiting list. Studies that used PEI directed at PDwS as a comparator with other forms of psychosocial interventions were also included.

Outcomes of interest—knowledge level of schizophrenia, coping style and managing illness, medication compliance, psychiatric symptoms, relapse and rehospitalisation, burden of care, physical and psychological outcomes, and social support.

Data sources and screening procedure

A comprehensive literature search was conducted to determine the relevant studies using the following electronic databases: MEDLINE, PubMed, CINAHL, PsycINFO, Web of Knowledge, Cochrane Library, Science Direct, Web of Science and Applied social Sciences Index and Abstract (ASSIA), and Google Scholar from 1999 to December 2014. Searches were limited to adults diagnosed with schizophrenia according to Diagnostic and Statistical Manual for Mental Disorder (DSM), International Classification of Mental Disorder (ICD) or Chinese Classification of Mental Disorder. The current study includes papers written either in English or in Arabic during the period of 1999 to 2014. The reason for choosing this time interval was to obtain up-to-date knowledge of this area of research to inform practice. In addition, there were only a limited number of studies published before 1999 and a lack of family caregiver outcomes reported in studies prior 1999, which rendered them a substantive number too insufficient to influence the design of the current study.

The general keywords used in the search were psycho-education, education intervention, family intervention, schizophrenia, psychosis, carers and randomised controlled trial. The characteristics for inclusion and exclusion of studies in the comprehensive literature review are summarised in Table 1 The studies' titles and abstracts were initially screened against inclusion criteria to determine potentially relevant studies. In the case of ambiguity of content, the full texts of the articles were consulted to identify content relevancy for the current study. All duplicated studies from different databases or those directed at PEI for PDwS with several mental illnesses were excluded. Reference lists of all included studies were compiled and examined to identify further relevant works that investigated the effect of PEI on the target population of this study.

Table 1: Summary of inclusion and exclusion criteria

	Inclusion	Exclusion
Participants	PDwS and their PCs [17].	PCs with mental illness and PDwS with two forms of mental disorder.
Studies criteria	Quantitative (RCT, non-RCT) [12,18]	Any other study design.
Intervention	Studies that used a PEI form of psychosocial intervention.	Any other forms of psychosocial interventions (e.g. behaviour family therapy, mutual support and social skill training) [8].

Outcomes	PDwS outcomes: knowledge level of schizophrenia, relapse rate, positive and negative symptoms. PCs' outcomes: knowledge level of schizophrenia, burden of care, and QoL [9].	Any outcomes other than those mentioned in the inclusion column.
Language	English or Arabic.	Any other language.
Place	No restriction on place.	-
Time	1999 or after.	Before 1999.
Keywords	Psychoeducat*, psychosocial, educat*, schizophren*, psychosis and caregivers.	

Search outcome

The initial screening of the abstracts yielded 2507 studies concerning schizophrenia, of which 2268 studies were excluded after reviewing their titles or being duplicated from different databases (n = 74). Abstracts were then reviewed and other studies were also excluded because they did not meet the inclusion criteria, such as: Irrelevant interventions for PDwS and family caregivers (i.e. focused on behaviour training such as cognitive behaviour therapy, behaviour modification therapy and mutual support) (n = 47), or PEIs for mental illnesses other than schizophrenia (n = 20), published in a language other than English or Arabic (n = 35), or Published outside the time period considered by this study (i.e., pre-1999) (n = 8). Studies were utilised qualitative design (n = 4).

The full text of 75 articles was reviewed comprehensively to identify gaps in the literature, after which 46 articles were excluded for several reasons. Some studies targeted PEI either solely at PDwS or at family caregivers (n = 23), or directed PEI to other forms of mental illness with or without schizophrenia (n = 23). Thus, 29 studies were ultimately included in the review, having met the inclusion criteria to learn more about PEI contents, delivery methods and session duration. The study selection process is outlined in Figure 1.

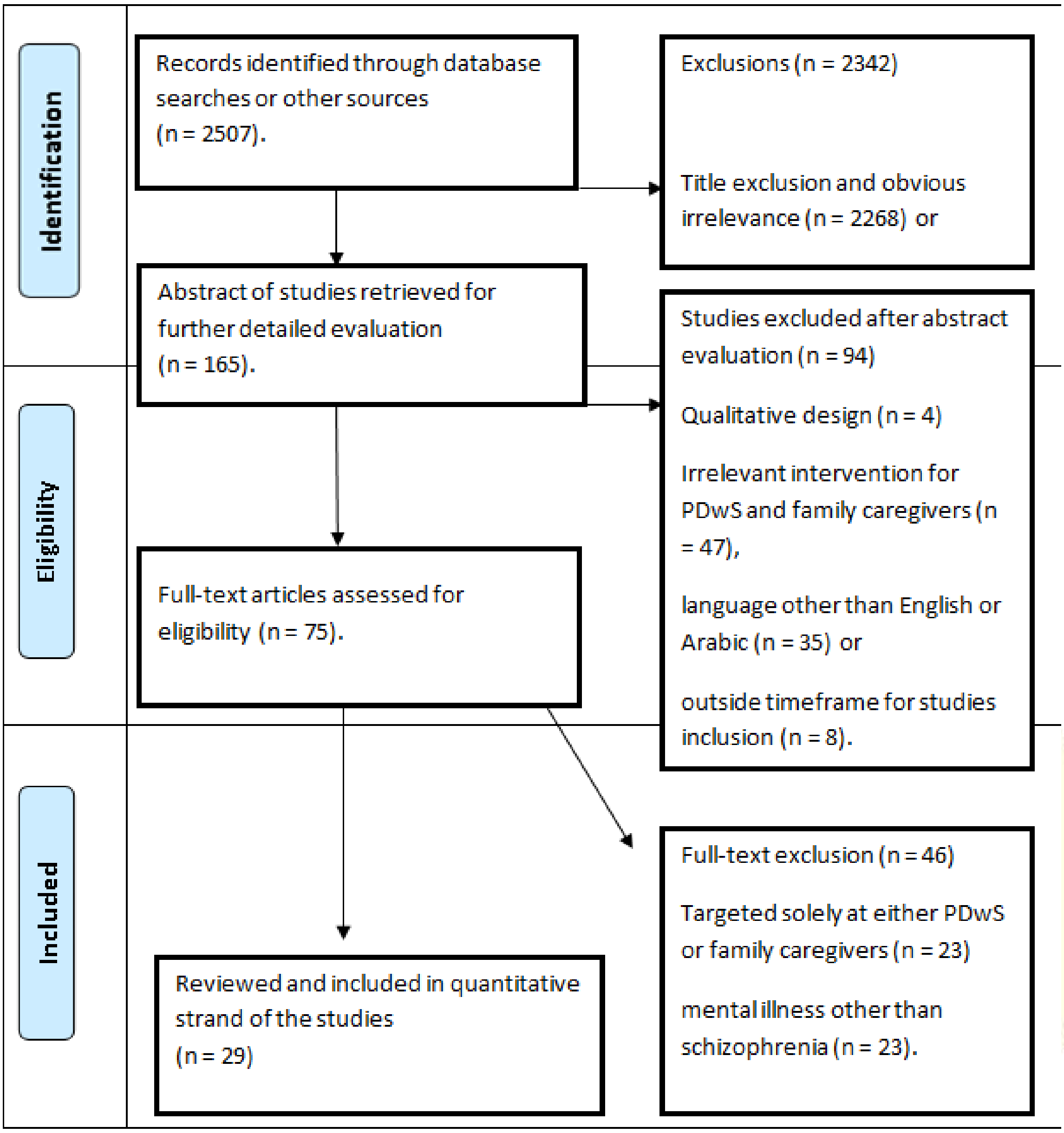

Figure 1: Flow diagram of data retrieved at each stage of the review

Quality appraisal

There is no consensus on a gold standard tool to evaluate the quality of RCTs and non-RCTs. Several quality assessment tools have been identified in the literature to assess the quality of these studies (i.e., RCTs and non-RCTs). In this review, the quality of all identified and included studies were critically appraised using checklists appropriate to this type of study design. For this literature review, the Consolidated Standards of Reporting Trial (CONSORT) checklist was administered to assess the quality of RCTs [5]. In addition, the Transparent Reporting of Evaluation with Non-randomised Designs (TREND) to evaluate non-randomised studies [6]. Two reviewers independently assessed methodological quality.

The CONSORT statement is a scale consisting of 25 items focused on title and abstract, introduction, methods, results, discussion and other information. A point was assigned to each study if there was a positive and clear description of every single item; thus, the consort score for the methodological quality ranged from 0 (very poor) to 25 (rigorous).

The TREND checklist has 21 items focused on the introduction, methodology, analysis and discussion. In this study, a point was awarded when the researcher dealt with each component clearly. Scores therefore ranged from 0 (poor quality) to 21 (rigorous). Moreover, the COREQ checklist consists of 32 items focused on three domains: research team and reflectivity, study design and analysis, and findings. A point was awarded when the researcher explicitly addressed the specified items. Scores in this study therefore range from 0 (poor quality) to 32 (rigorous). No paper was excluded based on methodological quality.

RESULTS AND DISCUSSION

Characteristics of the Reviewed Articles

The purpose of this systematic review was to examine outcomes of PEIs intervention on PDwS. Table 2 presents study characteristics and results of the articles reviewed). Among the 29 studies reviewed, 27 studies were RCT, one study had one group pre-post-test design [1], one study had quasi-experimental-non-equivalent comparison group [7], and one study had retrospective case-control design [8].

Table 2: Summary of the studies reviewed

Author/ Setting	**Population/Design**	**Interventions**	**Outcome measures**	**Results**
Sharif et al. (2012) Iran Outpatient	70 PDwS and PCs. RCT.	Intervention group (n = 35) received Treatment As Usual (TAU) with Psycho-educational Intervention (PEI) ten sessions (90 min), two sessions weekly supported with written material. Content: schizophrenia symptoms, treatment and effect on PDwS and family caregivers, medication, warning signs of relapse, communication skills, stress management, coping skills and ways of expressing emotion. Control group (n = 35) received TAU that was not specified.	PDwS outcome: BPRS. Family caregivers outcome: FBIS. Measured at baseline, immediately post-intervention and two-month follow-up. Multi-family group seminar (lecture based). Psychiatrist or psychiatric nurse.	There was a significant improvement in schizophrenia symptoms at both follow-up points.* There was a significant reduction in the burden of care scores in the intervention group at both follow-up points*.
Magliano et al. (2006) Italy Outpatient	126 PDwS and 71 family caregivers. RCT.	Intervention group (n = 42 PDwS, and 76 family caregivers) received TAU and monthly session of PEI for three hours over six-month. Content: clinical aspects of schizophrenia, treatment, early sign of relapse, communication skills and problems solving. Control group (n = 29, 50 dyads) assigned to waiting list.	PDwS outcome: BPRS. Social networking questionnaire (SNQ). Assessment of disability (AD). Family caregivers outcome: FPQ. Measured at baseline and immediately post-intervention. Psychologists and psychiatrists. Multi-family group seminar (lecture	There was a significant improvement in PDwS psychiatric symptoms post-intervention in intervention group compared with control group*. Relative social contacts and perception of professional support significantly improved in intervention group only*. A significant improvement found in intervention group in PDwS social relationships, interests in obtaining a job, maintained social

			based).	interests, and management of social conflicts*. The level of objective and subjective burden was improved significantly in both groups.
Nasr et al. (2009) Pakistan Outpatient	108 PDwS and PCs. RCT.	Intervention group (n = 52) received PEI (nine sessions weekly for 1.5 hours) supported with written material. Content: general information on schizophrenia, medication, communication skills and problem-solving. Control group (n = 56) received TAU. It was medication.	Family caregivers' outcome: FBIS. Baseline, six-month after intervention. Seminar (group) plus booklet. Psychiatric nurse.	There was significant reduction in burden of care reported in the intervention group post-intervention *.
Rotondi et al. (2005) USA Outpatient	30 PDwS and 21 family caregivers. RCT.	Intervention group (n = 16 PDwS, and 11 family caregivers) received PEI via the Internet. Content: illness information, treatment, common emotional problems and solutions. Control group (n = 14, 10) received treatment usual care, but it was not specified.	PDwS and family caregivers outcome: Perceived social support. Perceived stress. Baseline and three-month after intervention.	Significant improvement in PDwS social support and reduction in stress level at three-month follow-up*. No significant change in family caregivers' outcome between groups at any point was reported.
Li et al. (2005) China Inpatient	101 PDwS and family caregivers. RCT.	Intervention group (n = 46) received PEI; PDwS received eight hours and family caregivers were about 36 hours, then two hours per month for three-month after discharge for PDwS and family caregivers.	PDwS outcome: KASI. BPRS. Medication compliance (stops taking medication > 1 week). Relapse rate (re-admission or BPRS >5). Measured at admission, discharge,	Knowledge of schizophrenia was significantly improved by discharge and at two post-tests in the intervention group*. Psychiatric symptoms improved at nine-month only in the intervention group without any significant difference at discharge

		Content: not specified. Control group (n = 55) received TAU including no organised education intervention, they can seek information from staff, and education pamphlet.	three and nine- month after discharge. Seminar (lectured based). Psychiatric nurse.	or three-month between groups. No significant change in compliance level between groups at any points of the study. Relapse rate at nine-month was lower in the intervention group, but this was not significant.
Barrowclough et al. (1999) UK Outpatient	77 PDwS and primary caregivers. RCT.	Intervention group (n = 38) received 10-20 sessions of PEI over six-month. Based on family caregivers needs with family support. Content: not specified. Control group (n = 39) received TAU 'family support'. It included information, benefit advice, emotional support and practical help.	PDwS outcome: PANSS. Social functioning scale (SFS). Global assessment scale (GAS). Relapse (re-admission & symptoms exacerbation). Family caregivers outcome: Relative cardinal needs assessment (RCNA), General health questionnaires (GHQ), Social Behaviour Schedule (SBAS), Measured pre and post-intervention, Individual session (lecture based), and Clinical psychologist.	Relapse rate was significantly reduced in the intervention group at end of intervention favouring intervention group*. SFS and PANSS scores did not differ between groups. Family caregivers' needs reduced significantly after intervention*. GHQ, SBAS scores were not significantly changed between groups.
Chan et al. (2009) China Outpatient	73 PDwS and PCs. RCT.	Intervention group (n = 36) received ten sessions of PEI on weekly basis for three-month. Content: definition of psychosis, cause, diagnosis, treatment, recovery, early warning sign of relapse, problem-solving, stress management and coping with illness. Control group (n = 37) received TAU that included medication,	PDwS outcome: BPRS. Rating of Medication influence (ROMI), ITAQ, Family caregivers outcome: FBIS, SES, SSQ-6. Measured at baseline, immediate after intervention, six and 12 months after intervention. Multi-family group seminar (lecture based).	ITAQ score has significantly improved at post-intervention and both post-tests 1 and 2* in the intervention group. BPRS and ROMI had been improved at post-test 1 and post-test 2. However, no difference between groups at post-test 3 for all PDwS outcomes*. Burden of care was significantly reduced in the intervention group

		counselling, financial and social welfare.	Psychiatric nurse.	just at six-month*. Self-efficacy and level of satisfaction were improved at post-test 1 and post-test 2 only in the intervention group*.
Bradley et al. (2006) Australia Outpatient	59 PDwS and family caregivers. RCT.	Intervention group (n = 25 pairs, mixed ethnicity) received 26 sessions bi-weekly of PEI over 12-month. Content: illness nature, treatment approach, medication, common problems facing participants, common reaction to illness and family role. Control group (n = 34, mixed ethnicity) received case management that involved medication, individual psychosocial rehabilitation, and family contact.	PDwS outcome: BPRS. Scale of Assessment Negative Symptom (SANS). SNS. Family caregivers' outcome: Family burden scale. Relapse rate (symptoms exacerbations)—only reported at both follow-up times. Measured at baseline, post-intervention and at 18 months follow-up. Multi-family group seminar (lecture based). Psychiatrists & social worker.	Psychiatric symptoms significantly improved favouring intervention group at both follow-up points*. Negative symptoms improved significantly after 18 months in the intervention group. Relapse rate reduced significantly in the intervention group at both follow-up points*. SNS, family burden of care level did not differ between groups.
Rotondi et al. (2010) USA Outpatient	31 PDwS and 24 family caregivers. RCT.	Intervention group (n = 16 PDwS and family caregivers) received telehealth, four hours of PEI focused on communication and problem-solving skills. Control group (n = 15, 11) received TAU, not specified.	PDwS outcome: SAPS (reported at baseline and 12 months). KASI (reported at baseline and six-month). Measured at baseline, six, and 12 months.	Significant improvement in knowledge of schizophrenia was reported (at six-month) and reduction in positive symptoms was observed at 12 months*.

Merinder et al. (1999) Denmark Outpatient	46 PDwS and family caregivers. RCT.	Intervention group (n = 23) received eight session of PEI weekly. Content: definition of schizophrenia, diagnosis, prognosis, symptoms, cause and medication (many relatives did not attend sessions). PDwS session was with different relative, but it was the same content. Control group (n = 23) received TAU which consisted of medication, psychosocial rehabilitation and supportive psychotherapy.	PDwS outcome: BPRS. Global Assessment of Functioning (GAF). Insight Scale. Verona service satisfaction scale (VSSS). Knowledge of schizophrenia (KS). Not a validated scale. Relapse (symptoms exacerbation and admission). Family caregivers outcome: VSSS, KS, FP assessed Emotion Expression (EE). Measured at baseline, post-intervention and 12-month follow-up. Multi-family group seminar (lecture based with booklets). Psychiatric nurse.	No significant change in GAF or BPRS scores and relapse rate at any follow-up points between groups. Significant improvement in satisfaction with service in the intervention group for PDwS and family caregivers at two follow-up points*. Significant improvement in knowledge level at post-test 1 and this was not retained at post-test 2*. Significant improvement in relative knowledge of schizophrenia at post-test 1 was noted, but it was not retained for post-test 2*. EE not changed after intervention and was equal with control group at both post-tests.
Kulhara et al. (2009) India Outpatient	76 PDwS and PCs. RCT.	Intervention group (n = 38) received eleven sessions of PEI (40-60 min) over nine-month for PDwS and PCs. Their sessions were held alone to allow them to express some feelings supported with written material. Content: general information of schizophrenia including aetiology, symptoms, treatment and prognosis, medication, communication skills,	PDwS outcome: PANSS. Psychiatry disability (scored by Wold Health Organisation (WHO) disability scale). Relapse (symptoms exacerbation or re-admission). Family caregivers outcome: Social support scale, PDwS satisfaction questionnaires, FBIS, Coping checklist.	There was a significant improvement in psychiatric symptoms' scores with disability scores post-intervention in the intervention group compared with control group*. No significant different in relapse rate between groups at post-intervention. PCs in the intervention group perceived more support to

		problem-solving skills, relapse warning signs and employment opportunities. Control group (n = 38) received TAU which included medicine, supportive counselling of PDwS and their family caregivers.	Measured at baseline and immediately post-intervention. Multi-family group seminar (lecture based plus booklet). Mental health professionals.	mentally ill relative and were more satisfied in treatment compared with PCs in the control group*. No significant change in burden score was reported post-intervention between groups.
Ran et al. (2003) China Outpatient	357 PDwS and family caregivers. RCT.	Intervention group (n = 132) received nine session of PEI for nine-month (1.5-3hr) with medication. Content: definition of schizophrenia, symptoms, prognosis, treatment, long-term management, relapse prevention and social functioning rehabilitation. In addition, multi-family workshop held once every three-month and crisis intervention. Medication group (n = 110) received medication alone. Control group (n = 115) did not receive anything.	PDwS outcome: Medication Compliance (to what extent PDwS collect his/her allotment). Relapse rate (symptoms worsening). Social Disability Screening Schedule. Family caregivers outcome: Relative Belief Scale. Measured at baseline and immediately post-intervention. Seminar (lecture based), discussion and crisis Worksop. Psychiatrists.	Medication compliance at post-intervention was higher in the PEI group compared with two groups*. Relapse rate was significantly lower in PEI group than other two groups and medication group was lower than control group*. Social support improved in both groups (PEI & medication) post-intervention. Relative knowledge of schizophrenia or belief was changed in PEI group*.
Chien et al. (2004) China Outpatient	96 PDwS and family caregivers. RCT.	Intervention group, mutual support (n = 32) and PEI (n = 33) received 12 bi-weekly sessions lasting two hours for six-month. Content: mutual support focused on introduction, recognition and dealing with psychological needs,	PDwS outcome: BPRS. Rehospitalisation numbers and duration. Family caregivers outcome: Family Support Services Index	There was a significant reduction in the rehospitalisation numbers and duration at both post-tests favouring mutual support and PEI group*. There was a significant decrease in symptom severity, but it was

		and adopting new roles and challenges PEI: participants received 12 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic fact about schizophrenia, caregiving skills and coping skills. Control group (n = 31), TAU component that was medication, individual nursing support, social welfare and financial service.	(FSSI). Outcomes measured at baseline, one week and 12 months after intervention. Multi-family group seminar (lecture based). Psychiatric nurse.	not significant between groups at both follow-up times. Family caregivers service use and functioning level improved significantly in the mutual support and PEI group at both post-tests compared with control group*.
Chien et al. (2005) China Outpatient	96 PDwS and family caregivers. RCT.	Intervention group, mutual support (n = 32) and PEI (n = 33) received 12 bi-weekly sessions lasting two hours for six-month. Content: mutual support focused on introduction, recognition and dealing with psychological needs, and adopting new roles and challenges. PEI: participants received 12 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic facts about schizophrenia, caregiving skills and coping skills. Control group (n = 31) received TAU which included medication, individual nursing support, social	PDwS outcome: Specific level of functioning (SLOF). Rehospitalisation. Family caregivers, outcome: FSSI. FAD. Outcomes measured at baseline, one week and six-month after intervention. Multi-family group seminar. Psychiatric nurse.	No reduction in rehospitalisation observed between groups. There was a significant improvement in the SLOF scores noted in mutual support and PEI at both post-tests compared with control group*. FAD and FSSI scores significantly improved favouring mutual support and PEI at both of follow-up points*.

		welfare and financial service.		
Chien et al. (2006) China Outpatient	96 PDwS and family caregivers. RCT.	Intervention group, mutual support (n = 32) and PEI (n = 33) received 12 bi-weekly sessions lasting two-hour for six- month. Content: mutual support focused on introduction, recognition and dealing with psychological needs, adopting new roles and challenges. PEI: participants received 12 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic facts about schizophrenia, caregiving skills and coping skills. Control group (n = 31) received TAU which included medication, individual nursing support, social welfare and financial service.	PDwS outcome: SLOF. Rehospitalisation number and duration. Symptoms severity (BPRS). Family caregivers outcome: FBIS. Outcomes measured at baseline, six & 18 months after intervention. Multi-group seminar (lecture-based). Psychiatric nurse.	There were slight changes in the psychiatric symptom severity, but it was not significant between groups. Re-admission duration was statistically reduced in mutual support and PEI group, but the numbers of readmissions did not change between groups*. PDwS function level improved significantly at both follow-up points in mutual and PEI groups*. Family caregivers' burden of care reduced significantly in both intervention groups (mutual support & PEI) at two follow-up times*.
Chien et al. (2007) China Outpatient	84 PDwS and family caregivers. RCT.	Intervention group (n = 42) received 18 bi-weekly sessions of PEI for two hours. Content: Not stated, Control group (n = 42) received TAU monthly that was medical consultation, individual nursing advice, brief family education: two or three sessions for one hour in	PDwS outcome: SLOF. Rehospitalisation (number and frequency). Symptom severity (BPRS). Family caregivers outcome: FAD, FBIS. Baseline, one week and 12 months after intervention.	All the outcomes improved at both post-tests favouring intervention group*.

		relation to medication treatment and counselling.	Psychiatric nurse. Seminar groups (lecture based).	
Chien et al. (2010) China Outpatient	92 PDwS and family caregivers. RCT.	Intervention group (n = 46 dyads) received 14 sessions of PEI during two hours every two-week. Content: family caregiver roles, therapeutic communication, resolution of conflicts and experience of sharing and problem-solving. Control group (n = 46 dyads) received TAU which included medication, nursing advice, and brief family education.	PDwS outcome: SLOF, BPRS. Rehospitalisation number and length. Family caregivers outcome: FAD assessed family functioning, social support and expressed emotion. Six items Social Support Questionnaires (SSQ-6). Level of Expressed Emotional scale (LEE). Measured at baseline, one and 15 months after intervention. Individual session lecture based and discussion with psychiatrist and psychiatric nurse.	There was a significant improvement in FAD level & SSQ scores over both follow-ups in the intervention group*. No significant change in EE in both groups was noted. No significant change in mental condition between groups at any point of follow-up was reported. Significant improvement in level of functioning in the intervention group at one and 15 month follow-ups*. There was significant reduction in number and duration of rehospitalisation in the intervention group at both follow-up points compared with control group*.
Chien et al. (2013) China Outpatient	135 PDwS and families caregivers. RCT.	Intervention group, mutual support (n = 45) and PEI (n = 45) received 14 bi-weekly sessions of PEI lasted two hours for six-month. Content: mutual support focused on introduction, recognition and dealing with psychological needs, adopting new roles and challenges.	PDwS outcome: SLOF. Rehospitalisation number and duration. Symptom severity (BPRS). Family caregivers outcome: FAD. FSSI.	There was significant improvement in the function level among PDwS in the mutual support and PEI over follow-up points comparted with control group*. There was a significant reduction in psychiatric symptom severity between mutual support and PEI

		PEI: participants received 14 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic facts about schizophrenia, caregiving skills and coping skills. Control group (n = 45) received TAU which included medication, individual nursing support, social welfare and financial service.	Outcomes measured at baseline, one week, 12 and 24 months after intervention. Multi-group seminar with group discussion. Psychiatric nurse.	groups as compared with control group at both follow-up tests*. The duration of rehospitalisation was significantly reduced in mutual support and PEI group at post-test 1 & 2* without any change in the number of rehospitalisation between groups. All of the family caregiver outcomes significantly improved in the both intervention groups compared with control group at both follow-up times*.
Aguglia et al. (2007) Italy Outpatient	135 PDwS and family caregivers. RCT.	Intervention group (n = 69) received eight sessions of PEI (60-minute). Content: introduction, definition of schizophrenia, cause, treatment strategies, relapse prevention and family role. Control group (n = 66) received TAU which was psychosocial intervention, antipsychotic drug and PEI	PDwS outcome: BPRS. SAPS. SANS. ROMI. Family caregivers outcome: Lancashire QoL. At baseline, after three, six, nine and 12 months. Group seminar (lecture based). Psychiatrist and psychiatric nurse.	Severity of psychiatric symptoms as scored by BPRS decreased more significantly in the intervention group at all follow-up points. In addition, it decreased, however, not significantly in the control group*. A significant difference in positive symptoms from baseline to 12 months after intervention in the intervention group and no significant difference in the counterpart*. A significant difference in negative symptoms from baseline to 12 months after intervention in the intervention group and no significant difference in the counterpart*.

				A significant difference in medication compliance from baseline to 12 months after intervention in the intervention group and no significant difference in the counterpart*. A significant reduction in relapse rate in the favour of the intervention group over follow-up times*. Significant improvement in the QoL in the intervention group from baseline to 12 months follow-up*.
Fallahi et al. (2014) Iran Inpatient	71 PDwS and family caregivers. RCT.	Intervention group (n = 36) received four sessions for two hours weekly supported with written material. Content: description of illness, aetiology, symptoms: living with hallucination and delusion, medication use and coping with schizophrenia. Control group (n = 35) received TAU, but it was not specified.	Family caregivers outcome: Burden of care by FBIS. Assessed at baseline and at four-week after intervention. Psychiatric nurse. Seminars (lecture based) with booklet.	There was a significantly higher difference in all dimensions of burden of care in the intervention group compared with control group*.
Fiorillo et al. (2010) Italy Outpatient	212 PDwS and 230 family caregivers. RCT.	Intervention group (n = 107 PDwS, 112 family caregivers) received 12 sessions of PEI (60-90 min). Content: signs and symptoms of schizophrenia, diagnosis, cause, medication and side effect, warning sign of relapse, treatment in	Family caregivers outcome: Relative questionnaires on the opinion about mental illness (QO). Assessed at baseline and post-intervention. Multi-family group seminar (lecture based).	Relative opinion about some aspects of schizophrenia such as determinants, outcome, and possibility of treatment changed significantly in favour intervention group*.

		emergency, role of family member, alcohol and drug abuse and problem-solving skills. Control group (n =105 PDwS, 118 relatives) received TAU which was not specified.	Skilled mental health professional.	
Giron et al. (2010) Spain Outpatient	50 PDwS and family caregivers RCT.	Intervention group (n= 25 dyads) received bi-weekly session of PEI for nine-months, then monthly for 15 months. Content: providing information of illness, active listening and clarification of emotions, improve communication and problem-solving. Control group (n = 25) received TAU which involved support, home visit, social worker, rehabilitation, and medication with individual counselling.	PDwS outcome: Positive symptoms by Spanish version of the positive assessment scale. Negative symptoms assessed by section 1 of WHO psychiatric disability assessment scale. Social relationship by eight items from QoL scale. GAD. Relapse (number and duration of rehospitalisation). Family caregivers' outcome: SBAS. Outcomes measured baseline, at nine-month and 24 months. Individual seminars (lecture based). Psychiatrists, psychologist, social worker and nurses.	There was a significant decrease in psychiatric symptoms and improvement in social functioning in the intervention group at both follow-up points compared with control group*. Family caregivers experienced greater reduction in burden of care level at both follow-up times in the intervention group and that this was not the case for counterpart*.
Barrio et al. (2010) USA Outpatient	59 PDwS and primary caregivers. RCT.	Intervention group (n = 26 dyads) received culturally developed PEI bi-weekly for 16 sessions (two hours). Content: not specified. Control group (n = 33 dyads)	PDwS outcome: Symptoms severity. QoL. Treatment compliance. Family caregivers outcome: Burden of care.	There was a significant reduction in psychiatric symptom severity, improvement in QoL and treatment compliance at both follow-up points in the intervention group*.

		received TAU which was not reported.	Coping with illness. Illness knowledge. (instruments were not specified) Assessed at baseline, immediately post-intervention and three-month follow-up. Multi-family group seminar (lecture based)	Family caregivers in the intervention group reported a significant improvement in schizophrenia knowledge of schizophrenia, coping with illness and decreased burden of care at both follow-up tests*.
Leavey et al. (2004) UK Outpatient	106 people with first episode of psychosis and family caregivers. RCT.	Intervention group (n = 57) received seven sessions of PEI (one hour) supported with information pack. Content: general information about psychosis, coping strategies and problem-solving skills. Control group (n = 49) received TAU which consisted of informal support and ad hoc without specific protocol and training.	PDwS outcome: Hospitalisation rate & duration. Family caregivers outcome: Satisfaction with service (VSSS-32). Perceived of illness severity. Caregiver strain index (CSI). Burden of care (not specified scale). Outcomes assessed baseline, at four & nine-month follow-up. Individual (lecture based) with discussion. Psychiatric nurse.	There was no significant change in the rehospitalisation duration between groups at any of follow-up times*. There was no significant change in family caregivers' satisfaction with service or burden of care or perceived illness severity at both post-tests. Family caregivers' strain was significantly reduced in the intervention group at four-month follow-up*. The difference was no longer apparent at nine-month between groups.
Bauml et al. (2007) Germany Inpatient	101 PDwS and PCs. RCT.	Intervention group (n = 51) received eight weekly sessions of PEI (60-minute), then four sessions monthly for PDwS. However, PCs received eight bi-weekly sessions lasting 90-120 minutes. Content: coping strategies, medication and crisis plan.	PDwS outcome: Rehospitalisation rate. Duration of rehospitalisation. The mean of consuming chlorpromazine. Psychiatric symptoms (BPRS). Outcomes assessed at baseline, two and seven year follow-ups.	There was a significant reduction in the hospitalisation rate in the intervention group 54% vs. 88% in the control group. Also, there was reduction in rehospitalisation duration per PDwS 1.5 vs. 2.9 favouring intervention group with significant increase in consuming

		Control group (n = 50) received TAU which consisted of medication.	Individual session supported with booklet. Therapist.	chlorpromazine*. No change in psychiatric symptoms was noted between groups.
Devaramane et al. (2011) India Outpatient	20 PDwS and 20 PCs. One group pre-post-test design.	Intervention group (n = 20) conducted PEI over one month throughout three sessions. Each session completed over forty-five minutes as a seminar and 15 minutes as a discussion. They focused on education about schizophrenia, assessing and handling problems and looked at handling communication and emotional problems.	PDwS outcome: PANSS, Family caregivers outcome, Coping strategies measured by Family Emotional Involvement and Criticism Scale (FEICS), Burden Assessment Scale (BAS), Baseline and after intervention, Mental health professional, Multi-family group seminar (lecture based).	There was a significant improvement in psychiatric symptoms among PDwS after intervention*. There was a significantly lower the burden of care score on the BAS scale*. There was a significant improvement in coping skills for family caregivers by the end of the intervention*
Glynn et al. (2010) USA Outpatient	42 PDwS and family caregivers. Quasi-experimental-non-equivalent comparison group.	Intervention group (n = 26 dyads) received PEI over 12 months by online website. Content: chat weekly for six- month and bi-weekly for six- month; they focused on illness management and problem-solving skills. Control group (n = 16 dyads) received TAU which was not specified.	PDwS outcome: BPRS Family caregivers outcome: Perceived social support (not specified used scale). Psychologist managed website. Assessed at baseline and end of intervention.	No differences found between groups at end of intervention in terms of PDwS or family caregivers' outcome.
McWilliams et al. (2012) Ireland Outpatient	124 PDwS and PCs. Retrospective case-control design.	Intervention group (n = 60 dyads) received six-week of PEI. Content: signs and symptoms of schizophrenia, medication, coping skills and crisis management. Control group (n = 64 dyads)	PDwS outcome: Number of relapse (no specification operation definition). Time of first relapse. Length of stay. Number of beds.	PDwS and family caregivers significantly improved knowledge of schizophrenia scores after intervention compared with pre-intervention and their counterparts*.

		received TAU which was not specified.	Family caregivers' outcome: Knowledge questionnaire (KQ) assessed pre and post-intervention only. All PDwS outcomes assessed yearly over five years. Multi-family group seminar (lecture based). Psychiatrist, mental health nurse and social worker.	All relapse measures were significantly reduced favouring intervention group over five-year follow-up*. Subgroup analysis showed that family caregivers of PDwS gained more knowledge about schizophrenia from intervention and this improvement had positive correlation with all relapse measures over five- year follow-up*.
Sharif et al. (2012) Iran Outpatient	70 PDwS and PCs. RCT.	Intervention group (n = 35) received Treatment As Usual (TAU) with Psycho-educational Intervention (PEI) ten sessions (90 min), two sessions weekly supported with written material. Content: schizophrenia symptoms, treatment and effect on PDwS and family caregivers, medication, warning signs of relapse, communication skills, stress management, coping skills and ways of expressing emotion. Control group (n = 35) received TAU that was not specified.	PDwS outcome: BPRS. Family caregivers outcome: FBIS. Measured at baseline, immediately post-intervention and two-month follow-up. Multi-family group seminar (lecture based). Psychiatrist or psychiatric nurse.	There was a significant improvement in schizophrenia symptoms at both follow-up points.* There was a significant reduction in the burden of care scores in the intervention group at both follow-up points*.
Magliano et al. (2006) Italy Outpatient	126 PDwS and 71 family caregivers. RCT.	Intervention group (n = 42 PDwS, and 76 family caregivers) received TAU and monthly session of PEI for three hours over six-month.	PDwS outcome: BPRS. Social networking questionnaire (SNQ). Assessment of disability (AD).	There was a significant improvement in PDwS psychiatric symptoms post-intervention in intervention group compared with control group*.

		Content: clinical aspects of schizophrenia, treatment, early sign of relapse, communication skills and problems solving. Control group (n = 29, 50 dyads) assigned to waiting list.	Family caregivers outcome: FPQ. Measured at baseline and immediately post-intervention. Psychologists and psychiatrists. Multi-family group seminar (lecture based).	Relative social contacts and perception of professional support significantly improved in intervention group only*. A significant improvement found in intervention group in PDwS social relationships, interests in obtaining a job, maintained social interests, and management of social conflicts*. The level of objective and subjective burden was improved significantly in both groups.
Nasr et al. (2009) Pakistan Outpatient	108 PDwS and PCs. RCT.	Intervention group (n = 52) received PEI (nine sessions weekly for 1.5 hours) supported with written material. Content: general information on schizophrenia, medication, communication skills and problem-solving. Control group (n = 56) received TAU. It was medication.	Family caregivers' outcome: FBIS. Baseline, six-month after intervention. Seminar (group) plus booklet. Psychiatric nurse.	There was significant reduction in burden of care reported in the intervention group post-intervention *.
Rotondi et al. (2005) USA Outpatient	30 PDwS and 21 family caregivers. RCT.	Intervention group (n = 16 PDwS, and 11 family caregivers) received PEI via the Internet. Content: illness information, treatment, common emotional problems and solutions. Control group (n = 14, 10) received treatment usual care, but it was not specified.	PDwS and family caregivers outcome: Perceived social support. Perceived stress. Baseline and three-month after intervention.	Significant improvement in PDwS social support and reduction in stress level at three-month follow-up*. No significant change in family caregivers' outcome between groups at any point was reported.

Li et al. (2005) China Inpatient	101 PDwS and family caregivers. RCT.	Intervention group (n = 46) received PEI; PDwS received eight hours and family caregivers were about 36 hours, then two hours per month for three-month after discharge for PDwS and family caregivers. Content: not specified. Control group (n = 55) received TAU including no organised education intervention, they can seek information from staff, and education pamphlet.	PDwS outcome: KASI. BPRS. Medication compliance (stops taking medication > 1 week). Relapse rate (re-admission or BPRS >5). Measured at admission, discharge, three and nine- month after discharge. Seminar (lectured based). Psychiatric nurse.	Knowledge of schizophrenia was significantly improved by discharge and at two post-tests in the intervention group*. Psychiatric symptoms improved at nine-month only in the intervention group without any significant difference at discharge or three-month between groups. No significant change in compliance level between groups at any points of the study. Relapse rate at nine-month was lower in the intervention group, but this was not significant.
Barrowclough et al. (1999) UK Outpatient	77 PDwS and primary caregivers. RCT.	Intervention group (n = 38) received 10-20 sessions of PEI over six-month. Based on family caregivers needs with family support. Content: not specified. Control group (n = 39) received TAU ‘family support’. It included information, benefit advice, emotional support and practical help.	PDwS outcome: PANSS. Social functioning scale (SFS). Global assessment scale (GAS). Relapse (re-admission & symptoms exacerbation). Family caregivers outcome: Relative cardinal needs assessment (RCNA), General health questionnaires (GHQ), Social Behaviour Schedule (SBAS), Measured pre and post-intervention, Individual session (lecture based), and Clinical psychologist.	Relapse rate was significantly reduced in the intervention group at end of intervention favouring intervention group*. SFS and PANSS scores did not differ between groups. Family caregivers’ needs reduced significantly after intervention*. GHQ, SBAS scores were not significantly changed between groups.

Chan et al. (2009) China Outpatient	73 PDwS and PCs. RCT.	Intervention group (n = 36) received ten sessions of PEI on weekly basis for three-month. Content: definition of psychosis, cause, diagnosis, treatment, recovery, early warning sign of relapse, problem-solving, stress management and coping with illness. Control group (n = 37) received TAU that included medication, counselling, financial and social welfare.	PDwS outcome: BPRS. Rating of Medication influence (ROMI), ITAQ, Family caregivers outcome: FBIS, SES, SSQ-6. Measured at baseline, immediate after intervention, six and 12 months after intervention. Multi-family group seminar (lecture based). Psychiatric nurse.	ITAQ score has significantly improved at post-intervention and both post-tests 1 and 2* in the intervention group. BPRS and ROMI had been improved at post-test 1 and post-test 2. However, no difference between groups at post-test 3 for all PDwS outcomes*. Burden of care was significantly reduced in the intervention group just at six-month*. Self-efficacy and level of satisfaction were improved at post-test 1 and post-test 2 only in the intervention group*.
Bradley et al. (2006) Australia Outpatient	59 PDwS and family caregivers. RCT.	Intervention group (n = 25 pairs, mixed ethnicity) received 26 sessions bi-weekly of PEI over 12-month. Content: illness nature, treatment approach, medication, common problems facing participants, common reaction to illness and family role. Control group (n = 34, mixed ethnicity) received case management that involved medication, individual psychosocial rehabilitation, and family contact.	PDwS outcome: BPRS. Scale of Assessment Negative Symptom (SANS). SNS. Family caregivers' outcome: Family burden scale. Relapse rate (symptoms exacerbations)—only reported at both follow-up times. Measured at baseline, post-intervention and at 18 months follow-up. Multi-family group seminar (lecture based).	Psychiatric symptoms significantly improved favouring intervention group at both follow-up points*. Negative symptoms improved significantly after 18 months in the intervention group. Relapse rate reduced significantly in the intervention group at both follow-up points*. SNS, family burden of care level did not differ between groups.

			Psychiatrists & social worker.	
Rotondi et al. (2010) USA Outpatient	31 PDwS and 24 family caregivers. RCT.	Intervention group (n = 16 PDwS and family caregivers) received telehealth, four hours of PEI focused on communication and problem-solving skills. Control group (n = 15, 11) received TAU, not specified.	PDwS outcome: SAPS (reported at baseline and 12 months). KASI (reported at baseline and six-month). Measured at baseline, six, and 12 months.	Significant improvement in knowledge of schizophrenia was reported (at six-month) and reduction in positive symptoms was observed at 12 months*.
Merinder et al. (1999) Denmark Outpatient	46 PDwS and family caregivers. RCT.	Intervention group (n = 23) received eight session of PEI weekly. Content: definition of schizophrenia, diagnosis, prognosis, symptoms, cause and medication (many relatives did not attend sessions). PDwS session was with different relative, but it was the same content. Control group (n = 23) received TAU which consisted of medication, psychosocial rehabilitation and supportive psychotherapy.	PDwS outcome: BPRS. Global Assessment of Functioning (GAF). Insight Scale. Verona service satisfaction scale (VSSS). Knowledge of schizophrenia (KS). Not a validated scale. Relapse (symptoms exacerbation and admission). Family caregivers outcome: VSSS, KS, FP assessed Emotion Expression (EE). Measured at baseline, post-intervention and 12-month follow-up. Multi-family group seminar (lecture based with booklets).	No significant change in GAF or BPRS scores and relapse rate at any follow-up points between groups. Significant improvement in satisfaction with service in the intervention group for PDwS and family caregivers at two follow-up points*. Significant improvement in knowledge level at post-test 1 and this was not retained at post-test 2*. Significant improvement in relative knowledge of schizophrenia at post-test 1 was noted, but it was not retained for post-test 2*. EE not changed after intervention

			Psychiatric nurse.	and was equal with control group at both post-tests.
Kulhara et al. (2009) India Outpatient	76 PDwS and PCs. RCT.	Intervention group (n = 38) received eleven sessions of PEI (40-60 min) over nine-month for PDwS and PCs. Their sessions were held alone to allow them to express some feelings supported with written material. Content: general information of schizophrenia including aetiology, symptoms, treatment and prognosis, medication, communication skills, problem-solving skills, relapse warning signs and employment opportunities. Control group (n = 38) received TAU which included medicine, supportive counselling of PDwS and their family caregivers.	PDwS outcome: PANSS. Psychiatry disability (scored by Wold Health Organisation (WHO) disability scale). Relapse (symptoms exacerbation or re-admission). Family caregivers outcome: Social support scale, PDwS satisfaction questionnaires, FBIS, Coping checklist. Measured at baseline and immediately post-intervention. Multi-family group seminar (lecture based plus booklet). Mental health professionals.	There was a significant improvement in psychiatric symptoms' scores with disability scores post-intervention in the intervention group compared with control group*. No significant different in relapse rate between groups at post-intervention. PCs in the intervention group perceived more support to mentally ill relative and were more satisfied in treatment compared with PCs in the control group*. No significant change in burden score was reported post-intervention between groups.
Ran et al. (2003) China Outpatient	357 PDwS and family caregivers. RCT.	Intervention group (n = 132) received nine session of PEI for nine-month (1.5-3hr) with medication. Content: definition of schizophrenia, symptoms, prognosis, treatment, long-term management, relapse prevention and social functioning rehabilitation. In addition, multi-	PDwS outcome: Medication Compliance (to what extent PDwS collect his/her allotment). Relapse rate (symptoms worsening). Social Disability Screening Schedule. Family caregivers outcome: Relative Belief Scale.	Medication compliance at post-intervention was higher in the PEI group compared with two groups*. Relapse rate was significantly lower in PEI group than other two groups and medication group was lower than control group*. Social support improved in both groups (PEI & medication) post-

		family workshop held once every three-month and crisis intervention. Medication group (n = 110) received medication alone. Control group (n = 115) did not receive anything.	Measured at baseline and immediately post-intervention. Seminar (lecture based), discussion and crisis Worksop. Psychiatrists.	intervention. Relative knowledge of schizophrenia or belief was changed in PEI group*.
Chien et al. (2004) China Outpatient	96 PDwS and family caregivers. RCT.	Intervention group, mutual support (n = 32) and PEI (n = 33) received 12 bi-weekly sessions lasting two hours for six-month. Content: mutual support focused on introduction, recognition and dealing with psychological needs, and adopting new roles and challenges PEI: participants received 12 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic fact about schizophrenia, caregiving skills and coping skills. Control group (n = 31), TAU component that was medication, individual nursing support, social welfare and financial service.	PDwS outcome: BPRS. Rehospitalisation numbers and duration. Family caregivers outcome: Family Support Services Index (FSSI). Outcomes measured at baseline, one week and 12 months after intervention. Multi-family group seminar (lecture based). Psychiatric nurse.	There was a significant reduction in the rehospitalisation numbers and duration at both post-tests favouring mutual support and PEI group*. There was a significant decrease in symptom severity, but it was not significant between groups at both follow-up times. Family caregivers service use and functioning level improved significantly in the mutual support and PEI group at both post-tests compared with control group*.
Chien et al. (2005) China Outpatient	96 PDwS and family caregivers. RCT.	Intervention group, mutual support (n = 32) and PEI (n = 33) received 12 bi-weekly sessions lasting two hours for six-month. Content: mutual support focused on	PDwS outcome: Specific level of functioning (SLOF). Rehospitalisation.	No reduction in rehospitalisation observed between groups. There was a significant improvement in the SLOF scores noted in mutual support and PEI

		introduction, recognition and dealing with psychological needs, and adopting new roles and challenges. PEI: participants received 12 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic facts about schizophrenia, caregiving skills and coping skills. Control group (n = 31) received TAU which included medication, individual nursing support, social welfare and financial service.	Family caregivers, outcome: FSSI. FAD. Outcomes measured at baseline, one week and six-month after intervention. Multi-family group seminar. Psychiatric nurse.	at both post-tests compared with control group*. FAD and FSSI scores significantly improved favouring mutual support and PEI at both of follow-up points*.
Chien et al. (2006) China Outpatient	96 PDwS and family caregivers. RCT.	Intervention group, mutual support (n = 32) and PEI (n = 33) received 12 bi-weekly sessions lasting two-hour for six- month. Content: mutual support focused on introduction, recognition and dealing with psychological needs, adopting new roles and challenges. PEI: participants received 12 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic facts about schizophrenia, caregiving skills and coping skills. Control group (n = 31) received TAU which included medication,	PDwS outcome: SLOF. Rehospitalisation number and duration. Symptoms severity (BPRS). Family caregivers outcome: FBIS. Outcomes measured at baseline, six & 18 months after intervention. Multi-group seminar (lecture-based). Psychiatric nurse.	There were slight changes in the psychiatric symptom severity, but it was not significant between groups. Re-admission duration was statistically reduced in mutual support and PEI group, but the numbers of readmissions did not change between groups*. PDwS function level improved significantly at both follow-up points in mutual and PEI groups*. Family caregivers' burden of care reduced significantly in both intervention groups (mutual support & PEI) at two follow-up times*.

		individual nursing support, social welfare and financial service.		
Chien et al. (2007) China Outpatient	84 PDwS and family caregivers. RCT.	Intervention group (n = 42) received 18 bi-weekly sessions of PEI for two hours. Content: Not stated, Control group (n = 42) received TAU monthly that was medical consultation, individual nursing advice, brief family education: two or three sessions for one hour in relation to medication treatment and counselling.	PDwS outcome: SLOF. Rehospitalisation (number and frequency). Symptom severity (BPRS). Family caregivers outcome: FAD, FBIS. Baseline, one week and 12 months after intervention. Psychiatric nurse. Seminar groups (lecture based).	All the outcomes improved at both post-tests favouring intervention group*.
Chien et al. (2010) China Outpatient	92 PDwS and family caregivers. RCT.	Intervention group (n = 46 dyads) received 14 sessions of PEI during two hours every two-week. Content: family caregiver roles, therapeutic communication, resolution of conflicts and experience of sharing and problem-solving. Control group (n = 46 dyads) received TAU which included medication, nursing advice, and brief family education.	PDwS outcome: SLOF, BPRS. Rehospitalisation number and length. Family caregivers outcome: FAD assessed family functioning, social support and expressed emotion. Six items Social Support Questionnaires (SSQ-6). Level of Expressed Emotional scale (LEE). Measured at baseline, one and 15 months after intervention. Individual session lecture based and discussion with psychiatrist and	There was a significant improvement in FAD level & SSQ scores over both follow-ups in the intervention group*. No significant change in EE in both groups was noted. No significant change in mental condition between groups at any point of follow-up was reported. Significant improvement in level of functioning in the intervention group at one and 15 month follow-ups*. There was significant reduction in number and duration of

			psychiatric nurse.	rehospitalisation in the intervention group at both follow-up points compared with control group*.
Chien et al. (2013) China Outpatient	135 PDwS and families caregivers. RCT.	Intervention group, mutual support (n = 45) and PEI (n = 45) received 14 bi-weekly sessions of PEI lasted two hours for six-month. Content: mutual support focused on introduction, recognition and dealing with psychological needs, adopting new roles and challenges. PEI: participants received 14 bi-weekly sessions lasting two hours for six-month. Content: orientation about illness, understanding basic facts about schizophrenia, caregiving skills and coping skills. Control group (n = 45) received TAU which included medication, individual nursing support, social welfare and financial service.	PDwS outcome: SLOF. Rehospitalisation number and duration. Symptom severity (BPRS). Family caregivers outcome: FAD. FSSI. Outcomes measured at baseline, one week, 12 and 24 months after intervention. Multi-group seminar with group discussion. Psychiatric nurse.	There was significant improvement in the function level among PDwS in the mutual support and PEI over follow-up points comparted with control group*. There was a significant reduction in psychiatric symptom severity between mutual support and PEI groups as compared with control group at both follow-up tests*. The duration of rehospitalisation was significantly reduced in mutual support and PEI group at post-test 1 & 2* without any change in the number of rehospitalisation between groups. All of the family caregiver outcomes significantly improved in the both intervention groups compared with control group at both follow-up times*.
Aguglia et al. (2007) Italy Outpatient	135 PDwS and family caregivers. RCT.	Intervention group (n = 69) received eight sessions of PEI (60-minute). Content: introduction, definition of schizophrenia, cause, treatment	PDwS outcome: BPRS. SAPS. SANS. ROMI.	Severity of psychiatric symptoms as scored by BPRS decreased more significantly in the intervention group at all follow-up points. In addition, it decreased, however, not significantly in the

		strategies, relapse prevention and family role. Control group (n = 66) received TAU which was psychosocial intervention, antipsychotic drug and PEI	Family caregivers outcome: Lancashire QoL. At baseline, after three, six, nine and 12 months. Group seminar (lecture based). Psychiatrist and psychiatric nurse.	control group*. A significant difference in positive symptoms from baseline to 12 months after intervention in the intervention group and no significant difference in the counterpart*. A significant difference in negative symptoms from baseline to 12 months after intervention in the intervention group and no significant difference in the counterpart*. A significant difference in medication compliance from baseline to 12 months after intervention in the intervention group and no significant difference in the counterpart*. A significant reduction in relapse rate in the favour of the intervention group over follow-up times*. Significant improvement in the QoL in the intervention group from baseline to 12 months follow-up*.
Fallahi et al. (2014) Iran	71 PDwS and family caregivers. RCT.	Intervention group (n = 36) received four sessions for two hours weekly supported with written material.	Family caregivers outcome: Burden of care by FBIS. Assessed at baseline and at four-	There was a significantly higher difference in all dimensions of burden of care in the intervention group compared with control

Inpatient		Content: description of illness, aetiology, symptoms: living with hallucination and delusion, medication use and coping with schizophrenia. Control group (n = 35) received TAU, but it was not specified.	week after intervention. Psychiatric nurse. Seminars (lecture based) with booklet.	group*.
Fiorillo et al. (2010) Italy Outpatient	212 PDwS and 230 family caregivers. RCT.	Intervention group (n = 107 PDwS, 112 family caregivers) received 12 sessions of PEI (60-90 min). Content: signs and symptoms of schizophrenia, diagnosis, cause, medication and side effect, warning sign of relapse, treatment in emergency, role of family member, alcohol and drug abuse and problem-solving skills. Control group (n =105 PDwS, 118 relatives) received TAU which was not specified.	Family caregivers outcome: Relative questionnaires on the opinion about mental illness (QO). Assessed at baseline and post-intervention. Multi-family group seminar (lecture based). Skilled mental health professional.	Relative opinion about some aspects of schizophrenia such as determinants, outcome, and possibility of treatment changed significantly in favour intervention group*.
Giron et al. (2010) Spain Outpatient	50 PDwS and family caregivers RCT.	Intervention group (n= 25 dyads) received bi-weekly session of PEI for nine-months, then monthly for 15 months. Content: providing information of illness, active listening and clarification of emotions, improve communication and problem-solving.	PDwS outcome: Positive symptoms by Spanish version of the positive assessment scale. Negative symptoms assessed by section 1 of WHO psychiatric disability assessment scale. Social relationship by eight items from QoL scale. GAD.	There was a significant decrease in psychiatric symptoms and improvement in social functioning in the intervention group at both follow-up points compared with control group*. Family caregivers experienced greater reduction in burden of care level at both follow-up times in the intervention group and that

		Control group (n = 25) received TAU which involved support, home visit, social worker, rehabilitation, and medication with individual counselling.	Relapse (number and duration of rehospitalisation). Family caregivers' outcome: SBAS. Outcomes measured baseline, at nine-month and 24 months. Individual seminars (lecture based). Psychiatrists, psychologist, social worker and nurses.	this was not the case for counterpart*.
Barrio et al. (2010) USA Outpatient	59 PDwS and primary caregivers. RCT.	Intervention group (n = 26 dyads) received culturally developed PEI bi-weekly for 16 sessions (two hours). Content: not specified. Control group (n = 33 dyads) received TAU which was not reported.	PDwS outcome: Symptoms severity. QoL. Treatment compliance. Family caregivers outcome: Burden of care. Coping with illness. Illness knowledge. (instruments were not specified) Assessed at baseline, immediately post-intervention and three-month follow-up. Multi-family group seminar (lecture based)	There was a significant reduction in psychiatric symptom severity, improvement in QoL and treatment compliance at both follow-up points in the intervention group*. Family caregivers in the intervention group reported a significant improvement in schizophrenia knowledge of schizophrenia, coping with illness and decreased burden of care at both follow-up tests*.
Leavey et al. (2004) UK Outpatient	106 people with first episode of psychosis and family caregivers. RCT.	Intervention group (n = 57) received seven sessions of PEI (one hour) supported with information pack. Content: general information about psychosis, coping strategies and	PDwS outcome: Hospitalisation rate & duration. Family caregivers outcome: Satisfaction with service (VSSS-32). Perceived of illness severity. Caregiver strain index (CSI).	There was no significant change in the rehospitalisation duration between groups at any of follow-up times*. There was no significant change in family caregivers' satisfaction with service or burden of care or

		problem-solving skills. Control group (n = 49) received TAU which consisted of informal support and ad hoc without specific protocol and training.	Burden of care (not specified scale). Outcomes assessed baseline, at four & nine-month follow-up. Individual (lecture based) with discussion. Psychiatric nurse.	perceived illness severity at both post-tests. Family caregivers' strain was significantly reduced in the intervention group at four-month follow-up*. The difference was no longer apparent at nine-month between groups.
Bauml et al. (2007) Germany Inpatient	101 PDwS and PCs. RCT.	Intervention group (n = 51) received eight weekly sessions of PEI (60-minute), then four sessions monthly for PDwS. However, PCs received eight bi-weekly sessions lasting 90-120 minutes. Content: coping strategies, medication and crisis plan. Control group (n = 50) received TAU which consisted of medication.	PDwS outcome: Rehospitalisation rate. Duration of rehospitalisation. The mean of consuming chlorpromazine. Psychiatric symptoms (BPRS). Outcomes assessed at baseline, two and seven year follow-ups. Individual session supported with booklet. Therapist.	There was a significant reduction in the hospitalisation rate in the intervention group 54% vs. 88% in the control group. Also, there was reduction in rehospitalisation duration per PDwS 1.5 vs. 2.9 favouring intervention group with significant increase in consuming chlorpromazine*. No change in psychiatric symptoms was noted between groups.
Devaramane et al. (2011) India Outpatient	20 PDwS and 20 PCs. One group pre-post-test design.	Intervention group (n = 20) conducted PEI over one month throughout three sessions. Each session completed over forty-five minutes as a seminar and 15 minutes as a discussion. They focused on education about schizophrenia, assessing and handling problems and looked at handling communication and emotional problems.	PDwS outcome: PANSS, Family caregivers outcome, Coping strategies measured by Family Emotional Involvement and Criticism Scale (FEICS), Burden Assessment Scale (BAS), Baseline and after intervention, Mental health professional, Multi-family group seminar (lecture based).	There was a significant improvement in psychiatric symptoms among PDwS after intervention*. There was a significantly lower the burden of care score on the BAS scale*. There was a significant improvement in coping skills for family caregivers by the end of the intervention*

Glynn et al. (2010) USA Outpatient	42 PDwS and family caregivers. Quasi-experimental-non-equivalent comparison group.	Intervention group (n = 26 dyads) received PEI over 12 months by online website. Content: chat weekly for six- month and bi-weekly for six- month; they focused on illness management and problem-solving skills. Control group (n = 16 dyads) received TAU which was not specified.	PDwS outcome: BPRS Family caregivers outcome: Perceived social support (not specified used scale). Psychologist managed website. Assessed at baseline and end of intervention.	No differences found between groups at end of intervention in terms of PDwS or family caregivers' outcome.
McWilliams et al. (2012) Ireland Outpatient	124 PDwS and PCs. Retrospective case-control design.	Intervention group (n = 60 dyads) received six-week of PEI. Content: signs and symptoms of schizophrenia, medication, coping skills and crisis management. Control group (n = 64 dyads) received TAU which was not specified.	PDwS outcome: Number of relapse (no specification operation definition). Time of first relapse. Length of stay. Number of beds. Family caregivers' outcome: Knowledge questionnaire (KQ) assessed pre and post-intervention only. All PDwS outcomes assessed yearly over five years. Multi-family group seminar (lecture based). Psychiatrist, mental health nurse and social worker.	PDwS and family caregivers significantly improved knowledge of schizophrenia scores after intervention compared with pre-intervention and their counterparts*. All relapse measures were significantly reduced favouring intervention group over five-year follow-up*. Subgroup analysis showed that family caregivers of PDwS gained more knowledge about schizophrenia from intervention and this improvement had positive correlation with all relapse measures over five- year follow-up*.

A variety of psycho-educational interventions was employed. Although the contents of psycho-educational interventions in the intervention group were not specified in six studies [9-13], most of the reviewed papers included contents regarding definition of schizophrenia, description of its symptoms, its treatment, and its effect on family members and caregivers, information about medication, relapse prevention, and coping skills. The duration of the intervention sessions and frequency of the sessions varied widely between the studies and ranged between four sessions for two hours weekly supported with written material [14] and one year [7].

The most common measures of outcome variables targeting the PDwS included BPRS and Medication compliance [9,11,15]. However, all the studies investigated the effectiveness of PEIs on more than one outcome variables in PDwS concurrently. Other less commonly used measures of outcome variables targeting the PDwS included social networking questionnaire (SNQ), assessment of disability, perceived social support and perceived stress. These positive effects of PEI were reported by most of the studies. It is noteworthy to mention that most studies were RCT which enhance more trust in the credibility of the conclusions derived from them.

The papers reviewed in this study have focused on Asian, European, and American populations, which support the international and trans-cultural acceptability and effectiveness of the PEI. Each study had its own PEI which was tailored in the time schedule and delivery method based on the unique need of each specific population.

Nevertheless, family members are integral part of the life of PDwS and they usually have burden of caring with patients. Therefore, family members were included in the intervention programs because having schizophrenia by one family member may have negative consequences on all family members. Including family members in PEI may provide support for individuals who live with PDwS for long time, which extends the post-intervention effects period.

The findings of this study suggest that participation in PEI for PDwS and caregivers of patients with schizophrenia results in better clinical outcomes and more acceptance of the illness. In fact, multiple complex psychological, biological, and social factors may contribute to the course of schizophrenia, thus, to achieve the best outcomes for patients with schizophrenia, there is more acceptability of a combined approach of treatment and including psychotherapies, rather than depending on pharmacological treatment alone. This multiple psychotherapeutic approach may provide more understanding of the disease and provide an effective way of management of schizophrenia and enhance the coping with schizophrenia.

The results indicated that two studies had no positive outcomes. The first study is conducted by [7], the intervention was conducted online, however, different challenges were reported by the researchers including the accessibility to the intervention, privacy issues, some emergent special challenges regarding the time of implementing the intervention, and managing some situations adequately during the intervention. In addition, the researchers raised a concern of the efficacy regarding the intervention. The second study was conducted by [16] the researchers were investigating patients with a challenge of the first episode of psychosis in their life. The researchers concluded that it is difficult to provide the educational intervention shortly after the first psychotic episode. Furthermore, the researchers suggested that failure to take up the intervention threatens the conclusions and the power of the intervention was reduced.

Most of the PEI included information about the schizophrenia, problem-solving skills, communication skills, and social skills training. These aspects are crucial for patients with schizophrenia and their family members. Additional aspects and components of the intervention could by tailored according to the actual aim of the study and the needs of patients under study.

Different gaps were identified in the literature and recommendations for future research are suggested accordingly. Only three studies had samples of inpatients with schizophrenia, while most studies focused on outpatients. Future research may want to examine the effectiveness of PEI on additional samples of inpatients diagnosed with schizophrenia. This might accumulate more evidences to support the effectiveness of the intervention on this population in particular. In addition, few studies examined the role of sociodemographic variables, and clinical variables such as severity of the illness and number of years after diagnosis on the degree to which patients might get benefit from such interventions. Therefore, future research with respect to effectiveness of PEI on PDwS might do further investigations regarding the role of these variables.

LIMITATIONS

This review has limitations. First, the majority of the included studies evaluated as poor methodological design. Although no studies were excluded due to poor quality, inferences were cautiously drawn during the analysis. Second, in the literature, different format of delivering PEIs were studied; which makes comparison between these findings challenging. Third, we reviewed and included quantitative studies; however, some qualitative studies were eliminated. Therefore, there is a need for integrative systematic review to evaluate the effectiveness of PEIs and explore its mechanism.

AUTHOR CONTRIBUTIONS

AH and MM was involved in the review process, writing of the manuscript, data abstraction, quality appraisal. AH involved in the review process, writing of the manuscript, data abstraction, quality appraisal

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