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Improving the quality of life of people with schizophrenia through community based rehabilitation in Yogyakarta Province, Indonesia: A quasi experimental study

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ABSTRACT

Objective: The persistent disability and low Quality of Life (QoL) are the impacts of schizophrenia. Community-Based Rehabilitation (CBR) is recommended for people with schizophrenia. The objective of this study is to analyze the effectiveness of CBR to improve the quality of life of people with schizophrenia.
Methods: It was a quasi-experimental study, conducted in February-December 2017, in Yogyakarta, Indonesia. Subjectwere people with schizophrenia, 18–56 years old, with their caregiver. CBRintervention using psychoeducation module and social skill module during 12 weeks. It was conducted by local health workers, sub district social welfare workers, community health workers (called Kader in Indonesia) and supervised by a psychiatrist. The QoL was assessed using a validated measuring instrument at the baseline and at the week 16. Hypothesis test using Wilcoxon test
Results: There were 100 people with schizophrenia involved in the study. They were divided into intervention group and control group. Every group consists of 50 subjects. Both groups had similar characteristics at the baseline. The intervention group received CBR, whereas the control group didn't. Thirty-four people (68%) of intervention group increased their QoL, whereas in the control group there were twenty-three people (46%) increased their QoL. The QoL decrease occurred in one subject (4%) from the control group. Other subjects had constant QoL. Improvement of QoL in the intervention group is higher than the control group ($p < 0.05$).
Conclusions: CBR is effective for improving the QoL of people with schizophrenia in the community. CBR is conducted by the health worker and sub-district social welfare worker.

1. Introduction

Schizophrenia leads to persistent disability and a reduced quality of life (QOL) (Lieberman et.al., 2012; Moore, 2008; Corrigan and Mueser, 2008). It is a mental disorder that causes the highest level of disability when compared to other mental disorders listed in the Global Burden of Disease Study (Whiteford et al., 2013). People suffering with schizophrenia have a lowered function in almost all aspects of social life which causes severe disability as it significantly disturbs cognitive, interpersonal and social function (Lieberman et.al., 2012; Moore, 2008; Corrigan and Mueser, 2008). People suffering with schizophrenia also experience significant personal distress and stigma and have a reduced opportunity to be employed and participate in social activities (McDaid, 2008; Thornicroft et al., 2009; Cyhlarova et al., 2010). As a result, QOL has been adopted as one of the main indicators used to assess the management of schizophrenia and other chronic disabilities (Datar et al., 2010; Bellack et al., 2006; Corrigan &Mueser, 2008; Tomotake, 2011; Patel et al., 2010).

Psychosocial rehabilitation along with antipsychotics is recommended for the management of schizophrenia (Tyrer, 2008; Sadock and Sadock, 2010; Addington and Lecomte, 2012; Bharathi et al., 2011) and have been shown to improve QOL (Guo et al., 2012), reduce recurrence and improve social function (Wang et al., 2013; Guo et al., 2010). In settings of inadequate resources for mental health, the World Health Organization (WHO) Mental Health Gap Action Program (mhGAP) recommends Community Based Rehabilitation (CBR) for people with schizophrenia. CBR is an approach that is intended to improve QOL and provide social inclusion for people with disability

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(WHO, 2010). CBR involves community participation and is an effective and feasible model for rehabilitation (Chatterjee et al., 2003).CBR has been showed to be effective in creating enabling environments for patients with schizophrenia to recover. CBR also addresses social, cultural and economic barriers to care delivery (Balaji et al., 2012; Wang et al., 2013).

CBR thus can be an effective model for psychosocial rehabilitation of patients with schizophrenia in settings like Yogyakarta, Indonesia where resources for mental health care remain minimal. Models of CBR in Yogyakarta have been successfully shown to improve outcomes (Marchira et al., 2018, 2016; Marchira et al., 2017), but have not been scaled. Insofar, models that have been tested in Yogyakarta only leverage the health systems through its primary health care cadres and community mental health nurses. Indonesia's care system however stipulates that the social welfare system provides psychosocial rehabilitation for patients with schizophrenia which is regulated in the Law number 18 mental health law of 2014. Indonesia has a decentralized welfare system that relies on rehabilitation institutions and sub-district social workers to provide psychosocial rehabilitation to patients with schizophrenia. Involving sub-district social workers in CBR would not only leverage resources from the social welfare system but would connect the health and the social welfare system so as to create a scalable model at the community. This study attempts to test such a model using a quasi-experimental design.

2. Methods

2.1. Sample and study design

This was a quasi-experimental study with intervention and control groups. Two primary health centerswere selected from each of the 5 districts in the province of Yogyakarta. One was allocated as the intervention group and the other the control group. Fig. 1, shows how sites were selected (Chart 1).

Subjects of the study were recruited from the primary health centers using a purposive sampling approach. Fifty samples were recruited for each arm of the study. Study participants were recruited by primary care physicians in the primary health care center. Subjects were recruited if they met the criteria of schizophrenia based on DSM IV, was consuming routine medication through the primary health center, was 18–59 years old, had a caregiver, and was willing to participate in the activities of the research. Subjects were excluded if they had a physical illness or if they had other mental illness. Participants are withdrawn from the study if they do not follow the intervention completely or relapse during the study period.Primary care physicians recruited subjects by informing them about the study and asking consent if they could be contacted by the researcher. The researchers then obtained written informed consent from the patient and their primary caregiver. The study was conducted between February and December 2017 and was approved by the Research Ethics Boards of Universitas Gadjah Mada Yogyakarta

3. Intervention

The control group received routine outpatient care through the primary health center whereas the intervention wing received CBR. CBR in this study comprised of two main activities: psychoeducation and social skills training. Patients received both psychoeducation and social skills training whereas caregivers received only psychoeducation. The CBR intervention was conducted in twelve weeks.

The psychoeducation sessions were delivered by primary care physicians and community mental health nurses that were trained by the researchers using standardized training modules. There were six sessions of psychoeducation for people with schizophrenia and their caregivers, they included:

Session 1: Schizophrenia definition.
Session 2: Schizophrenia symptoms.
Session 3: Schizophrenia management.
Session 4: Recovery and relapse.
Session 5: Family role
Session 6: Stress management.

Social skill training was conducted by sub-district level social workers and was facilitated by the researchers. Sub-district social workers were trained by the team or researchers using standardized training modules. Activities for social skill training included lectures, discussions, personal reflections, role play, games and homework. There were six sessions of social skills training for people with schizophrenia, they included:

Session 1: Starting conversation skill.
Session 2: Active listening skill.
Session 3: Delivering request skill.
Session 4: Delivering pleasure feeling skill.
Session 5: Delivering unpleasant feeling skill.
Session 6: Ending conversation skill.

The summary of intervention descriptions in both control and intervention group is showed in Table 1.

3.1. Measures

QOL was measured using Lehman's Quality of Life Interview (QOLI) (Lehman, 1995) which has been validated in the Indonesian context (Eniarti, 2008). QOLI evaluates the patient's QOL using the first-person

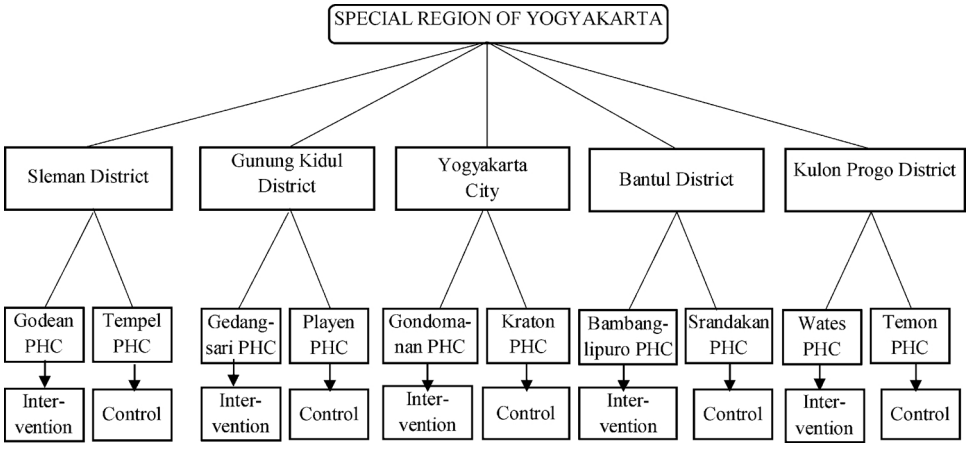

Fig. 1. Subject Allocation.
*PHC: Primary Health Center; *Intervention : Intervention Group; *Control : Control Group.

CONSORT
TRANSPARENT REPORTING of TRIALS

CONSORT 2010 Flow Diagram

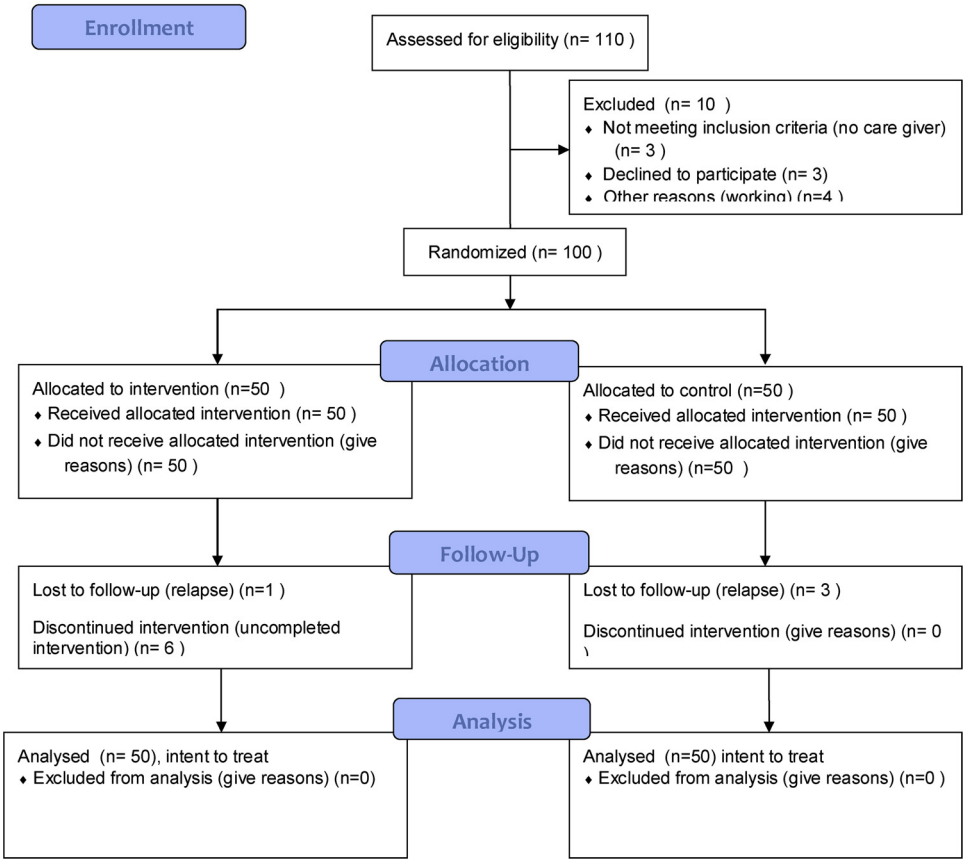

Chart 1. Flow Diagram to Select Respondents.

perspective and asses both objective and subjective components of the patient's quality of life. The results of QOLI was classified into the following: High for those having scores of 30–34, Moderate for those having scores of 15–30, and low for those having scores of 0-14. QOLI was conducted before the intervention and four weeks after the intervention (Tsang et al., 2010: Wang et al., 2013; Pan et al., 2011; Hasan et al., 2014).

To test for similarities of subjects between groups, basic socio-demographic, clinical symptoms using the Positive and Negative Symptom Scale (PANSS), and global function using the global assessment of function scale (GAF) were also measured at baseline.

3.2. Statistical analysis

Analysis was performed with an intent to treat approach. Bivariate analysis was conducted to analyse the QOL within groups using the Wilcoxon test. The Mann-Whitney test was used to compare QOL between the intervention and the control group of the study. Descriptive statistic was used to analyze the baseline data. To compare baseline characteristics between groups, the Chi-Square or the Fischer Exact test was used for categorical data and independent sample *t*-test or Mann-Whitney test was used for numeric data.

4. Results

A total of 110 subjects were selected from 10 primary health center sites from all the 5 districts in Yogyakarta.We were unable to obtain consent from 10 subjects referred to us from the sites. 4 people did not consent to participating in the study because they were working, 3 did not have caregivers, and 3 people refused to participate in the activities. A total of 100 subjects participated in the activities of the study, 50 in the control wing and the other 50 in the intervention group.

Socio-demographic characteristics comprising of gender, age, education, employment and marital status were assessed at baseline. Clinical characteristics including family history, antiphyscotic medications, global assessment function (GAF), medication compliance, clinical symptoms (assessed with PANSS), social function (assessed with PSP) were also measured at baseline. Table 2 shows the comparison of baseline characteristics between the control and intervention group.

There were no significant differences in baseline sociodemographic and clinical indicators between the control group and intervention group (p-value > 0,05).

Caregiver characteristics comprising of gender, age, education, employment, income, relation, duration of care were assessed at baseline and can be found in Table 3.

Table 1
Comparison of Intervention and Control Group.

	Intervention Group (Community Based Rehabilitation)	Control Group
Regular treatment with a doctor or psychiatrist	Once a month	Once a month
Family Intervention	Psycho education Module six sessions once a week (Chatterjee et al., 2003; Tara *et al,* 2005) in groups (8-12 people) (Wang et al., 2013; Uzdil et al., 2015). 60-90 minutes in duration (Chatterjee et al., 2003)	None
Intervention For People with Schizophrenia	1. Psycho education Module Six session once a week in groups (8-12 people) 60-90 minutes in duration	None
	2. Social skills training : Basic Communication Module Six session once a week in groups (8-12 people) 60-90 minutes in duration	None
Service By	- Psychiatrist/Doctor/Nurse - Sub-district Social Welfare Workers - Health cadres	Psychiatrist/ Doctor/Nurse

There were no significant differences of caregiver characteristics between groups (p-value > 0,05).

Out of the 100 subjects that agreed to participate in the study, 90 people (90%) completed the activities of the study. Seven subjects in the intervention group were withdrawn from the study; One had an episode of relapse and 6 others did not complete the activities fully (less than 80% activities). Three subjects form the control group was withdrawn from the study because they had relapsed. An intent to treat approach was used for analysis. Table 4 shows the QOL change in the intervention and control group.

Both intervention and control group showed a statistically improved QOL. The intervention group however, showed a higher improvement of QOL. Table 5 shows the differences in the improvement of QOL between the intervention and control group. Thirty four people (68%) in the intervention group compared to twenty three (46%) people in the control group had an improvement in QOL. QOL decreased for one subject in the control group. There is a statistically significant (p = 0,023) difference in the improvement of QOL in the intervention group compared to the control group.

Based on Table 6, Participants of intervention group recruited had symptoms in remission as indicated by their PANSS scores positive symptoms (mean ± S.D) = 17.12 ± 6.29; negative symptoms (mean ± S.D) = 17.43 ± 9.51. There was a significant change in PANSS scores post intervention [post intervention positive symptoms (mean ± S.D) = 14.02 ± 5.61;, p < 0.00; post intervention negative symptoms (mean ± S.D) = 15.02 ± 6.40; p > 0.03. On the other hand, the control group PANSS score positive symptom (mean ± S.D) = 17.04 ± 5.87; negative symptom (mean ± S.D) = 19.20 ± 7.95. There was no significant change in PANSS scores post intervention; positive symptoms (mean ± S.D) = 16.04 ± 6.60; p = 0.111; post intervention negative symptoms (mean ± S.D) = 17.68 ± 8.15; p = 0.078.

Table 7 explain that there are no differences PANSS positive neither negative between intervention and control group.

Table 2
Comparison of Sociodemographic and Clinical Characteristics of Participants at Baseline.

Characteristic	Group				P for difference
	Intervention		Control		
	F	%	F	%	
Gender					
Male	32	64	33	66	0,834
Female	18	36	17	34	
Age					
< 20 years old	0	0	3	6	0,187
21-30 years old	6	12	8	16	
31-40 years old	17	34	21	42	
41-50 years old	21	42	12	24	
51-60 years old	6	12	6	12	
Education					
Primary School	9	45,0	11	55,0	0,770
Junior High School	15	45,5	18	54,5	
Senior High School	24	54,5	20	45,5	
College	2	66,7	1	33,3	
Employment					
Unemployment	36	50,7	35	49,3	0,826
Employee	14	48,3	15	51,7	
Marriage					
Not married	28	56	30	60	0,862
Married	17	34	17	34	
Widow/widowed	5	10	3	6	
Duration					
< 1 year	0	0	4	8	0,264
2 - 5 years	6	12	5	10	
5 - 10 years	15	30	15	30	
> 10 years	29	58	26	52	
Onset					
< 20 years old	17	34	17	34	0,762
20 - 30 years old	19	38	23	46	
31 - 40 years old	8	16	5	10	
41 - 50 years old	6	12	5	10	
Family Medical History					
None	38	76	34	68	0,373
Exist	12	24	16	32	
Type of antipsychotics					
Atypical	19	38	20	40	0,838
Typical	31	62	30	60	
Inpatient History					
Mean ± SD	2,140	2,241	2,160	1,931	0,726
PSP					
Poor	4	8	4	8	1,000
Medium	28	56	29	58	
Low	18	36	17	34	
GAF					
80 – 71	7	14	8	16	0,064
70 – 61	12	24	4	8	
60 – 51	9	18	9	18	
50 – 41	7	14	12	24	
40 – 31	12	24	7	14	
30 – 21	3	6	10	20	
Drug Compliance					
Low	30	60	27	54	0,544
Medium	19	38	23	46	
High	1	2	0	0	
QOLI					
Low	5	10	3	6	0,461
Medium	41	82	39	78	
High	4	8	8	16	
PANSS Total					
Mean ± SD	69,26	24,67653	74,82	23,72606	0,254
PANSS General					
Mean ± SD	30,66	11,39748	34,3	13,76516	0,153

(*continued on next page*)

Table 2 (*continued*)

Characteristic	Group				P for difference
	Intervention		Control		
	F	%	F	%	
PANSS Positive					
Mean ± SD	17,36	6,45474	17,04	5,872662	0,871
PANSS Negative					
Mean ± SD	17,64	9,531387	19,2	7,948816	0,225

GAF: Global Assessment Function; PANSS: Positive and Negative Syndrome Scale; PSP: Personal and Social Performance; QOLI: Quality of Life.
p < 0,05*based on wilcoxon test* or *independent t*-test or chi square or fisher exact.

Table 3
Comparison of Caregiver Characteristic.

Characteristic	Group				P for difference
	Intervention		Control		
	F	%	F	%	
Gender					
Male	20	40	23	46	0,545
Female	30	60	27	54	
Age					
< 20 years old	0	0	2	4	0,706
20 - 30 years old	2	4	2	4	
31 - 40 years old	5	10	9	18	
41 - 50 years old	12	24	11	22	
51 - 60 years old	16	32	16	32	
61 - 70 years old	11	22	8	16	
> 70 years old	4	8	2	4	
Education					
No School	7	14	8	16	0,916
Primary School	18	36	14	28	
Junior High School	11	22	12	24	
Senior High School	12	24	15	30	
College	2	4	1	2	
Employment					
Unemployed	14	28	13	26	0,822
Employee	36	72	37	74	
Income					
0	14	28	13	26	0,185
< 1.300.000 rupiah	35	70	31	62	
> 1.300.000 rupiah	1	2	6	12	
Relation					
Mother	17	34	16	32	0,467
Father	6	12	8	16	
Sibling	15	30	9	18	
Children	1	2	3	6	
Couple	7	14	12	24	
Others	4	8	2	4	
Duration of Care					
< 1 year	0	0	5	10	0,128
2 - 5 years	8	16	5	10	
5 - 10 years	16	32	16	32	
> 10 years	26	52	24	48	

p < 0,05 *based on chi Square or fisher exact* test.

5. Discussion

At baseline our data shows that patients with schizophrenia indeed had reduced QOL. This is consistent with other studies that have demonstrated the impact of schizophrenia on social, economic and interpersonal dimensions of living (Lieberman et.al., 2012; Moore, 2008; Corrigan and Mueser, 2008; Tomotake, 2011). Social function is a important predictor of the QOL (Bellack et al., 2006) and schizophrenia

Table 4
Pre-Post Test Between Intervention and Control Group.

Variable	Intervention				P	Control				*P- value*
	Pre		Post			Pre		Post		
	F	%	F	%		F	%	F	%	
Quality of Life										
Low	5	10	0	0	0,000	3	6	1	2	0,000
Medium	41	82	13	26		39	78	20	40	
High	4	8	37	74		8	16	29	58	

p < 0,05 *based on wilcoxon test, intent-to-treat.*

Table 5
Hypothesis Test.

Variable	Group				P
	Intervention		Control		
	F	%	F	%	
Quality of Life Changing					
Worse	0	0,0	1	2	0,023
Constantly	16	32	26	52	
Better	34	68	23	46	

p < 0,05 *based on mann-whitney test, intent-to-treat.*

Table 6
Hypothesis Test of PANSS Score.

Group		Variable	Mean ± SD	P
Intervention	Pre test	PANSS Positive	17.12 ± 6.29	0.000*)
	Post test	PANSS Positive	14.02 ± 5.61	
	Pre test	PANSS Negative	17.43 ± 9.51	0.032*)
	Pre test	PANSS Negative	15.02 ± 6.40	
Control	Pre	PANSS Positive	17.04 ± 5.87	0.111*)
	Post	PANSS Positive	16.04 ± 6.60	
	Pre	PANSS Negative	19.20 ± 7.95	0.078**)
	Post	PANSS Negative	17.68 ± 8.15	

*)Hasil uji Wilcoxon.
**)Hasil uji Paired Sample *t*-test

Table 7
The Difference Test PANSS score between Intervention and Control Group.

Variable	Mean	Std. Deviation	P
PANSS Positive			
Intervention Group	−2,235	4,533	0,343*)
Control Group	−2,180	6,242	
PANSS Negative			
Intervention Group	0,706	5,491	0,718*)
Control Group	1,420	6,503	

*)Hasil Uji Mann Whitney.
Table 7 explain that there are no differences PANSS positive neither negative between intervention and control group.

decreases social function to up to 80% (Hunter et al., 2010). QOL thus has become an important indicator of outcomes of schizophrenia treatment (Boyer et al., 2013; Patel et al., 2010) and have been used as the main indicator to show successful treatment programs (Mueser& Jeste, 2008; Tomotake, 2011; Makara-Studzinska et al., 2011).

The results of the study indicates that the improvement for the QOL of lie in the intervention group is significantly higher than that of the control group. Thus, this study has showed that this model of CBR is effective in the treatment of schizophrenia in the community. Community based psychosocial rehabilitation in addition to routine outpatient medications is indeed are recommended treatment options for people with schizophrenia (Tyrer, 2008; Sadock and Sadock, 2010;

Addington and Lecomte, 2012; Bharathi et al., 2011).

Previous studies has showed that rehabilitation improved cognitive function, decreased clinical symptoms, increased knowledge level, increased medical compliance, decreased relapse, improved employment possibilities and other social functions. Thus the findings of this study is constant with the literature that indeed psychosocial rehabilitation even when provided through a community based framework improves QOL for people afflicted with schizophrenia (Tsang et al., 2010; Chatterjee et al., 2003; Wang et al., 2013; Pan et al., 2011).

Rehabilitation is an essential component of care for people with schizophrenia, however in settings like Yogyakarta, Indonesia resources including human resources for mental health remain minimal and thus rehabilitation services is isolated only within the mental health hospital. Indonesia also has a decentralized health system in which the responsibility of delivering health care to people with schizophrenia relies heavily on the primary health care system. This study shows that CBR delivered within the setting of primary health care improves outcomes of the people with schizophrenia. Moreover, the welfare system in Indonesiastipulates that the social welfare department is responsible in the provision of rehabilitation services for people with schizophrenia.This study leverages these resources as the community level and connects the social welfare systems and the health systems hence making this model of CBR scalable in this context.

CBR in low resources settings can effetely be used to overcome the economic, geographic and cultural barriers to the delivery of rehabilitation for people with schizophrenia (Balaji et al., 2012; Wang et al., 2013). It involves the active participation of patients their caregivers and primary health workers and thus leverages community resources for the care of people with schizophrenia (Chatterjee et al., 2003). CBR models can be used to provide rehabilitation to people with schizophrenia in low resource settings at scale.

The two main activities that this study employed as CBR were physcoeducation and social skill training. These interventions are in line with the interventions recommended by PORT (Lehman et al.,2004; Dixon et al., 2010). Previous studies have showed that psychoeducation increased the knowledge (Thara et al., 2005; Hou and Bai, 2008; Hasan et al., 2014), decrease family burden (Hasan et al., 2014), decrease relapse rates (Chen et al., 2002), and improve QOL and clinical symptoms of people with schizophrenia (Hasan et al., 2014). Psychoeducation without social skill training has also been showed in the setting of our intervention to be effective in the improvement of outcomes of people with schizophrenia (Marchira et al., 2018, 2016; Marchira et al., 2017). Social skill training has been showed in previous studies to improve communication skill and social function (Dixon et al., 2006). Activities in the study's model of CBR were also conducted in groups, giving opportunities for people with schizophrenia to interact with one another (De Silva et al., 2013). Engaging people with schizophrenia in group activities has also been showed to improve social function.The final clinical goal in schizophrenia treatment is the maximality of individual productivity and achieving a purposeful life (Tandon et al., 2006). The mental health professional team plan has to comprehensive including decreasing the illness symptoms, social skill and also adaptation skills.

The effectiveness of this CBR model is also reassured by a change in clinical symptoms, namely the PANSS score; in this study, there was a negative and positive change in PANSS. The results of this study support previous research that shows the influence of social cognitive on clinical symptoms (Thonse et al., 2018; Tan et al., 2018; Li et al., 2018). Improving social capacity with CBR toward people with schizophrenia, will give the significance effect to PANSS score.

6. Conclusion

This study has demonstrated that a combination of psychoeducationand social skill training can be delivered via community based rehabilitation at the primary health setting in a low resource setting. The study leverages available resources in the community and provides a useful model for the scale up of rehabilitation to people with schizophrenia in Indonesia

Limitations

Study follow-up was only conducted in the 16th week. Long-term follow-up is still needed.

Conflict of interest

None.

Participating centers

1 Primary Health Center of Godean 2, Sleman District, Yogyakarta Province; Primary Health Center of Tempel 1 Sleman District, Yogyakarta Province; Primary Health Center of Kraton, Yogya City, Yogyakarta Province; Primary Health Center of Gondomanan, Yogya City, Yogyakarta Province; Primary Health Center of Bambanglipuro, Bantul District, Yogyakarta Province; Primary Health Center of Srandakan, Bantul District, Yogyakarta Province; Primary Health Center of Wates, Kulon Progo District, Yogyakarta Province; Primary Health Center of Temon 1, Kulon Progo District, Yogyakarta Province; Primary Health Center of Gedangsari 2, Gunung Kidul District, Yogyakarta Province; Primary Health Center of Playen 2, Gunung Kidul District, Yogyakarta Province.
2 Social Welfare Center of Sleman District, Yogyakarta Province; Social Welfare Center of Yogya City, Yogyakarta Province; Social Welfare Center of Bantul District, Yogyakarta Province; Social Welfare Center Kulon Progo District, Yogyakarta Province; Social Welfare Center Gunung Kidul District, Yogyakarta Province.
3 Public Health Center of Sleman District, Yogyakarta Province; Public Health Center Yogya City, Yogyakarta Province; Public Health Center Bantul District, Yogyakarta Province; Public Health Center Kulon Progo District, Yogyakarta Province; Public Health Center Gunung Kidul District, Yogyakarta Province and Public Health Center of Yogyakarta Province
4 Community leader in each site of the research

Research coordinators and research assistants

Shanti Wardhaningsih, Ririn,Wahyu Nugroho.

The Research Coordinators and Research Assistants screened patients, obtained consent, and collected data.

Research intervention

1 Physicians: Dela Oktaviana, Seruni Angreni Susila, Dian Monika Sharie, Fitri Nurkhamidah, Rakhmawati Lailiana Putri, Fifi Sumarwati, Deo Hadi Nanda, Eka Yulianto Pusponegoro, Andry Winarni, Shofi Hesfianto.
2 Nurse: Suratmi, Muhrarom, Sulastri, Debra Yeni Purwandaru, Eny Setyaningsih, Eka Suprihatin, Bernadheta Winarsih, Sri Sulistiyowati, Prima Aditama, Tugono.
3 Psychologist: Siam Hanifah, Kholinjah, Citra Saraswati, Ariyanto Senewe.
4 Sub-District Social Welfare Workers: Sunarno, Sugiyanto, Asih Ratna Sari, Nanang Heri Triyanto, Yusa Krisnuryana, Darmawan Ansori, Rini Iswandari, Muhammad Arif Yasfani, Taufik Subagyo, Rondiyah.
5 Community Health Workers (Cadres): Sapta Sukesi, Erry Yuniawan, Wibowo, Utami Wulandari, Yulianti Maharani, Suprih Wiyarti, Yuli Warsi Murtiningsih, Sumarni, Sri Muryani, Hety Dwi Mawarni, Astutik, Amini Suparjo, Purwanti, Reni Setyowati, Kholimah, Mularsih, Purwaningsih, Sutirah, Sulastri, Hery Attyanti, Istiyani,

Pujiati, Parilah, Sri Suhartatik, Supriyati, Warsini, Suminem, Winarti, Ermiyati Pratiwi, Wakhit Ghoni, Anifah Lestari, Emi Sunarsih, Waliyem, Umi, Suharni, Sri Marpinjun, Nani Pudjiastuti.

Adjudicators

Ida Rochmawati, Nurmi, Ririn Afrian Sulistyawati, Arum Puspitasari, Evi Yunita Inayati, Indah Utami Putri.

Primary Outcomes were adjudicated for presence and severity.

Senior

Soewadi, Prof; Sumarni, DR.

Data entry and statisticians

Agus Wibowo, Wahyu Nugroho.

Data access and responsibility

The principal investigator, Warih Andan Puspitosari, had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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References

Addington, J., Lecomte, T., 2012. Cognitive behaviour therapy for schizophrenia. F1000 Med. Rep. 4, 6. https://doi.org/10.3410/M4-6.

Anon, 2019. Law Number (No) 18 of 2014 on Mental Health. Jakarta, Indonesia.

Balaji, M., Chatterjee, S., Koschorke, M., Rangaswamy, T., Chavan, A., Dabholkar, H., Dakshin, L., Kumar, P., John, S., Thornicroft, G., et al., 2012. The development of a lay health worker delivered collaborative community based intervention for people with schizophrenia in India. BMC Health Serv. Res. 12, 42. https://doi.org/10.1186/1472-6963-12-42.

Bellack, A.S., Green, M.F., Cook, J.A., Fenton, W., Harvey, P.D., Heaton, R.K., Laughren, T., Leon, A.C., Mayo, D.J., Patrick, D.L., Patterson, T.L., Rose, A., Stover, E., et al., 2006. Assessment of community functioning in people with schizophrenia and other severe mental illnesses: a white paper based on an NIMH-sponsored workshop. Schizophr. Bull. 33 (3), 805–822. https://doi.org/10.1093/schbul/sbl035.

Bharathi, Goorah Deenoo, Huan, Nan, Zheng, Lu., 2011. Psychosocial interventions for patients with schizophrenia. Shanghai Arch. Psychiatry 23 (6), 368–375.

Boyer, L., Millier, A., Perthame, E., Aballea, S., Auquier, P., Toumi, M., 2013. Quality of life is predictive of relapse in schizophrenia. BMC Psychiatry 13, 15. https://doi.org/10.1186/1471-244X-13-15.

Chatterjee, S., Patel, V., Chatterjee, A., Weiss, H.A., 2003. Evaluation of a community-based rehabilitation model for chronic schizophrenia in rural India. Br. J. Psychiatry 182, 57–62.

Chen, G.Y., LI, B.Q., Li, C.Y., Gu, G.M., 2002. Efficacy of individual family intervention for schizophrenia patients: three years followed up study. Chin. J. Behav. Med. Sci. 11 (4), 394–396.

Corrigan, P.W., Mueser, K.T., 2008. Principles and Practice of Psychiatric Rehabilitation: An Empirical Approach. The Guilford Press, New York.

Cyhlarova, E., McCulloch, A., McGuffin, P., Wykes, T., 2010. Economic Burden of Mental Illness Cannot Be Tackled Without Research Investment. Mental Health Foundation, London.

Datar, S., Bawikar, R., Rao, G., Rao, N., Masdekar, U. (Eds.), 2008. Skill Training for Social Workers: A Manual. SAGE Publications, India.

De Silva, M., Cooper, S., Li, H., Lund, C., Patel, V., 2013. Effect of psychosocial interventions on social functioning in depression and schizophrenia: meta-analysis. Br. J. Psychiatry 202 (4), 253–260. https://doi.org/10.1192/bjp.bp.112.118018.

Dixon, L., Messias, W., Wohlheiter, K., 2006. Nonpsychiatric comorbid disorders. In: Scott Stroup, T., Lieberman, Jeffrey A., Perkins, Diana O. (Eds.), The American Psychiatric Publishing Textbook of Schizophrenia / Edited by Jeffrey A. Lieberman, T. Scott Stroup, Diana O. Perkins. (1st Ed. Ed.). American Psychiatric Pub, Washington, DC.

Eniarti, 2008. Perbedaan Skor Kualitas Hidup Pasien Skizoprenia Yang Mendapat Terapi Kerja Berorientasi Token Economy Dengan Terapi Aktifitas Kelompok. Thesis. Faculty of Medicine.Universitas Gadjah Mada.

Guo, X., Zhai, J., Liu, Z., et al., 2010. Effect of antipsychotic medication alone vs combined with psychosocial intervention on outcomes of early-stage schizophrenia: a randomized, 1-Year study. Arch. Gen. Psychiatry 67 (9), 895–904. https://doi.org/10.1001/archgenpsychiatry.2010.105.

Hasan, A.A., Callaghan, P., Lymn, J.S., 2014. Evaluation of the impact of a psycho-educational intervention on knowledge levels and psychological outcomes for people diagnosed with Schizophrenia and their caregivers in Jordan: a randomized controlled trial. BMC Psychiatry 14 (1), 17.

Hou, H.B., Bai, Q., 2008. Effect of rehabilitation for schizophrenia with education for family member. Chin. J. Pract. Nerv. Dis. 11 (7), 139–140.

Hunter, R., Barry, S., EGOFORS Research Group, 2010. P03-64-Impact of negative symptoms on psychosocial functioning in schizophrenia. Eur. Psychiatry 25, 1186.

Lehman, A.F., 1995. Vocational rehabilitation in Shizophrenia. Schizophr. Bull. 21 (4), 645–656. https://doi.org/10.1093/schbul/21.4.645. %J Schizophrenia Bulletin.

Lehman, A.F., Kreyenbuhl, J., Buchanan, R.W., Dickerson, F.B., Dixon, L.B., Goldberg, R., et al., 2004. The schizophrenia patient outcomes research team (PORT): updated treatment recommendations 2003. Schizophr. Bull. 30 (2), 193–217. https://doi.org/10.1093/oxfordjournals.schbul.a007071.

Li, J., Huang, Y.G., Ran, M.S., Fan, Y., Chen, W., Evans-Lacko, S., Thornicroft, G., 2018. Community-based comprehensive intervention for people with schizophrenia in Guangzhou, China: effects on clinical symptoms, social functioning, internalized stigma and discrimination. Asian J. Psychiatr. 34, 21–30. https://doi.org/10.1016/j.ajp.2018.04.017.

Makara-Studzinska, M., Wolyniak, M., Partyka, I., 2011. The quality of life in patients with schizophrenia in community mental health service-selected factors. J. Pre-Clin. Clin. Res. 5 (1).

Marchira, Carla Raymondalexas, WarihAndanPuspitasari, Ida Rochmawati, Mulyani, Siti, 2016. "Evaluation of primary health workers training program to provide psychoeducation to family caregivers of persons with psychotic disorder.". J. Med. Sci. (BerkalailmuKedokteran) 47 (01).

Marchira, C.R., Supriyanto, I., Subandi, S., Good, M.J.D., Good, B.J., 2017. Brief interactive psychoeducation for caregivers of patients with early phase psychosis in Yogyakarta, Indonesia. Early Interv. Psychiatry.

Marchira, C.R., Puspitosari, W.A., Rochmawati, I., Mulyani, S., Supriyanto, I., 2018. Managing information gaps on caregivers of psychotic patients in primary health settings of Yogyakarta, Indonesia. Health Promot. Perspect. 8 (2), 163.

McDaid, D., 2008. Countering the Stigmatisation and Discrimination Of People With Mental Health Problems In Europe. Luxembourg: European Commission, pp. 1–20.

Moore, D., 2008. Textbook of Clinical Neuropsychiatry (Vol. Second edition). CRC Press Taylor & Francis Group.

Pan, L., Mellor, D., McCabe, M., Hill, B., Tan, W., Xu, Y., 2011. An evaluation of the Shanghai Mental Health Service schizophrenia rehabilitation program. Am. J. Psychiatr. Rehabil. 14 (4), 287–306.

Patel, V., et al., 2010. Mental and Neurological: A Global Perspective, 1st edition. Elsevier Inc., Amsterdam.

Sadock, B.J., Sadock, V.A., 2010. Kaplan and Sadok's Pocket Handbook of Clinical Psychiatry (Vol. 5th Edition. Lippincott Williams and Wilkins, New York.

Tan, B.L., Lee, S.A., Lee, J., 2018. Social cognitive interventions for people with schizophrenia: a systematic review. Asian J. Psychiatr. 35, 115–131. https://doi.org/10.1016/j.ajp.2016.06.013.

Tandon, R., Targum, S., Nasrallah, H.A., Ruth, R., 2006. Strategies for maximizing clinical effectiveness in the treatment of schizophrenia. J. Psychiatr. Pract. 12 (6), 348–363. https://doi.org/10.1097/00131746-200611000-00003.

Thara, R., Padmavati, R., Lakshmi, A., Karpagavalli, P., 2005. Family education in schizophrenia: a comparison of two approaches. Indian J. Psychiatry 47 (4), 218. https://doi.org/10.4103/0019-5545.43056.

Thonse, U., Behere, R.V., Frommann, N., Sharma, P., 2018. Social cognition intervention in schizophrenia: description of the training of affect recognition program - Indian version. Asian J. Psychiatr. 31, 36–40. https://doi.org/10.1016/j.ajp.2017.12.015.

Thornicroft, G., Brohan, E., Rose, D., Sartorius, N., Leese, M., INDIGO Study Group, 2009. Global pattern of experienced and anticipated discrimination against people with schizophrenia: a cross-sectional survey. Lancet 373 (9661), 408–415. https://doi.org/10.1016/S0140-6736(08)61817-6.

Tomotake, M., 2011. Quality of life and its predictors in people with schizophrenia. J. Med. Investig. 58 (3, 4), 167–174. https://doi.org/10.2152/jmi.58.167.

Tsang, A.W., Ng, R.M., Yip, K.C., 2010. A six-month prospective case-controlled study of the effects of the clubhouse rehabilitation model on Chinese patients with chronic schizophrenia. East Asian Arch. Psychiatry 20 (1), 23.

Tyrer, P.S.K.R., 2008. Effective Treatment in Psychiatry (Vol. 1st edition). Cambrige University Press, Cambrige.

Wang, L., Zhou, J., Yu, X., Qiu, J., Wang, B., 2013. Psychosocial rehabilitation training in the treatment of schizophrenia outpatients: a randomized, psychosocial rehabilitation training–and monomedication-controlled study. Pak. J. Med. Sci. 29 (2), 597.

Whiteford, H.A., Degenhardt, L., Rehm, J., Baxter, A.J., Ferrari, A.J., Erskine, H.E., et al., 2013. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. Lancet 382 (9904), 1575–1586. https://doi.org/10.1016/S0140-6736(13)61611-6.

WHO, 2010. Mental Health Gap Action Programme. Intervention Guide for Mental, Neurological and Substance Use Disorders in Non-Specialized Health Settings. WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland.