Integrated supported employment plus cognitive remediation training for people with schizophrenia

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KEY MESSAGES

1. Integrated supported employment plus cognitive remediation training (ISE+CRT) or ISE alone produced positive therapeutic effects for people with schizophrenia.
2. More improvement trends in vocational, clinical, and cognitive outcomes were noted in the ISE+CRT group, and a more positive trend for the psychological and functional outcomes was noted in the ISE group.
3. The hypothesis that ISE effect would be augmented by the addition of CRT is not well supported in vocational, clinical, and cognitive domains.
4. Further comparative studies are required to determine whether the addition of CRT to an ISE programme enhances vocational and clinical outcomes in the long term.

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Introduction

Helping people with schizophrenia to gain competitive employment is a key to improving their quality of life and facilitating their recovery.[1] Through a combination of individual placement and support, work-related social skills training, and cognitive remediation training (CRT), our earlier studies demonstrated that 78.8% of people with severe mental illness succeeded in getting competitive employment; the longest job tenure was 24 weeks using the integrated supported employment (ISE) model that combines individual placement and support and work-related social skills training.[2] ISE outperformed other vocational rehabilitation services in Hong Kong. Cognitive ability is a predictor of employment outcomes including work success, skills acquisition, and independent living among those with severe mental illness.[3] This study aimed to test whether helping people with schizophrenia to restore their neurocognitive functions by CRT enhances the effects of ISE programme. We hypothesised that better vocational and clinical outcomes would be achieved with this model that combines three evidence-based rehabilitation components.

Methods

This study was conducted from January 2011 to March 2014. A total of 90 eligible participants aged ≥18 years with a diagnosis of schizophrenia or schizoaffective disorder from the psychiatric service units of the Baptist Oi Kwan and United Christian Hospital were recruited from April 2011 to April 2013. Those who had moderate or greater cognitive impairment (based on the 30-item Mini-Mental State Examination score of >18) were excluded.

Participants were randomly assigned to the ISE+CRT (n=45) or ISE (n=45) group. For ISE, intervention followed the protocol described in our previous study.[1] For ISE+CRT, in addition to ISE, 6 hours (2-hour session, 3 sessions) per week of individualised computer-assisted cognitive exercises with two cognitive remediation software systems (Strong Arm System and Captain's Log) per week for 12 weeks were included. Recreational activities were added to the ISE group as control to neutralise the effect of additional time and therapist contact in the ISE+CRT group.[4]

Participants were assessed before and after completion of the 3-month service, and at 7-month, 11-month, and 15-month follow-up by independent, trained, and blinded assessors. Only 70 participants were followed up at 15 months.

The primary outcome measures were vocational outcome (as measured by the employment outcome checklist) and clinical outcome (as measured by the 18-item Brief Psychiatric Rating Scale). Secondary measures included the Global Assessment of Functioning, executive functioning

measured by Wisconsin Card Sorting Test, and five cognitive domains measured by MATRICS Consensus Cognitive Battery. Verbal learning and working memory was measured in three stages of information processing by the Hong Kong List Learning Test 2nd Edition.

Baseline variables were compared using ANOVA or Chi-square test to detect group differences. Repeated ANOVA measures with post-hoc analysis were used to determine whether significant differences occurred at different stages of the study. The employment rate reported at different follow-up periods was the cumulative rate. Job tenure was defined as the longest duration of a job held. All

TABLE 1. Baseline characteristics and outcomes of the Integrated supported employment plus cognitive remediation training (ISE+CRT) and ISE alone groups

Variable	Mean±SD or No. (%) of subjects		χ^2 or *t*	P value
	ISE+CRT (n=45)	ISE (n=45)		
Age (years)	35.38±9.2	36.89±9.4	-0.771	0.443
Gender			0.05	0.827
Male	28 (62.22)	29 (64.44)		
Female	17 (37.78)	16 (35.56)		
Recruitment sites			0.41	0.523
Baptist Oi Kwan	21 (46.67)	18 (40.00)		
United Christian Hospital	24 (53.33)	27 (60.00)		
Marital status			2.35	0.672
Single	40 (88.89)	39 (86.67)		
Married	1 (2.22)	2 (4.44)		
Divorced	3 (6.67)	3 (6.67)		
Widowed	0 (0.00)	1 (2.22)		
Separated	1 (2.22)	0 (0.00)		
Education since K1 (years)	15±2.71	14.89±2.48	0.203	0.840
Diagnosis			1.64	0.286
Schizophrenia	29 (64.44)	23 (51.11)		
Schizoaffective disorder	16 (35.56)	22 (48.89)		
Age at diagnosis (years)	24.04±7.51	25.8±9.58	-0.968	0.336
Age of first hospitalisation (n=35)	24.1±7.29	25.97±9.18	-0.974	0.333
Duration of illness (years)	11.33±8.87	11.08±6.62	0.148	0.883
No. of hospital admissions (n=45 vs n=44)	2.38±2.28	2.25±2.37	0.259	0.796
Mini-Mental State Examination (range, 0-30)	28.0698±1.75	27.58±2.37	1.074	0.286
Brief Psychiatric Rating Scale (range, 0-126)	23.78±3.25	23.71±4.42	-0.082	0.935
Global Assessment of Functioning (range, 0-100)	60.64±7.34	61.47±8.53	-0.49	0.625
Employment history			0.35	0.557
Yes	44 (97.78)	43 (95.56)		
No	1 (2.22)	2 (4.44)		
Living condition			2.5	0.475
Family	34 (75.56)	35 (77.78)		
Alone	8 (17.78)	6 (13.33)		
Relatives	3 (6.67)	2 (4.44)		
Hostel	0 (0.00)	2 (4.44)		
Income (n=45 vs n=44)			1.94	0.585
Family	14 (31.11)	11 (24.44)		
Disability allowance	17 (37.78)	24 (53.33)		
Comprehensive Social Security Assistance	8 (17.78)	6 (13.33)		
Others (alimony, training compensation)	5 (11.11)	4 (8.89)		

analyses followed the principle of 'intent-to-treat'. The 'last observation carried forward' method was used to replace the missing data. Significance level was set at P<0.05 with Bonferroni adjustment.

Results

The ISE+CRT participants attended a mean of 25 (70%) of 36 sessions of CRT, whereas the ISE participants attended a mean of 28 (78%) of 36 TV watching sessions (P=0.405). The programme attrition rate was 11.11% with no significant between-group difference at the 11-month follow-up (χ^2=0.45, *df*=1, P=0.502). The two groups were comparable in baseline demographics and clinical outcomes (Table 1).

At 15-month follow-up, 20 (60.6%) ISE+CRT participants and 23 (62.2%) ISE participants obtained competitive employment (Table 2). Most worked at entry-level jobs such as security guard, cleaner, shop assistant, clerk, or delivery worker. The ISE+CRT participants had a trend to work longer (but not significantly) in a job than the ISE group at 7 months (P=0.780) and 11 months (P=0.591). Both groups were paid an hourly wage greater than the minimum hourly wage of HK$30. The number of job terminations was low for both groups throughout the period.

For clinical symptoms, the time-by-group difference up to 11 months was not significant [F(3, 264)=0.429, P=0.70]. Both groups showed a gradual downward trend of the total Brief Psychiatric Rating Scale score up to 11 months but no significant time effect (P=0.262, Table 1, Fig). At 15 months, the ISE group elicited more psychotic symptoms than the ISE+CRT group but not significantly (P=0.065). For the Global Assessment of Functioning, there was significant group-by-time interaction effect up to 11 months [F(3, 264)=3.05, P=0.05]. There was a significant upward time trend in global functioning for both groups throughout the 15-month period (P<0.05, Table 1, Fig). The two groups did not differ significantly in terms of psychological, social, or occupational functioning at any of the time intervals (all P>0.01 with Bonferroni correction).

For executive functioning, both groups improved significantly in categories completed score and conceptual level response throughout the 15-month period (P<0.01). Both groups improved significantly in perseverative errors (P<0.001) and non-perseverative errors (P<0.001).

TABLE 2. Employment rate of the Integrated supported employment plus cognitive remediation training (ISE+CRT) and ISE alone groups

Employment rate	ISE+CRT	ISE	χ^2	df	P value
At 7 months	22.2% (10/45)	28.9% (13/45)	0.526	1	0.468
At 11 months	44.4% (20/45)	55.6% (25/45)	1.110	1	0.292
At 15 months*	60.6% (20/33)	62.2% (23/37)	0.018	1	0.894

* 20 participants were not followed up due to recruitment delay

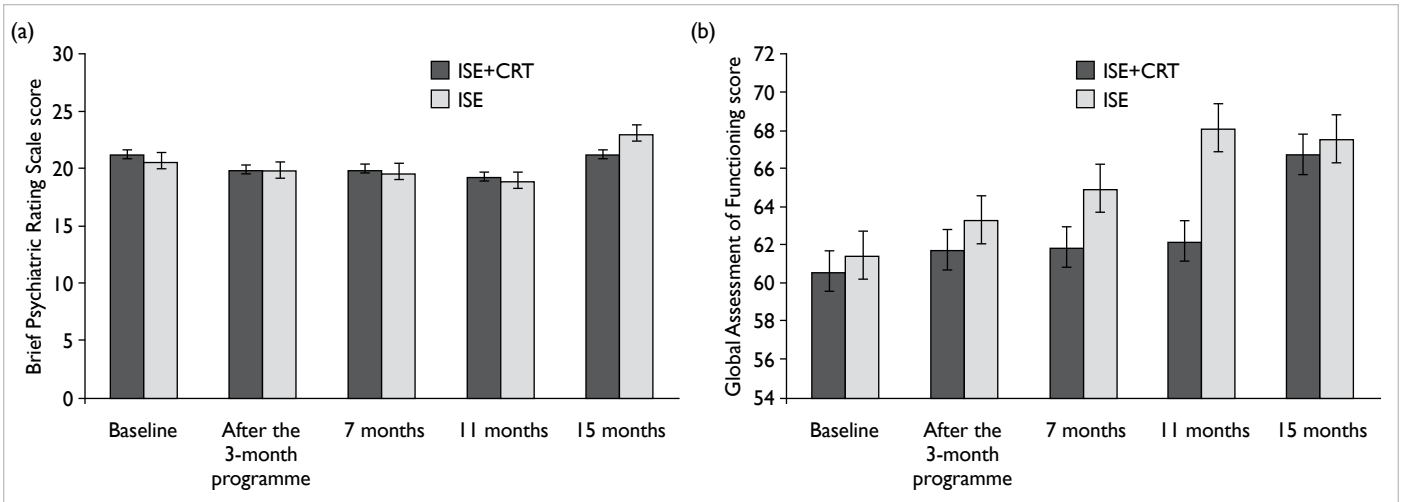

FIG. The mean scores of the (a) Brief Psychiatric Rating Scale and (b) Global Assessment of Functioning for the Integrated supported employment plus cognitive remediation training (ISE+CRT) and ISE alone groups at various time intervals

The interaction effects of group over time were not significant for the five neurocognitive domains. Both groups improved significantly in attention/vigilance and visual learning immediately after the 3-month programme (all P<0.001). Both groups showed better performance in reasoning and problem solving since the 7-month follow-up (P<0.001) and speed of processing starting at the 11-month follow-up (P<0.01). Nonetheless, a slight decrease in social cognition performance was noted for both groups over the 15-month period (P<0.05). Post hoc t-test on the simple effect of group showed no significant difference in any domain at any interval, with the exception of visual learning. The significant group difference was noted in the visual learning domain immediately after the intervention, with higher scores in the ISE+CRT than ISE group (P<0.025 with Bonferroni correction).

For verbal learning and memory and the three information processing stages (acquisition, retention, and retrieval), a positive time trend was significant for the stage of acquisition (P<0.001), while the negative time trend was significant for retention (P<0.001). No significant time trend was noted at the retrieval stage. The CRT+ISE group appeared to learn and memorise more words than the ISE group, but performed relatively poorly in the retrieval stage at the 15-month follow-up (all P>0.01 with Bonferroni correction). Nonetheless, no significant interaction for group effect over time or group difference was found at any of the three stages.

Discussion

Both the ISE+CRT and ISE groups demonstrated sustained improvement in vocational, clinical, psychological, and neurocognitive outcomes. Nonetheless, there was no evidence that cognitive remediation facilitated improvement in these aspects above and beyond the gains associated with ISE alone. In addition, ISE and CRT had different effects across the spectrum of outcomes. The augmenting effect of CRT on ISE is more complicated than the simple equation of 1+1=2.

The improved employment rate of 60-62% is comparable with that from western countries that focused on adding CRT to an individual placement and support programme.[4] In our study, more ISE+CRT participants worked full-time jobs, worked longer in a job, and received a higher hourly wage than ISE participants at the 7- and 11-month follow-up, but the effect was not sustained at the 15-month follow-up. In clinical aspects, the ISE group elicited more psychotic symptoms than the ISE+CRT group at the 15-month follow-up, but this effect was not detected immediately after the interventions. Further comparative studies are required to determine whether the addition of CRT to an ISE programme enhances vocational and clinical outcomes in the long term.

Given that our study excluded participants with moderate or severe cognitive impairment, addition of CRT components targeting them might result in a larger group difference that poorer cognitive functioning along with more clinical symptoms at baseline may be associated with better cognitive improvements.[5] On the contrary, a decreasing performance was noted in the social cognition domain for the ISE+CRT group. Further analysis of the addition of social cognition training in the vocational context is recommended.

This study had a number of limitations. Many outcome measures did not differ significantly between the two groups. This might have been due to the plateau effect induced by the work-related social skills training that had already pushed the effects to the upper limit. Adding CRT may not have caused significant further improvement. In the absence of work-related social skills training, adding CRT may significantly improve the outcome of an individual placement and support programme.[4] The insignificant results might be due to the small sample size.

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