Ten-year employment patterns of patients with first-episode schizophrenia-spectrum disorders: comparison of early intervention and standard care services

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Background

Little is known about long-term employment outcomes for patients with first-episode schizophrenia-spectrum (FES) disorders who received early intervention services.

Aims

We compared the 10-year employment trajectory of patients with FES who received early intervention services with those who received standard care. Factors differentiating the employment trajectories were explored.

Method

Patients with FES ($N = 145$) who received early intervention services in Hong Kong between 1 July 2001 and 30 June 2002 were matched with those who entered standard care 1 year previously. We used hierarchical clustering analysis to explore the 10-year employment clusters for both groups. We used the mixed model test to compare cluster memberships and piecewise regression analysis to compare the employment trajectories of the two groups.

Results

There were significantly more patients who received the early intervention service in the good employment cluster (early intervention: $N = 98$ [67.6%]; standard care: $N = 76$ [52.4%]; $P = 0.009$). In the poor employment cluster, there was a significant difference in the longitudinal pattern between early intervention and standard care for years 1–5 ($P < 0.0001$). The number of relapses during the first 3 years, months of full-time employment during the first year and years of education were significant in differentiating the clusters of the early intervention group.

Conclusions

Results suggest there was an overall long-term benefit of early intervention services on employment. However, the benefit was not sustained for all patients. Personalisation of the duration of the early intervention service with a focus on relapse prevention and early vocational reintegration should be considered for service enhancement.

Declaration of interests

No relevant conflicts of interests reported by C.L.M.H., Y.N.S., P.S., H.H.P. and K.K.Y. S.K.W.C., W.C.C. and E.H.M.L. report that they are members of the working group of the Early Assessment Service for Young People with Psychosis (EASY) programme of the Hospital Authority in Hong Kong. E.Y.H.C. is the convener of the working group of the EASY programme of the Hospital Authority in Hong Kong.

Keywords

Schizophrenia; early intervention; long-term outcomes; employment; cluster analysis.

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Functional impairment is a core feature of schizophrenia, and functioning can be measured tangibly by gainful employment. With gainful employment, patients achieve economic independence, enhanced self-esteem and have reduced clinical needs.[1,2] However, the employment rate of patients with schizophrenia is particularly low, with a reported rate of between 10 and 30%.[3,4] Early intervention services for psychosis have been implemented worldwide based on the critical period hypothesis,[5] which suggests that the first 2–5 years of the illness are important in terms of long-term outcomes. Most early intervention services provide a fixed-period assertive case management intervention to patients with first-episode psychosis. A key consensus outcome of this service is regaining and maintaining gainful employment.[6] Many interventions have been developed to improve vocational outcomes of people with schizophrenia. Consistent evidence has shown that early intervention has a short-term beneficial effect on symptom improvement and recovery of functioning, including a better employment rate.[7] However, the long-term outcomes of early intervention services have been inconsistent. Some studies reported no sustained clinical benefit beyond the intervention period at 5-year and 10-year follow-up.[8,9] The 10-year follow-up of the OPUS study found a negative effect of early intervention on clinical outcomes, but a positive effect on the ability of patients to live independently.[9] Other studies reported that patients continued to show better outcomes including clinical remission, number of hospital admissions and suicide mortality at a follow-up period of between 5 and 10 years.[10–12] In addition to the sustainability of the benefits of early intervention, another important policy-related question concerns the optimal duration of the early intervention service.[13] Most early intervention services are delivered for between 1 and 3 years.[7] Only three randomised controlled trials (RCTs) have attempted to explore the optimal duration of early intervention services, and they had conflicting results. One study found that extending the existing 2-year early intervention service to 5 years was not associated with significant further benefits,[14] whereas the other two RCTs reported that extending early intervention services to 3 or 5 years had benefits in terms of functional recovery and duration of clinical remission.[15,16] The heterogeneous trajectories of patient outcomes might be one possible explanation for these inconsistent results. Therefore, early intervention services with durations tailored to patients have been suggested.[13] However, no study has provided evidence to support this suggestion by comparing the longitudinal outcome trajectories of early intervention and standard care services. Furthermore, studies of longer-term longitudinal patterns of functioning of patients with schizophrenia and predictive factors are limited and

there are none specifically focused on employment. A 20-year longitudinal study on the social functioning of patients with psychotic disorders suggested heterogeneity of the longitudinal functional outcomes.[17] A review study reported that premorbid functioning and previous work consistently predicted employment outcomes and other factors such as positive and negative symptoms, cognitive functions and job-seeking attitude have also been suggested.[18] However, most studies have explored the correlates of employment outcomes and the few longitudinal studies that have been conducted have had a small sample size,[19] a single point of employment-outcomes analysis[20] or a short follow-up period.[4] The aim of this study was to explore and compare the 10-year longitudinal trajectories of employment patterns of patients who had received standard care with those of patients who had received the early intervention service. Predictors that differentiate the longitudinal employment patterns were also explored. The results provide evidence to further improve the early intervention service model.

Method

Study setting

The Early Assessment Service for Young People with Psychosis (EASY) programme was established by the public health provider in Hong Kong (Hospital Authority) in 2001 as a region-wide early intervention service for patients with first-episode psychosis. There were 4 teams serving a population of around 6 million. Each team has two psychiatrists, three case managers and a 0.25 full-time-equivalent clinical psychologist. The programme provides 2-year, phase-specific interventions for patients aged 15–25 years with first-episode psychosis.[21] These phases include initial engagement, psychoeducation, psychological adjustment, medication management and vocational support. After completing the initial 2 years of service, patients were transferred to the general adult mental health service in the third year, with the pace of transition depending on individual clinical needs. The standard service consisted of publicly funded psychiatric out-patient clinic consultation and in-patient care. Support and intervention from other professionals including community psychiatric nurses, clinical psychologists and social workers were available based on needs without a dedicated coordinator. About 6% of the patients discharged from the in-patient unit used the community support service.[21]

Samples

We used a historical control study method because the early intervention service was implemented as a region-wide service in 2001, which precluded the possibility of having concurrent study samples. To minimise the potential cohort effects, the two samples were only 1 year apart. We identified patients with a diagnosis of schizophrenia-spectrum disorder who had received the early intervention service in Hong Kong between 1 July 2001 and 30 June 2002 from the centralised hospital database (clinical management system [CMS]). This is the centralised clinical database for the public healthcare service, which is responsible for more than 90% of tertiary healthcare in Hong Kong. Clinicians determined the baseline diagnosis, using ICD-10 (1992) criteria and all available clinical information. We excluded patients with comorbid organic brain conditions, drug-induced psychosis, intellectual disabilities and those who had received prior psychiatric treatment for longer than 1 month before presentation to the early intervention service. We individually matched the identified patients – based on gender, age at presentation and diagnosis at onset – with those who first presented to the standard care service between

1 July 2000 and 30 June 2001. The same inclusion and exclusion criteria applied to the standard care group.

A total of 148 matched pairs were identified. All patients were approached for face-to-face interviews to determine their clinical and functional status 10 years after their first presentation to the service. Written consent was obtained from all patients. The main results of these face-to-face interviews were reported previously.[12] The longitudinal diagnoses were based on DSM-IV (1994) Axis I Disorders criteria and were determined using all available information (clinical interviews and medical records). After reviewing the longitudinal diagnoses, six patients were excluded from the analysis as they did not fulfil the diagnostic criteria (two patients had substance-induced psychosis, three patients had affective psychosis and one patient had delusional disorder). As a result, each group consisted of 145 patients. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The study was approved by the Institutional Review Board (IRB) of the University of Hong Kong/Hospital Authority Hong Kong West Cluster (approval number UW09-249) and ethics committees of the other six research sites in Hong Kong (Kowloon central/ Kowloon East cluster IRB: KC/KE-10-0213/ER-3; Kowloon West cluster IRB: Kw/Ex/11-007(35-07); Hong Kong East Cluster IRB: HKEC-2010-083; New Territory East Cluster: CRE-2011.026; New Territory West Cluster: NTWC/CREC/902/10).

Ten-year employment history

We obtained the 10-year employment histories of all patients on a monthly basis for the first 3 years and every 3 months for the subsequent 7 years from the CMS and written clinical records, using a standardised data-entry form. Patients who were in full-time or part-time competitive paid employment or full-time education (provided by a government-recognised educational institution) at any time during the assessment period were considered as employed for that period. Months of employment were calculated for each patient for each year. The inclusion of full-time education was to reflect the young age of the study population. Supported employment, volunteer work, working at a rehabilitation centre and part-time education were not included. Given the young age of the patients, most of whom were living with family,[12] reports of being a homemaker were not considered as employment.

Baseline and clinical information of the initial 3 years of treatment

Baseline and clinical information for patients during the first 3 years of treatment was obtained from the CMS and written clinical records. The baseline data included initial clinical diagnosis, age at onset, gender, duration of untreated psychosis and premorbid occupational impairment. Duration of untreated psychosis was defined as the period (in days) between the first emergence of psychotic symptoms and the initiation of effective antipsychotic medications.[22]

We retrieved monthly data for the first 3 years by using a standardised data-entry form based on operationalised definitions. This included the 2-year early intervention service and the third transitional year. Positive and negative symptoms were measured with the Clinical Global Impressions–Schizophrenia (CGI-SCH) scale.[23] Other information included antipsychotic medication types and dosage, number of relapses and number of admissions to hospital. Relapse was operationally defined as a change in the CGI-SCH-positive scores from 1 to 3 or from 4–6 to 5–7, followed by an adjustment of antipsychotic medication or admission to hospital.[24] An average of CGI-SCH-positive and -negative symptoms

over the 3 years was calculated. We also calculated the number of months of full-time employment in the first year of treatment and mean defined daily dose[25] of antipsychotic medications for each patient during the initial 3 years.

Face-to-face interview

We conducted semi-structured interviews with patients at their 10-year anniversary of entering into the service. Symptoms were assessed using the Positive and Negative Syndrome Scale (PANSS) for schizophrenia.[26] We assessed information on social and occupational functioning by using the Social and Occupational Functioning Assessment Scale (SOFAS)[27] and the Role Functioning Scale (RFS).[28]

Data analyses

All statistical analyses were conducted using SPSS version 24.0 and R version 3.3.2, both for Windows 10. We used the last-observation-carried-forward method to manage missing information in the clinical record review. Total months of employment in each year over 10 years were used for hierarchical cluster analysis to identify distinct clusters of longitudinal employment trajectories for each group. We conducted a separate cluster analysis for each group, taking the different services they have received into account. We used a within-group method for the clustering algorithm, using the squared Euclidean distance for distance measuring. The average silhouette approach was used to determine the optimal number of clusters.[29] A mixed model test was used to compare cluster memberships between early intervention and standard care groups because they were partially matched after exclusion of the six patients based on their longitudinal diagnoses. The slopes of the longitudinal trajectories of the early intervention and standard care groups were compared in different segments, years 1–5 and years 6–10, using piecewise regression analysis. We carried out a multiple imputation by predictive mean matching to assess the influence of missing data on the results of the hierarchical cluster and piecewise regression analysis. Propensity score-based sensitivity analysis with inverse probability weighting was used to reduce the bias of non-concurrent samples. The details of the unweighted and propensity score-reweighted patient characteristics reported according to the brief guidelines[30] are given in Supplementary Table 1 available at https://doi.org/10.1192/bjp.2019.161.

A univariate relationship between the baseline and the clinical characteristics of the initial 3 years of treatment for the different clusters was estimated using logistic regression for the early intervention and standard care groups. All significant variables were included for multivariate analysis with the enter method. We compared the clinical and functional outcomes between the clusters in the early intervention and standard care groups at the 10-year

follow-up assessment, using non-parametric tests depending on the number of clusters.

Data quality and reliability

Clinicians and researchers had fortnightly consensus meetings to monitor data quality during data collection. An experienced clinician and two researchers completed medical record reviews of 12 patients using the study's data-collection form. An intraclass correlation coefficient (ICC) test was used to test the validity of the CGI-SCH-positive and CGI-SCH-negative scores. The validity test results (CGI-SCH positive: ICC = 0.89; CGI-SCH negative: ICC = 0.77) suggested that the ratings of the researchers were comparable with the ratings of the clinician. The interrater reliability of the researchers was also assessed using PANSS and SOFAS scores for ten patients. The results indicated satisfactory concordance between researchers (PANSS: ICC = 0.88; SOFAS: ICC = 0.97).

Results

There was no significant difference in demographic and baseline characteristics between the early intervention and standard care groups apart from the positive symptoms (Table 1). The successful interview rates for the standard care and early intervention groups were 70.3% ($N = 104$) and 74.3% ($N = 110$), respectively. After excluding patients with non-schizophrenia-spectrum diagnoses, there were 102 patients in the standard care group and 107 in the early intervention group (Supplementary Fig. 1).

Hierarchical clustering analysis and comparison between early intervention and standard care

The optimal cluster number was two for both early intervention and standard care groups (Fig. 1). Supplementary Fig. 2 shows the results of the silhouette test. The median percentage agreement of cluster allocation of the imputed 20 data-sets with the original is 95.2%, suggesting that the missing data has little influence on the clustering results. The good employment cluster had 98 (67.6%) patients who received the early intervention and 76 (52.4%) patients received standard care. There was a significant difference in the longitudinal pattern of this cluster between the early intervention and standard care groups in years 1–5 ($P < 0.001$) but not for years 6–10 ($P = 0.12$). The poor employment cluster had 47 (32.4%) patients who received the early intervention and 69 (47.6%) patients who received standard care. The early intervention patients in this cluster had a reduction in the number of months of employment after year 3 and the number remained low subsequently. There was a significant difference between the early intervention and standard care groups in this cluster for years 1–5

Table 1 Comparison of demographic and baseline characteristics between early intervention and standard care groups

Baseline characteristics	Early intervention ($N = 145$)	Standard care ($N = 145$)	t/z	P-value
Age at onset (s.d.)	20.92 (3.09)	21.12 (3.43)	−1.13	0.26
Years of education (s.d.)	10.84 (2.34)	10.84 (2.56)	0.00	1.00
Gender (male, n, %)	74 (51.03)	73 (50.34)	0.12	0.91
Log DUP (s.d.)	1.92 (0.78)	1.91 (0.76)	0.08	0.94
CGI-SCH positive (s.d.)	4.15 (0.90)	4.61 (0.96)	−4.23	<0.0001
CGI-SCH negative (s.d.)	2.75 (1.40)	2.82 (1.23)	−0.47	0.64
Premorbid occupation impairment (impaired, n,%)	12 (8.28)	13 (8.97)	−0.21	0.83
Diagnosis, n (%)			0.03	0.86
Schizophrenia	127 (87.60)	126 (86.9)		
Other (brief psychotic disorders or psychosis NOS)	18 (12.40)	19 (13.1)		

t, partially paired t-test; z, z-value from mixed effect model; s.d., standard deviation; DUP, duration of untreated psychosis; CGI-SCH, Clinical Global Impressions–Schizophrenia; NOS, not otherwise specified.
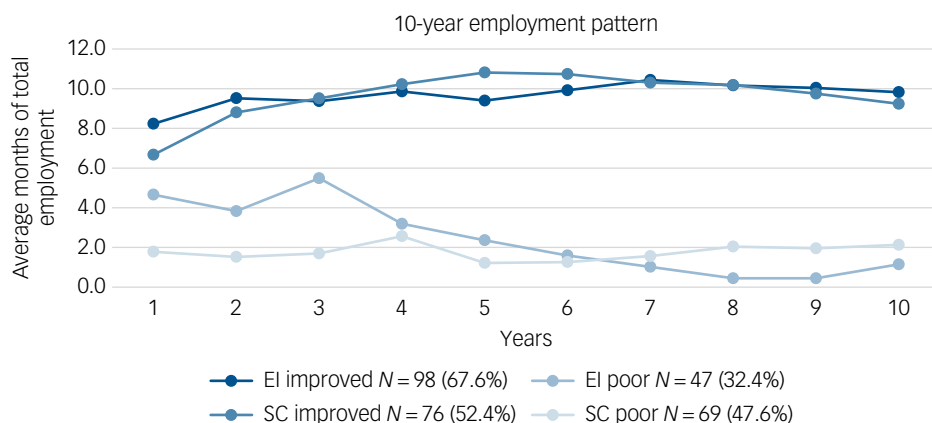
Fig. 1 Hierarchical cluster analysis of the 10-year average months of employment of the early intervention and standard care groups.

EI, early intervention; SC, standard care.

($P < 0.0001$) but not for years 6–10 ($P = 0.12$). The results of piecewise regression with multiple imputation were consistent with these findings. The mixed model analysis found significantly more patients who received the early intervention than patients who received standard care in the good employment cluster ($P = 0.009$). The propensity score-adjusted analysis was consistent with the mixed model analysis.

Demographic and early clinical characteristics of early intervention and standard care groups in the good and poor employment clusters

The patients who received the early intervention in the good employment cluster had significantly more years of education, more total months of full-time employment in the first year and fewer relapses over the initial 3 years (Table 2). The effects of relapse in each of the first 3 years on cluster membership were explored with χ^2 tests. Significantly more patients who had relapsed in years 2 or 3 were in the poor employment clusters (Supplementary Table 2). The model with years of education, total months of full-time employment in the first year and number of relapses over the initial 3 years was significant in explaining 19.1–26.7% of variance in the clusters ($\chi^2 = 30.77$, $P < 0.0001$; Supplementary Table 2).

The patients who received standard care in the good employment cluster had significantly more years of education, more total months of full-time employment in the first year, lower mean negative symptoms, fewer admissions to hospital over the initial 3 years and fewer of them were male (Table 2). The model including these variables was significant in explaining 33.7–45% of the variance in the clusters ($\chi^2 = 59.65$, $P < 0.0001$). Only total months of full-time employment in year 1 and mean negative symptoms over the initial 3 years were significant in the model (Supplementary Table 3).

Table 2 Comparison between the good and poor employment clusters on baseline clinical characteristics and clinical characteristics during the initial 3 years for both early intervention and standard care groups

	Early intervention group				Standard care group			
	Good employment (N = 98)	Poor employment (N = 47)	Odds ratio	95% CI	Good employment (N = 76)	Poor employment (N = 69)	Odds ratio	95% CI
Demographics								
Age at onset (s.d.)	20.92 (3.30)	20.91 (2.65)	1.00	0.89–1.12	21.24 (3.30)	20.99 (3.58)	1.02	0.93–1.12
Years of education (s.d.)	11.19 (2.46)	10.11 (1.90)	1.25*	1.05–1.48	11.29 (2.62)	10.35 (2.43)	1.16*	1.02–1.33
Gender, male (n, %)	47 (48.00)	27 (57.4)	1.47	0.73–2.95	31 (40.80)	42 (60.90)	2.26*	1.16–4.39
Baseline characteristics								
Log DUP (s.d.)	1.89 (0.78)	1.98 (0.80)	0.86	0.55–1.34	1.85 (0.70)	1.98 (0.83)	0.80	0.52–1.23
Premorbid occupation impairment, yes (n, %)	6 (6.10)	6 (12.8)	0.45	0.14–1.47	6 (7.90)	7 (10.10)	0.76	0.24–2.38
CGI-SCH positive (s.d.)	4.14 (0.89)	4.17 (0.94)	0.97	0.66–1.43	4.71 (0.76)	4.49 (1.13)	1.27	0.80–1.81
CGI-SCH negative (s.d.)	2.61 (1.43)	3.04 (1.30)	0.80	0.62–1.03	2.66 (1.08)	3.00 (1.37)	0.80	0.61–1.04
Clinical characteristics of initial 3 years								
Total months of FT employment in year 1 (s.d.)	7.07 (4.76)	3.19 (4.07)	1.20***	1.10–1.31	5.84 (4.64)	1.17 (2.87)	1.35***	1.21–1.51
Mean CGI-SCH positive over 3 years (s.d.)	1.58 (0.65)	1.59 (0.56)	0.86	0.58–1.94	1.54 (0.68)	1.80 (0.91)	0.65	0.41–1.03
Mean CGI-SCH negative over 3 years (s.d.)	1.36 (0.43)	1.50 (0.56)	0.52	0.25–1.09	1.34 (0.41)	1.91 (0.90)	0.24***	0.12–0.48
Number of relapses over 3 years (s.d.)	0.60 (0.89)	1.00 (1.02)	0.65*	0.45–0.94	0.64 (1.03)	0.68 (0.86)	0.96	0.68–1.35
Mean DDD over 3 years (s.d.)	0.51 (0.38)	0.65 (0.56)	0.51	0.24–1.11	0.65 (0.58)	0.71 (0.53)	0.81	0.45–1.46
Number of admissions to hospital over 3 years (s.d.)	0.91 (1.06)	1.00 (1.02)	0.92	0.66–1.28	1.42 (0.79)	1.80 (1.24)	0.69*	0.49–0.98

DUP, duration of untreated psychosis; CGI-SCH, Clinical Global Impressions–Schizophrenia scale; CI, confidence interval; FT, full time; DDD, daily defined dose; s.d., standard deviation.
*$P < 0.05$; **$P < 0.001$; ***$P < 0.0001$.

Table 3 Comparison of 10-year clinical and functioning outcomes between the different clusters of each study sample

	Early intervention group				Standard care group			
	Good employment (N = 77)	Poor employment (N = 29)	U	P-value	Good employment (N = 59)	Poor employment (N = 43)	U	P-value
Clinical outcomes								
PANSS positive (s.d.)	11.64 (5.65)	11.14 (4.87)	1081.50	0.80	9.81 (4.20)	12.65 (7.12)	946.50	0.023
PANSS negative (s.d.)	10.57 (4.58)	13.28 (7.50)	826.50	0.035	9.78 (3.88)	13.70 (7.00)	826.50	0.003
PANSS general (s.d.)	25.23 (8.30)	29.00 (9.62)	827.00	0.040	23.83 (8.77)	29.14 (11.55)	822.50	0.003
Functional outcomes								
SOFAS (s.d.)	62.94 (10.75)	53.17 (7.81)	495.00	<0.0001	64.66 (9.03)	55.00 (12.00)	619.00	<0.0001
RFS subscore								
Work (s.d.)	5.47 (1.08)	4.07 (1.19)	398.50	<0.0001	5.63 (1.03)	4.47 (1.55)	689.50	<0.0001
Independent living (s.d.)	5.95 (0.83)	5.17 (0.97)	608.00	<0.0001	6.19 (0.84)	5.51 (0.98)	766.50	<0.0001
Immediate relationship (s.d.)	5.87 (0.84)	5.45 (0.87)	841.00	0.045	5.91 (0.90)	5.26 (1.07)	812.00	0.001
Extended relationship (s.d.)	5.31 (1.25)	4.83 (1.20)	836.50	0.041	5.49 (0.99)	4.84 (1.31)	915.00	0.011

PANSS, Positive and Negative Syndrome Scale; s.d., standard deviation; SOFAS, Social and Occupational Functioning Assessment Scale; RFS, Role Functioning Scale; U, Mann–Whitney U test.

Comparing clinical and functional outcomes of the good and poor employment clusters at the 10-year follow-up

At the 10-year follow-up, the early intervention and standard care groups in the good employment cluster had significantly lower PANSS-negative and -general scores, higher SOFAS scores and higher subscores of RFS compared with the poor employment cluster. Only the standard care group had higher PANSS positive scores (Table 3).

Discussion

This is one of the first studies to compare the longitudinal employment trajectories of patients who received early intervention with those who received standard care services. Significantly more patients who received the early intervention were in the good employment cluster. The beneficial effect of the early intervention service on employment for this group of patients was sustained over 10 years. In the poor employment clusters, there were significant differences between the early intervention and standard care groups for years 1–5 but not for years 6–10. This suggests that the patients who received the early intervention were more successful in achieving employment than those who received standard care during the initial few years, but they failed to sustain this employment. In the good employment clusters, there were significant differences between the early intervention and standard care groups in years 1–5, suggesting different early trajectories of vocational improvement between groups. The patients who received the early intervention had significant vocational functioning improvement in the first 2 years, whereas the standard care group improved more gradually. We found that years of education, months of full-time employment in the first year and number of relapses in the initial 3 years of treatment were significant indicators that differentiated patients who received the early intervention into the good and poor employment clusters. For patients who received standard care, negative symptoms in the initial 3 years and months of full-time employment in the first year were significant indicators that differentiated cluster membership.

The period between 15 and 25 years of age is an important developmental stage that signifies a transition to adulthood, which includes completing education and establishing an identity in the workplace. An onset of psychosis during this period often interrupts this significant life trajectory. Therefore, the vocational outcomes of patients with illness onset during this period are crucial. Reviews have reported a modest short-term effect of early intervention programmes to improve vocational outcomes.[31] However, evidence of the longevity of such effects is scarce. The results of this study suggest that significantly more patients who received the early intervention achieved good longitudinal employment outcomes over 10 years compared with the standard care group, and the benefit was sustained beyond the intervention period. This finding supports the critical period hypothesis[5] and highlights long-term benefits of the early intervention programme.

During the initial 3 years, the early intervention group in the poor employment cluster achieved better employment than the standard care group, but their employment status deteriorated to the same level as that of the standard care group between years 3 and 4 and subsequently remained unchanged. This suggests that the employment-related benefit of the 2-year early intervention service was not sustained in this group of patients. About 68% of the patients in the good employment cluster who received the early intervention maintained their employment, but in the poor employment cluster 32% of the patients who received the early intervention were not able to sustain their vocational functioning. These heterogeneous longitudinal trajectories of vocational outcomes highlight the need for personalisation of the duration of the early intervention service, which could be a key direction for future development of the early intervention service model.[13]

Patients in the poor employment cluster had poor functional and clinical outcomes at the 10-year follow-up. This suggests that the specific clusters identified using the longitudinal employment data have important prognostic value. One of the factors differentiating the employment clusters for both early intervention and standard care groups is years of education. This result is in line with previous findings on the relationship between premorbid functioning and vocational outcome, because years of education can be a proxy of premorbid functioning. The number of months of full-time employment as early as the first year was also found to be a significant differentiating factor for both groups. Therefore, early vocational reintegration should be a key component of an enhanced early intervention programme.

Early relapse in patients with first-episode psychosis has been suggested as an important factor relating to long-term clinical outcomes[32] and mortality.[11] This study further suggests that a greater number of relapses during the first 3 years is associated with worse longitudinal vocational outcomes in patients who received the early intervention. The results of a detailed exploration of relapse patterns suggest that relapses in years 2 and 3 are particularly important. This time point is around the transition phase of a 2-year early intervention service programme. Patients who had a relapse during this period may not have sufficient recovery time before the transition to standard service. Therefore, a fixed-period early intervention service may not be sufficient for patients who have had a relapse during the latter part of the service provision. This

highlights the possibility of a critical intervention period after early relapse and the need to provide a longer period of early intervention service for patients who relapsed in years 2 or 3. The important effect of early relapse on long-term outcomes and the lack of consistent beneficial impact of early intervention service on relapse reduction[7] indicate a need to strengthen the early intervention service in terms of relapse prevention and management.

Negative symptoms during the initial 3 years were identified as one of the significant differentiating indicators of the employment clusters among the patients in the standard care group. This is in line with previous findings supporting the relationship between negative symptoms and functional outcomes.[18] However, we did not find a significant role of negative symptoms in the early intervention group. It is possible that the patients who received the early intervention service had much improved negative symptoms.[7] Such improvement might have narrowed the difference in negative symptoms between the good and poor employment clusters of the patients in the early intervention group, and hence led to a statistically non-significant result.

Strengths and limitations of the study

One of the strengths of this study is its 10-year follow-up with matched patients and high time resolution. However, because vocational functioning is associated with the social environment, interpretation of our results must take the context and limitations of the study into account. First, the quality of clinical information obtained from clinical records might be limited by the quality of clinical documentation, despite ensuring the reliability of the symptom extraction from the clinical record. Although we used a standard definition, we did not have a standardised measurement to obtain information on the duration of untreated psychosis, and this might limit the reliability of our study. Additionally, the definition of employment was relatively broad, which limits a precise exploration. Due to the region-wide implementation of the early intervention service, a concurrent comparison group was not possible. However, patients were matched with those only 1 year apart to reduce sampling bias. As the early intervention group was identified at the start of the new early intervention service, the service model might not be mature. Other factors such as cognitive functioning and premorbid adjustment were not explored. Additionally, the exclusion criteria and the age and diagnosis restrictions may limit the generalisability of the study results. Selection bias might have been introduced because the samples were recruited from the public health service, which only covers about 90% of the health service in Hong Kong.

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EXTRA
CONTENT
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