



Community Treatment Order: Identifying the need for more evidence based justification of its use in first episode psychosis patients



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ABSTRACT

Objectives: Community Treatment Order (CTO) is a legal regime that obliges patients suffering mental disorder to adhere to treatment in the community and allows for a swift admission to hospital if necessary. Study aims were to: (i) determine CTO frequency in a large representative sample of first episode psychosis (FEP) patients; (ii) compare the characteristics of patients with or without CTO before entry, during treatment and at discharge from an early psychosis program.

Methods: Information on 660 patients treated at the Early Psychosis Prevention and Intervention Centre (EPPIC) between 1998 and 2000 was collected from medical files.

Results: 19.2% of patients were under CTO at least once during treatment and they differed on most pre-treatment, baseline, treatment and service discharge variables. They were less educated, more likely to have a history of offending behavior, had lower pre-morbid functioning, longer duration of untreated psychosis, increased prevalence and more persistent substance use disorders, greater severity of symptoms, lower functioning, poorer insight at any time during treatment and were more likely to be admitted to hospital.

Conclusions: CTO frequency was high, likely related to the representativeness of the cohort. Characteristics of patients on CTO are comparable to those with serious and persistent mental illness. Considering the absence of solid evidence regarding the effectiveness of this form of compulsion, it is crucial to study the use of CTO in FEP patients in order to explore its impact and identify patients for whom it may be beneficial.

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1. Introduction

The early phase of psychotic disorders has received increasing attention over the last decades (Marshall and Rathbone, 2011). Different intervention programs that target this early phase of the illness have been developed and assessed (Garety et al., 2006; Gleeson et al., 2013; Petersen et al., 2005). One of the main aims of such programs is to reduce the duration of untreated psychosis (DUP), because of the association between a longer DUP and poorer outcome (Boonstra et al., 2012; Golay et al., 2016; Penttila et al., 2014). Disengagement from services

and poor adherence to treatment has been identified as factors that are likely to limit the effect of early intervention programs (Conus et al., 2010c; Garety et al., 2006).

There is an absence of evidence regarding the effectiveness of Community Treatment Orders (CTOs) (Kisely and Campbell, 2014). Studies that addresses the topic have been questioned because of specific bias such inclusion criteria or protocol violation (Burns et al., 2013a). In this context, CTOs are often considered by specialists as useful tools to reduce disengagement and improve adherence to treatment (Mustafa, 2015). As a reminder, the concept of a CTO was developed in several jurisdictions and was first commonly used in the US in the 1960s and 70s. They were quickly adopted by other countries, especially in the English speaking world (Hiday, 2003). By authorizing outpatient care within the structure of a CTO, the aim was to offer a less restrictive alternative to involuntary hospitalization. It was hoped that CTO would make it possible to keep people in care outside of hospital, to avoid any decline in their state of health and their social situation, and crucially, to limit recourse to institutional placements (least restrictive CTO). Several

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jurisdictions like most of the US states, Australia or New Zealand further adapted their legislation to authorize the use of CTO on a preventative basis (preventative CTO).

Victoria was the first Australian state to introduce CTO in 1986 (Power, 1999). This new form of compulsion has been implemented in the context of deinstitutionalised services and well-developed networks of community mental health teams (Churchill et al., 2007). The criteria for a CTO required that: (a) the person suffered a mental illness; (b) a risk to self or other people existed; (c) the person refused treatment or his or her consent was unavailable; (d) there was no less restrictive alternative for treatment; and (e) immediate and adequate community treatment or care was available (Dawson, 2005).

To our knowledge, the use of CTOs for first episode psychosis (FEP) patients involved in a specialized youth-specific early intervention program has never been studied. Considering the importance of the restriction it imposes on patients, it is crucial to study if it has a positive impact on patients' outcome. The aims of the study were to: (i) determine the frequency of CTOs in a large representative sample of FEP patients; and (ii) to compare pre-treatment, treatment and outcome characteristics of FEP patients who were put on a CTOs during treatment at a specialized early intervention program with those of patients who were not exposed to CTOs.

2. Material and methods

2.1. Patient sample

This paper is based on a file audit study (FEPOS; First Episode Psychosis Outcome study) (Conus et al., 2007). The initial sample comprised a population-based cohort of all the 786 FEP patients consecutively treated at the Early Psychosis Prevention and Intervention Centre (EPPIC) between January 1998 and December 2000. EPPIC is a comprehensive program for young people aged between 15 and 29 years and experiencing their first episode of psychosis (McGorry et al., 1996). The catchment area covered the northwestern regions of Melbourne, Australia. Eighty-two patients were transferred to other services and their medical files were unavailable for the audit. Forty-three cases were excluded because of a non-psychotic diagnosis. One case was excluded because information about CTO was missing. Therefore, data were available on 660 patients. Contrary to certain countries, application of CTO in Victoria at the time of the study was not restricted to patients aged 18 or more.

2.2. Procedure

2.2.1. Assessment of CTO

The existence of a CTO was assessed on the basis of the case notes in the file as well as the legal forms that were produced in such contexts. For each patient, the number of treatment phases under CTO was reported in their case notes. The population was then dichotomized between patients who were treated under CTO for one or more period and those who never were under CTO.

2.2.2. Assessment of pre-treatment, baseline and outcome characteristics

Data was extracted from the file regarding the following periods: (1) pre-treatment phase, that is time before entry to EPPIC; (2) baseline, that is patient's characteristics at the time of entry to the EPPIC program and (3) during EPPIC treatment. Pre-morbid functioning was assessed with the Global Assessment of Functioning Scale (GAF, APA, 1994). Duration of prodrome was defined as the time between the moment when mention was made of the appearance of the first disturbances, which represented a deviation from the patient's previous behavior, and the development of the florid features of the disorder. Age at onset was defined as the age when first sustained positive psychotic symptoms occurred, according to the Duration of Untreated Psychosis (DUP) scale (McGorry et al., 1990a; McGorry et al., 1990b). DUP was defined as

age at entry into EPPIC subtracted by age when first sustained positive psychotic symptoms started (age at onset). Past exposure to trauma was documented according to sub-type of trauma as detailed elsewhere (Conus et al., 2010a; Conus et al., 2010b). Past history of psychiatric diagnoses, substance use disorder (SUD) included, were defined according to Diagnostic and Statistical Manual of Mental Disorders of Mental Disorders (4th ed., DSM-IV) criteria and past suicide attempts according to ICD-10 classification (Dilling and Dittmann, 1990). Diagnoses at discharge were preferred to the initial diagnoses because of the known instability of diagnoses in the early phase of illness (Schimmelmann et al., 2005).

Severity of illness at baseline and discharge was assessed with the Clinical Global Impressions scale (CGI) (Guy, 1976), and functioning level with the GAF. Insight into illness was assessed on the basis of one item with anchors ranging from absent to partial and full insight (Conus et al., 2007). Employment/occupation at entry and discharge was defined on the basis of the Modified Vocational Status Index (MVCI) (Tohen et al., 2000) as having a job (full-time or part-time) or being a student at school or university for at least the previous four weeks. Patients were also dichotomized according to the evolution of substance use disorder during treatment period as follows: (a) absence of substance use disorder (b) decrease or interruption of substance use disorder over treatment period and (c) persistence, increase or commencement of substance use disorder over treatment period (Lambert et al., 2005). Inter-rater reliability for forty cases (between Lambert and Conus who assessed all files) was established for CGI-S (ICC2,1 = 0.87), GAF (ICC2,1 = 0.88), PAS (ICC2,1 = 0.82), and insight score (kappa = 0.89) (Conus et al., 2007). The Structured Clinical Interview for DSM-IV-TR Axis I Disorders-Patient Edition (SCID-I/P) was used to determine the validity of diagnoses for a subset of 115 patients. There was good concordance for both psychotic (kappa = 0.80) and substance use (kappa = 0.74) diagnoses (Conus et al., 2007).

2.3. Statistical analysis

To allow all comparisons to be included on the same metric a series of logistic regression analyses were conducted with CTO (yes/no) as the dependent variable, and the individual premorbid and service entry variables as predictors (one at a time for each model). From these analyses, odds ratios (OR) and the 95% confidence intervals (CI) of the ORs were derived. The Wald statistic (z) was used to determine significance of predictors. In order to highlight the most important variables independently of each other, three synthetic multivariate logistic models were estimated with significant predictors for pre-treatment, baseline and "treatment" variables respectively.

For the treatment and discharge variables, adjusted ORs and 95% CI of the adjusted ORs were reported, controlling for entry characteristics and time in service. Comparisons between CTO and past history of offending behavior categories and final diagnostic at discharge were performed using Fisher's exact test. The association between CTO occurrence and the final diagnostic at discharge was tested with a Fisher Exact Test with Monte-Carlo estimation. In order to highlight which diagnostic categories differed the most between groups and contributed to the overall significant result we examined significant standardized residual at the 0.05 level. All statistical tests were two-tailed and significance was determined at the 0.05 level. All statistical analyses were performed with IBM® SPSS® version 22.

3. Results

3.1. Frequency of CTO

19.2% ($n = 127$) of the patients were placed under CTO at some point during the 18 months of treatment.

3.2. Pre-treatment variables

Pre-treatment variables are presented on Table 1. Patients under CTO were significantly more likely to be male (OR = 1.62, $p = 0.030$) and had fewer years of education (OR = 0.83, $p = 0.005$). They showed a lower premorbid functioning (OR = 0.96, $p < 0.001$) and a longer duration of untreated psychosis (OR = 1.33, $p = 0.007$). Patients under CTO were less likely to have a history of suicide attempt (OR = 0.90, $p = 0.029$). They had more frequently a past history of offending behavior (OR = 2.44, $p < 0.001$) and of substance use disorder (OR = 1.63, $p = 0.046$). While taken altogether, lower premorbid functioning (OR = 0.96, $p > 0.001$), fewer history of suicide attempt (OR = 0.27, $p = 0.001$) and higher past history of offending behavior (OR = 1.73, $p = 0.028$) remained the more discriminating characteristics of CTO occurrence with respect to pre-treatment variables.

Patients under CTO did not differ from other FEP patients with respect to their ethnicity, age at onset of psychosis, duration of prodromal phase, exposure to traumatic events, family history of schizophrenia and past history of psychiatric or personality disorders.

3.3. Baseline (service entry) and treatment variables

Baseline (service entry) and treatment variables are presented on Table 2. At service entry, patients under CTO differed from other FEP patients on almost all variables except age, proportion of patients who did not attained the age of majority and psychiatric comorbidities, SUD included. Patients under CTO had significantly more severe symptoms (OR = 2.37, CGI-S; $p < 0.001$), a lower global (OR = 0.93, $p < 0.001$) and vocational functioning (OR = 0.64, $p = 0.029$) and a lower level of insight (OR = 8.43, $p < 0.001$). When taken altogether a lower global functioning (OR = 0.97, $p = 0.042$) and lower level of insight (OR = 6.04, $p < 0.001$) remained the more discriminating characteristics of CTO occurrence with respect to baseline variables.

Their length of time in early intervention service was higher (OR = 1.01, $p < 0.001$). They were more likely to have been admitted to hospital (OR = 28.60, $p < 0.001$) and had a higher average number of admissions (OR = 1.71, $p = 0.027$). Non-compliance with treatment was higher in the CTO group (OR = 5.62, $p < 0.001$). During treatment,

patients under CTO were more likely to be using substance (OR = 3.11, $p < 0.001$).

At discharge, even after adjusting for time in service and level of insight at entry, patients under CTO showed a lower level of insight (OR = 4.29, $p < 0.001$). Similarly, the severity of symptoms in patients under CTO was greater even after adjusting for time in service and CGI-S at entry (OR = 1.63, $p < 0.001$). They were less likely to have favorable real-life outcomes such as global functioning (OR = 0.97, $p < 0.001$) and employment (OR = 0.35, $p < 0.001$). When taken altogether higher likelihood to have been admitted to hospital (OR = 9.82, $p = 0.004$), higher average number of admissions (OR = 1.273, $p = 0.011$), non-compliance with treatment (OR = 3.91, $p < 0.001$) and lower level of insight (OR = 2.36, $p = 0.027$) remained the more discriminating characteristics of CTO occurrence with respect to treatment variables.

Diagnoses at discharge are presented on Table 3. CTO occurrence and diagnostic were significantly associated (Cramer's V = 0.249, $p < 0.001$). Examination of the standardized residual suggested that patients under CTO were more likely to have a diagnostic of schizophrenia (60.6%) than other FEP patients (38.6%). They were also unlikely to have a diagnostic of schizophreniform disorder (3.9%) compared to other patients (22.1%). The number of patients who were lost to follow-up and the rate of suicide attempts did not differ between patients under CTO and other FEP patients.

4. Discussion

To the best of our knowledge, this is the first study exploring the use of CTOs among FEP patients. Our data analyses led to four main findings.

First, the percentage of patients who were under CTO at least once over the 18 months treatment period was relatively high. Indeed, the 19.2% rate that we observed in our sample contrasts with the significantly lower rates recorded over the same period by the Victorian Psychiatric Case Register where information about all psychiatric inpatient admissions in the public sector of the Australian state of Victoria (which represents 94% of all psychiatric hospitalizations) is collected. Based on this register, 14% of inpatient admissions resulted in a CTO in 1998, 12% in 1999 and 13% in 2000 (Burgess et al., 2006). The more frequent use of CTOs in our FEP sample may be linked to three elements. It

Table 1
Pre-treatment characteristics of patients with and without Community Treatment Order (CTO).

Variable		Total (n = 660)	Community Treatment Order		OR	95% CI of OR		p-Value
			Yes (n = 127)	No (n = 533)		LCI	UCI	
Pre-treatment variables								
Gender %Male	% (n)	65.8 (434)	74.0 (94)	63.8 (340)	1.62	1.05	2.50	0.030
Years in school	M (SD)	10.5 (1.5)	10.2 (1.4)	10.6 (1.5)	0.83	0.73	0.95	0.005
Born in Australia (% Yes)	% (n)	81.4 (537)	80.3 (102)	81.6 (435)	1.09	0.67	1.77	0.736
Region of birth								
Oceania (% Yes)	% (n)	83.7 (546)	83.1 (103)	83.9 (443)	Reference category			
Europe (% Yes)	% (n)	2.6 (17)	2.4 (3)	2.7 (14)	0.92	0.26	3.23	0.099
Africa and Middle East (% Yes)	% (n)	4.0 (26)	4.0 (5)	4.0 (21)	1.02	0.38	2.78	0.963
Asia (% Yes)	% (n)	9.7 (63)	10.5 (13)	9.5 (50)	1.12	0.59	2.14	0.735
Pre-morbid GAF	M (SD)	69.5(10.6)	65.7 (9.84)	70.3 (10.6)	0.96	0.94	0.98	<0.001
Duration of prodrome (in days) ^a	M (SD)	391.0 (570.4)	414.9 (482.0)	385.1 (590.5)	1.17	0.96	1.43	0.131
Duration of untreated psychosis (in days) ^a	M (SD)	255.2 (544.0)	356.6 (623.5)	230.8 (520.8)	1.33	1.08	1.64	0.007
Age at onset (years)	M (SD)	21.3 (3.6)	21.2 (3.6)	21.3 (3.6)	0.99	0.94	1.05	0.797
Exposure to traumatic event (% Yes)	% (n)	17.4 (114)	82.5 (104)	82.7 (439)	0.99	0.59	1.65	0.971
Physical assault (% Yes)	% (n)	26.0 (171)	27.8 (35)	25.6 (136)	0.90	0.58	1.38	0.619
Past history of suicide attempt (%Yes)	% (n)	14.3 (93)	8.0 (10)	15.8 (83)	0.46	0.23	0.92	0.029
Family history of schizophrenia	% (n)	23.5 (147)	26.4 (33)	22.8 (114)	1.22	0.78	1.90	0.396
Past history of offending behavior	% (n)	28.8 (186)	44.8 (56)	25.0 (130)	2.44	1.63	3.66	<0.001
Against person (sexual or violence)	% (n)	8.8 (58)	19.7 (25)	6.2 (33)	3.71	2.12	6.51	<0.001
Diagnostic history								
Psychiatric disorder (%Yes)	% (n)	47.4 (313)	40.2 (51)	49.2 (262)	0.69	0.47	1.03	0.069
Personality disorder (%Yes)	% (n)	7.0 (46)	7.1 (9)	6.9 (37)	0.98	0.46	2.08	0.954
Substance use disorder (SUD) (%Yes)	% (n)	74.1 (489)	81.1 (103)	72.4 (386)	1.63	1.01	2.65	0.046

Note. OR, odds ratio; CI, confidence interval; LCI, lower bounds of confidence interval; UCI, upper bounds of confidence interval.

^a Raw data are presented, however the test statistics were based on log10 (+ constant) transformed data because of extreme positive skewness.

Table 2

Baseline (service entry) and treatment characteristics of patients with and without Community Treatment Order (CTO).

Variable		Total (n = 660)	Community Treatment Order		OR	95% CI of OR		p-Value
			Yes (n = 127)	No (n = 533)		LCI	UCI	
Comorbidity at service entry								
Comorbid psychiatric disorder (%Yes)	% (n)	17.3 (114)	17.3 (22)	17.3 (22)	1.00	0.60	1.68	0.987
Comorbid Personality disorder (%Yes)	% (n)	42.1 (48)	40.9 (9)	42.4 (39)	0.94	0.37	2.42	0.899
Substance use disorder (SUD) (%Yes)	% (n)	61.4 (405)	68.5 (87)	59.7 (318)	1.47	0.97	2.22	0.067
Baseline variables								
Age at service entry	M (SD)	22.0 (3.4)	22.3 (3.6)	22.0 (3.4)	1.02	0.97	1.08	0.427
Patients under 18 (% Yes)	% (n)	13.2 (87)	10.2 (13)	13.9 (74)	0.71	0.38	1.32	0.277
Severity of symptoms at entry								
CGI-S severity score	M (SD)	5.5 (0.8)	5.9 (0.7)	5.4 (0.8)	2.37	1.80	3.13	<0.001
Functional level at entry								
Employment/occupation (%Yes)	% (n)	48.0 (316)	39.2 (49)	50.1 (267)	0.64	0.43	0.96	0.029
GAF	M (SD)	32.1 (9.8)	27.4 (8.6)	33.3 (9.7)	0.93	0.91	0.96	<0.001
Insight at entry (%No)	% (n)	62.5 (410)	91.3 (116)	55.6 (294)	8.43	4.44	16.01	<0.001
Treatment variables								
Length of time in service (in weeks)	M (SD)	63.4 (34.1)	74.6 (29.8)	60.7 (34.5)	1.013	1.01	1.02	<0.001
Admitted to hospital (%Yes) ^a	% (n)	73.8 (487)	98.4 (125)	67.9 (362)	28.60	6.98	117.24	<0.001
Number of admissions ^a	M (SD)	1.4 (1.5)	2.7 (1.8)	1.1 (1.3)	1.71	1.49	1.96	0.027
Non-compliance with treatment (%Yes) ^a	% (n)	60.7 (379)	86.5 (109)	54.2 (270)	5.62	3.26	9.71	<0.001
Lost to Follow-up (%Yes) ^a	% (n)	23.2 (153)	17.3 (22)	24.6 (131)	0.98	0.56	1.70	0.939
Substance use disorder (SUD) ^{a,b}								
No SUD	% (n)	34.7 (229)	26.0 (33)	36.8 (196)	Reference category			
Remitted SUD (decreased or stopped)	% (n)	40.2 (265)	35.4 (45)	41.3 (220)	1.26	0.76	2.07	0.368
Persistent SUD (increased or no change)	% (n)	25.2 (166)	38.6 (49)	22.0 (117)	3.11	1.85	5.24	<0.001
Suicide attempt in treatment (%Yes) ^a	% (n)	8.7 (57)	9.4 (12)	8.5 (45)	0.95	0.48	1.88	0.879
Insight at discharge (%No) ^c	% (n)	17.0 (111)	37.8 (48)	12.0 (63)	4.29	2.57	7.17	<0.001
Severity of symptoms at discharge								
CGI-S severity score ^d	M (SD)	3.0 (1.3)	3.6 (1.4)	2.8 (1.3)	1.63	1.38	1.92	<0.001
Functional level at discharge								
Employment/occupation (%Yes) ^e	% (n)	44.7 (255)	27.2 (31)	49.1 (224)	0.35	0.21	0.57	<0.001
GAF ^f	M (SD)	62.2 (14.6)	56.1 (13.6)	63.7 (14.5)	0.97	0.95	0.98	<0.001

Note. OR, odds ratio; CI, confidence interval; LCI, lower bounds of confidence interval; UCI, upper bounds of confidence interval.

^a Adjusted OR with time in service as covariate.^b Based on multinomial logistic regression with "no substance use" as the reference category for the dependent variable.^c Adjusted OR with covariates being time in service and Insight at entry.^d Adjusted OR with covariates being time in service and CGI-S at entry. Unadjusted means and standard deviations are reported.^e Adjusted OR with covariates being time in service and employment status at entry.^f Adjusted OR with covariates being time in service and GAF score at entry. Unadjusted means and standard deviations are reported.

may be related to clinicians' wish to minimize duration of inpatient stay, hospitalization being commonly considered as potentially deleterious in young patients with regards to social integration and promotion of engagement into treatment. It may also be related to insufficient staffing of outpatient services and lack of availability to really work in depth on engagement and provision of home based support of patients. Finally, CTOs may also have been used as a mean to minimize disengagement which is known to be frequent among FEP patients (Conus et al., 2010c; Garety and Rigg, 2001; Turner et al., 2007) and to correlate with poorer outcome (Garety et al., 2006). However, while this attitude may have seemed intuitively sound at the time of the study, more recent

data stemming from various randomized controlled trials show that CTOs have no significant impact regarding engagement in treatment when compared to voluntary ambulatory care (Burns et al., 2013b; Steadman et al., 2001; Swartz et al., 1999). Moreover, patients who experience the poorest outcome while on CTO are the younger patients who are in the early phase of their illness (Power, 1999). Considering our data stem from an observational study and not from a randomized controlled trial, it is impossible to know if this holds true in a FEP population. The observation that disengagement rate was similar whether patients were under CTO or not could suggest either the failure of this measure to prevent disengagement or its success to bring this rate

Table 3

Final diagnostic at discharge.

Variable		Total (n = 660)	Community Treatment Order		p-Value ^a	Effect size ^b
			Yes (n = 127)	No (n = 533)		
Final diagnostic ^a						
Schizophrenia	% (n)	42.9 (283)	60.6 (77)	38.6 (206)	<0.001	V = 0.249
Schizophreniform disorder	% (n)	18.6 (123)	3.9 (5)	22.1 (118)		
Schizoaffective disorder	% (n)	9.7 (64)	13.4 (17)	8.8 (47)		
Psychotic disorder NOS	% (n)	0.8 (5)	0.8 (1)	0.8 (4)		
Delusional disorder	% (n)	3.6 (24)	4.7 (6)	3.4 (18)		
Brief psychotic episode	% (n)	1.7 (11)	0.0 (0)	2.1 (11)		
Substance induced psychosis	% (n)	2.1 (14)	0.0 (0)	2.6 (14)		
Bipolar affective disorder	% (n)	17.9 (118)	15.7 (20)	18.4 (98)		
Major depression with psychotic features	% (n)	2.7 (18)	0.8 (1)	3.2 (17)		

Note. In bold, cells with significant standardized residual at the 0.05 level; NOS, not otherwise specified.

^a Based on Fisher Exact Test with Monte-Carlo estimation.^b Based on Cramer's V.

down in a group of patient patients would have been highly likely to interrupt treatment. More research in this specific population is therefore warranted.

The second finding is that the higher rate of history of offending behavior (especially sexual violence and violence against other people) that we observed among patients under CTO suggests that the perceived risk of harm to others was probably an important factor associated with the decision to use this intervention. This would however be in contradiction with Dawson who did not identify risk to others as a main reason to place people under CTO in Victoria (Dawson, 2005). On the other hand, the observation that the rate of suicide attempt in the past was lower among patients under CTO suggests that the decision of compulsory outpatient treatment is rarely taken on the basis of risk to harm oneself. Another explanation for this lower rate of suicide attempt among patients under CTO could be that, according the more complex clinical and social profile of this population, self-harm events were less reported before treatment.

Third, patients who were placed under CTO seemed to have a specific profile, with a lower pre-morbid level of functioning, shorter time in school, higher rate of history of substance abuse, higher illness severity and lower degree of insight at the beginning of treatment at EPPIC. This is in keeping with data from Brophy et al. (2006) who identified a specific cluster of patients placed under CTO, composed of young males suffering from schizophrenia, with a lower level of education and a high rate of history of substance use disorder. This shows that CTOs are used with patients who present many of the well-identified predictors of poor outcome in FEP patients.

Finally, patients who were under CTO during the treatment phase spent a longer time attending the early intervention program. While the observational nature of our study prevents definitive conclusions on this basis, this observation suggests various hypotheses. Considering the patients' profile mentioned above, CTOs seem to a certain extent to have allowed for some degree of prevention of disengagement. However, the higher rate of hospital admission in the CTO group suggests that this measure fails to prevent admissions in an important number of cases. The significantly poorer outcome of patients who were put on CTO compared to those who were not suggests this measure may have only limited benefits in terms of patients' improvement. It should however be reminded that CTO patients had a significantly worse profile at baseline and that the context of our study doesn't allow to exclude an even worse outcome if CTO had not been implemented.

Several limitations of this study should be mentioned. First, it is known that retrospective medical file audit studies have limitations; however, numerous strategies were applied in order to optimize the validity of data, as discussed in previous papers stemming from this same data base (Conus et al., 2007; Schimmelmman et al., 2005). On the other hand, the key benefit of cohort based file audits is that selection bias linked to informed consent procedures is avoided which allows to collect data on a highly representative sample of the patients. Second, data on CTOs was limited to its occurrence or not over the entire treatment period, and there was no information regarding the timing and the context of its implementation, its duration and the reasons for its interruption. Third, as mentioned above, the purely observational context of the study does not allow drawing any conclusion regarding the impact of this measure, which would be possible only in the context of a randomized controlled trial. Finally, this paper is based on data that relate to treatment provided close to 20 years ago. As such, it is likely not to represent the current situation at EPPIC regarding use of CTO. However, we felt that the nature of this study, based on one of the very few quasi epidemiological samples of first episode psychosis patients, and the lack of knowledge regarding CTO in early psychosis, justified its publication. The current situation at EPPIC regarding CTO may have greatly changed since then and interesting comparisons could be made with the more recent application of CTO in contemporary early intervention centres. Despite these limitations our study shows that frequency of use of CTOs may be relatively high in FEP samples and the data suggest it is

applied to patients who are considered to be at risk to harm others and who have a poorer clinical profile at baseline. While we could observe that patients under CTO remained in treatment for a longer time, the higher number of admissions they needed and the poorer outcome they displayed compared to non-CTO patients shed doubt on its efficacy in such patient populations. Considering that recent randomized controlled studies in populations of chronic patients did not find any benefit to this measure and taking into account the important restriction of freedom it implies, more studies, ideally in a randomized controlled setting, should be conducted, in order to see if the well-meant decision to apply a CTO in order to prevent disengagement in early psychosis treatment is justified by improvement in clinical and social outcomes. In the future, the impact of CTOs on disengagement should also be tested against non-coercive efficient interventions such as assertive community treatment (Lambert et al., 2010) or promising approaches such as shared decision making (Kreyenbuhl et al., 2009).

Contributors

M Lambert and P Conus designed the study and wrote the protocol. S Morandi managed the literature searches and analyses. P Golay and SM Cotton undertook the statistical analysis, and S Morandi and P Golay wrote the first draft of the manuscript. S Morandi, P Golay and P Conus revised the manuscript. All authors contributed to and have approved the final manuscript.

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Conflict of interest with respect to the study and manuscript

Prof. Dr. Martin Lambert: Data of the present paper were collected within a large outcome study in first-episode psychosis at the Early Psychosis Prevention and Intervention Centre (EPPIC) in Melbourne Australia. One part of the study was the comparison of Olanzapine and Risperidone in first-episode psychosis, which was financially supported by Eli Lilly Company Australia with 60,000 Australian Dollar for Prof. Dr. Martin Lambert as primary investigator of the study. Therefore, Eli Lilly Company did not directly sponsor the present paper.

All other authors declare that they have no conflicts of interest.

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