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Original article

A PRogram for detection, Intervention and Monitoring first-Episode Psychosis (PRIME-P): a spokes-hub-spokes model of the Department of Mental Health of Lecce Local Health Trust

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Conflict of interest
The Authors declare no conflict of interest.

Summary

Data show how it is essential, in prognostic terms, to set up adequate treatment for the psychosis onset. Several studies highlight that a longer duration of untreated psychosis (DUP) is associated with worse clinical and functional outcomes. In the last years, early intervention services have been implemented in various countries, also endorsed in Italy by the publication of national guidelines in 2007, and delivered through Community Mental Health Centers. In line with these recommendations, the Department of Mental Health (DMH) of Lecce, Italy, developed a program for detection, intervention and monitoring of first-episode psychosis (PRIME-P). The program is formed of two subprograms based on the service involved at the patient's first access, that is through the outpatient unit (otherwise referred to as Group SPRINT) or through the inpatient unit (otherwise referred to as Group STARTER). The quality of treatment for the first psychotic episode is guaranteed by continuous and structured training of the DMH staff and a shared pathway to care. The data collected in the first two years of the program (via both Groups SPRINT and STARTER - GSS, for a total of 137 subjects) were compared with a two-year retrospective sample, with similar characteristics, detected in the years 2011-2012 (Group AREP - GAREP, for a total of 95 subjects). Despite the homogeneity of the two groups in terms of main socio-demographic characteristics (sex, age, education, working condition), the results of our study show a significant reduction in the GSS group (22.63%; p = 0.011) in diagnoses of Psychotic Disorder not Otherwise Specified, when compared to the GAREP group (38.95%). In the GSS group we found a significantly lower DUP (GSS vs GAREP, 3.03 ± 2.98 *vs* 7, 83 ± 3.46). Although preliminary, those data show how continuous and structured training interventions can improve care practices, in terms of diagnostic adequacy as well as better ability to treat early psychosis.

Key words: early intervention services, first-episode psychosis, public mental health, spokes-hub-spokes model

Background

The diagnosis and treatment of psychotic disorders are complex processes, often conditioned not only by clinical or environmental aspects and their interrelation, but also by the activities that psychiatric services are able to provide [1]. A large number of recent studies highlights the decisive role of extra-clinical variables, connected to the timing and methods of the offer/use of services in relation to care needs, to the management and therefore to the outcome of the disorder [2]. The most relevant data show that in the great majority of cases, psychotic disorders come to treatment late in both instances of appearance of the first non-specific symptoms (Duration of Untreated Illness - DUI), and of full-blown psychotic onset (Duration of Untreated Psychosis - DUP), when symptoms are already evident and stabilized [3,4].

Some authors, analyzing the clinical trend and the functional relapses of the disorder, have described as *critical period*, the period of time that goes from the appearance of the first symptoms to the following 2-5 years [5]. After this period, the possibility that the interventions can lead to recovery, in terms of personal and social functioning, appears to be progressively reduced [6].

Therefore, the need for early interventions aimed at reducing the DUP appears crucial [7,8].

In light of this evidence, several specific programs for patients with a first-episode psychosis (FEP) have been activated over the last 30 years, initially in Australia and subsequently in the United Kingdom, Europe and North America [6,9].

Initially born as intervention models to facilitate the identification and care of young subjects with psychotic onset, over time they have generated a series of practices, with various degrees of structure, which can be grouped into three categories [10,11].

The first category, mainly present in the United Kingdom, United States, Australia, New Zealand and Scandinavia, concerns specific early intervention services (EIS), with a specialized team distinct from the one present in services aimed at adults [12].

This type offers indubitable advantages in psychiatric care, also in terms of reduction of disengagement from treatment, but it requires considerable resources; at the same time it may determine problems in the transition of patients towards generalist services [13,14].

The second category provides for a central specialized service (hub) that supports generalist centers (hub-and-spoke model) [15].

The third category refers to the generalist services' adoption of the principles of recognition, taking charge and early treatment of subjects suffering from psychosis through team training [10,11]. Less costly in terms of investment of resources [16], this category may, however, be less suitable for FEP patients who need adequate supervision and more specific treatments [11,17].

In 2007 the Italian National Institute of Health (Istituto Superiore di Sanità, ISS) [13], that is the Scientific and Technical Body of the National Health Service that develops and promotes health interventions on the national territory, issued a paper on recommendations of early interventions in schizophrenia, to be provided through generalist services, like community-based mental health centers (CMHCs) [13], further updated in 2009. Although those guidelines recommend socio-health policies that guarantee a more consistent and homogeneous financial support in the Regional Health Services, to launch those programs, the lack of dedicated budgets and psychiatry specialists often puts the generalist services in the impossibility of running these initiatives. In 2013 the National Plan for Action in Mental Health (Ministry of Health, 2013) listed early interventions for psychosis as a priority target [18].

In an attempt to ensure an early treatment for young patients with psychotic disorders in an iso-resource condition, in 2012 the Department of Mental Health (DMH) of Lecce Local Health Trust (LHT) decided to implement a circular model defined Spokes-Hub-Spokes Model, aimed at improving the treatment delivered by outpatient (CMHCs; CePsIA: Centro di Psichiatria e psicoterapia per l'Infanzia e l'Adolescenza, an outpatient stand-alone centre for psychiatric and psychological disorder in childhood and adolescence; Child Neuropsychiatry Services, CNPs) and inpatient (General Hospital Psychiatric Wards - GHPWs) services (the *spokes*) through specific training, research and provision of dedicated interventions, supported by the Training and Research Center (Centro Formazione e Ricerca, CFR) of the DMH (the *hub*).

The aim of the CFR was not only to transfer information based on top-down approach, but also to elaborate interpretative models and design concrete solutions starting from the evaluation of problems emerging during the programmatic meetings with the teams of generalist centers' (spokes') teams based on a bottom-up approach. This model is the basis of the Program of Detection, Intervention and Monitoring for First-Episode Psychosis (PRIME-P).

In this report we will present the results of this first four years of the program.

Materials and methods

The Department of Mental Health of Lecce Local Health Trust (LHT)

The DMH of Lecce Local Health Trust (LHT) consist of a management direction, some staff services including the Training and Research Center (CFR), ten CMHCs, four CNPs, a centre for youth (CePsIA), four General Hospital Psychiatric Wards (GHPWs), an Eating Disorder Unit, a Prison Mental Health Unit. Lecce DMH covers a catchment area of 2,759 km^2 for a population of 800,000 inhabitants.

PRIME-P of Lecce DMH: resources and costs

The PRIME-P provides for the continuous commitment of the staff of the CFR team through regular meetings with the psychiatric services teams (CMHCs, GHPWs CNPs and CePsIA), doctors, psychologists, nurses, psychiatric rehabilitation technicians and social workers, which are set to take place on a quarterly basis. The frequency of meetings could vary according to the needs of the services.

The PRIME-P doesn't require additional resources, except for the budget already foreseen for the training of the teams and research. The package of care for FEP provided by CMHCs and other outpatients services includes pharmacological treatment, psychoeducation and cognitive-behavioral psychotherapy, family psychoeducation and support, social-skill training, cognitive remediation, vocational rehabilitation or supported education.

In 2012, the first step was to carry out a retrospective analysis of the interventions performed for patients with FEP who came into contact for the first time with the DMH services, in the previous two years (Analisi Retrospettiva Esordi Psicotici - AREP: First-Episode Psychosis Retrospective Analysis), with the view to assess the state of the art and related critical issues [19].

After the 2013 analysis of those data, 2 subprograms for patients with FEP were launched, differentiated on the basis of the type of service (outpatient *vs* inpatient service) that accepted such patients for the first time. Those sub-programs, although characterized by different steps that reflect the different specificities of the involved agencies, are inspired by the recommendations provided by the ISS about FEP [13].

The PRIME-P was approved by the Ethics Committee and by the General Management of the Lecce LHT, with Resolution No. 150 of 28 January 2019.

The SPRINT and STARTER programs

The 2 subprograms were identified with the acronyms of SPRINT (Schizofrenia Primo episodio e Riabilitazione Intensiva Nel Territorio: FEP and Intensive Outpatient Rehabilitation), and STARTER (SPDC nel Trattamento dell'Acuzie e invio alla Rete Territoriale degli EsoRdi: GHPWs in the Treatment of Urgency and patient's engagement by outpatient services). Started at the DMH of Lecce LHT in 2013 and still in course, their outcomes include:

1. optimize the detection and early psychiatric care of patients with FEP;
2. reduce the variability between clinicians in initial assessment and patient treatment;
3. provide more appropriate and evidence-based interventions even in a public generalist service;
4. monitor the effectiveness of the interventions delivered through a periodic follow-up, with psychiatric evaluations and periodic reviews of drug therapy for at least 5 years after the inclusion in the program (at 6, 12, 24, 36, 48, 60 months, or up to interruption/termination of treatment);
5. reduce the disengagement rate through the achievement of the first two points and the implementation of the continuous training of the teams involved.

The inclusion criteria for early intervention program are: a) patient with psychotic symptoms (delusions, hallucinations, disorganized thinking and disorganized behavior); b) age ≤ 35 years; c) first contact with the psychiatric services of the Lecce DMH; d) onset of psychotic symptoms ≤ 5 years; d) resident in Lecce Province. The exclusion criteria are represented by: a) organic mental disorder; b) medication-induced psychotic disorder or psychotic disorder due to general medical condition; c) moderate to severe intellectual disability.

In order to standardize and easily retrieve the information, every referral team collects data, since 2013, using the same computerized form (Scheda Unica per gli Esordi, SUE), which contains demographic, clinical and treatment data, and the results of administered rating scales, about clinical and psychosocial features.

Patients and family members give an informed consent for the use of the data for research purposes.

Comparison between ARES and the SPRINT and STARTER programs

In order to assess the ability of the PRIME-P to reach the outcome, data from 2-year retrospective analysis (AREP Group: GAREP) were compared with new cases included in the first two years of the program (SPRINT and STARTER Group - GSS, Fig. 1).

In the first group (GAREP), formed by 120 subjects surveyed by 2-year retrospective analysis, only 95 subjects met the inclusion and exclusion criteria.

From 2013 to 2015, 151 new cases were included in the SPRINT and STARTER sub-programs (GSS), and 137 subjects met the inclusion and exclusion criteria.

Statistical analysis

The two groups (GSS vs GAREP) were preliminarily compared on the basis of the socio-demographic characteristics detected at the baseline (age, sex, education level, type of occupation) using the χ^2 (non-parametric test) for the nominal variables (age, sex, marital status, occupation) and for the continuous variables (age) one-way ANOVA.

In order to evaluate the effectiveness of the PRIME-P model in terms of diagnostic accuracy, the two groups (GSS vs GAREP) were compared with respect to the diagnoses, according to the criteria of DSM-5: Schizophrenia spectrum disorders, Bipolar spectrum disorders. A third optional category was identified for subjects whose clinical characteristics can't be classified according a specific diagnostic category (Psychotic Disorder not Otherwise Specified). The comparison was made by χ^2 using the Yates correction.
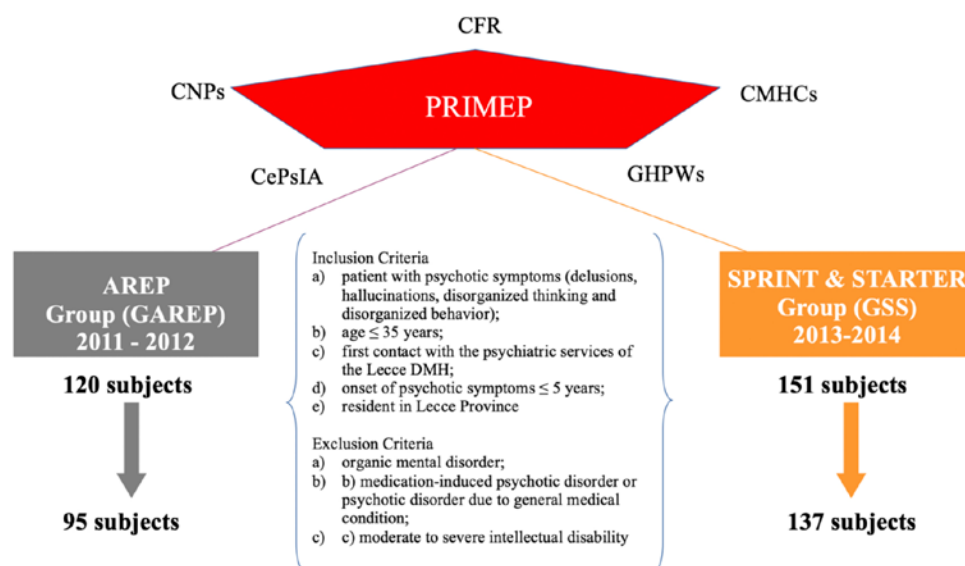
Figure 1. PRIME-P Lecce DMH.

The two groups were compared with respect to the duration of untreated disease (DUP) by one-way ANOVA and the presence in comorbid use of substances (cannabis, cocaine, heroin, amphetamine) and/or alcohol (χ^2 by Yates correction).

The appropriacy of interventions was also assessed analyzing the prescribing characteristics in both groups. Specifically, the use of first (FGAs) and second generation (SGAs) antipsychotics both in mono and in polytherapy (combination with drugs of other classes) was evaluated; the use of long-acting antipsychotics (AP LAI); the use of other classes of drugs (antidepressants, mood stabilizers, benzodiazepines). Differences between the two study groups (GSS vs GAREP) were evaluated χ^2 using the Yates correction.

Statistical analysis was conducted with Stat software.

Results

The analysis of the socio-demographic characteristics showed a lower average age, although not statistically significant, in the subjects of GSS group compared to GAREP group (23.50 ± 3.96 vs 24.42 ± 3.90). In both groups, most of the subjects were male; in GSS group this variable constituted 74.45% of the sample (M = 102), while in GAREP group 62.10% of sample (M = 59). The percentage of subjects who presented a stable relationship (marriage cohabitation) was around 10% both in the GSS group (8.76%) and in the GAREP group (12.63%), with no statistically significant differences (0.462). There were no differences in activity/study levels between the two groups (Tab. I). The assessment of familiarity for mental disorders (also considering first degree relatives) did not show statistically significant differences between the two groups (GSS = 49; GAREP = 39) (Tab. I).

The evaluation of the diagnoses highlighted a statistically significant equivalence between GSS and GAREP for both non-affective (61.32 vs 48.42%) and affective psychotic disorders (16.05 vs 12.63%). In GSS group (22.63%) we found a significant reduction (p = 0.011) in the diagnosis of Psychotic Disorder not Otherwise Specified, compared to the GAREP group (38.95%) (Tab. II).

Table I. Socio-demographic characteristics in the two study groups at baseline (GSS vs GAREP).

Socio-demographic variable		GSS (137)	GAREP (95)	P [a]
Age (mean ± SD)		23.50 ± 3.96	24.42 ± 3.90	0.083
Gender, M/F, n (%)		102/35 (74.45/25.55)	59/36 (62.10/37.90)	0.062
Marital status	Single	125 (91.24)	83 (87.37)	0.463
	Married/cohabiting	12 (8.76)	12 (12.63)	
Activity/study	Student	31 (22.63)	29 (30.52)	0.230
	Employed	22 (16.06)	12 (12.63)	0.591
	Unemployed	84 (61.31)	54 (56.85)	0.584
Family history of mental disorders		49 (35.76)	39 (41.05)	0.497

[a]: χ^2 by Yates correction.

Table II. Clinical characteristics of the two study groups (GSS *vs* GAREP).

Clinical variable	GSS (137)	GAREP (95)	P a,b
Diagnosis			
Schizophrenia spectrum disorder, n (%)	84 (61.32)	46 (48.42)	0.070 [a]
Bipolar spectrum disorders, n (%)	22 (16.05)	12 (12.63)	0.591 [a]
Diagnosis of Psychotic Disorder not Otherwise Specified, n (%)	31 (22.63)	37 (38.95)	0.011 [a]
DUP, medium (SD)	3.03 (2.98)	7.83 (3.46)	0.001 [b]
Substance/Alcohol use, n (%)	71 (51.82)	61 (64.21)	0.082 [a]

[a]: χ^2 by Yates correction; [b]: one-way ANOVA.

Table III. Comparison of drug treatment in the two groups.

	GSS (137)	GAREP (95)	P a
Psychopharmacological treatment, n (%)	134 (97.81)	92 (96.80)	0.971
Antipsychotic treatment, n (%)	128 (95.52)	85 (92.40)	0.482
Antipsychotics in monotherapy, n (%)	70 (52.23)	34 (36.95)	0.050
FGAs/SGAs in monotherapy, n (%)	11/59 (15.71/84.29%)	21/13 (61.76/38.24%)	0.001
Antidepressants, n (%)	20 (14.93)	35 (38.04)	0.001
Mood stabilizers, n (%)	47 (35.07)	30 (32.60)	0.809

[a]: χ^2 by Yates correction.

Duration of Untreated Psychosis (DUP) was significantly lower in GSS group (3.03 ± 2.98) than in GAREP group (7.83 ± 3.46) (Tab. II).

In both groups, more than 50% of subjects had comorbid use of alcohol and/or substances, with higher percentage values in GAREP group (64.21%) than in GSS group (51.82%), although not statistically significant (p = 0.082) (Tab. II).

In both groups, almost all of the sample received a prescription of a psychopharmacological treatment (GSS *vs* GAREP; 97.81 *vs* 96.80%), mostly antipsychotic drugs (95.52 *vs* 92.40%), without statistically significant differences between the two groups (p < 0.05) (Tab. III). Significantly (p = 0.050) higher use of antipsychotics in monotherapy (52.23%) was found in GSS group than in GAREP group (36.95%), with a significant inversion, over time, in the ratio between first generation and second generation drugs (FGAs/SGAs) (15.71/84.29 *vs* 61.76/38.24%) (Tab. III).

The treatment with antidepressants was significantly lower in GSS group (14.93%) than in GAREP group (38.04%). There were no statistically significant differences in the use of mood stabilizers (35.07 *vs* 32.60%) (Tab. III).

Conclusions

This study establishes the feasibility and opportunity of early intervention programs in terms of greater ability to detect patients with FEP, compared to generalist interventions, with a lower average age and a significantly lower DUP in the sample recruited during the PRIME-P program (3.03 ± 2.98) compared to the 2-year retrospective sample (AREP: 7.83 ± 3.46). In our experience, this better detection capacity was associated to a more appropriate diagnosis; we found a significant reduction in diagnoses of Psychotic Disorder not Otherwise Specified in PRIME-P program (22,63% of the sample) compared to AREP (38.95% of the sample). This finding is related to a greater appropriacy of therapeutic interventions, such as an increase in monotherapy antipsychotic treatment, in particular with second generation drugs. The homogeneity of the sample of two groups, with respect to socio-demographic characteristics at the baseline, contributes to corroborate those initial findings, without excessive confounding factors.

Other emerging features of the sample, resulting from a comprehensive clinical, cognitive and functional assessment, or data related to treatment adherence, are not reported in this report, as they are not available for the retrospective group (GAREP); this call for a further analysis.

The shortage of collected assessment, as well as the lack of an adequate follow-up in the retrospective group (GAREP) did not allow to verify the impact of the PRIME-P in terms of reduction of the patients who dropped out from services, thus making its evaluation partial.

Despite those limitations, our report demonstrates how the investment in widespread training of operators through structured programs for early psychosis, like other interventions that involve the implementation of specialized teams, lead to a significant improvement in diagnostic-therapeutic pathways to care in public settings, with few or no additional resources.

The PRIME-P is successful and until today we have more than 400 new patients accepting the treatment,

Figure 2. A campaign against stigma in mental health, Lecce, Italy #IamStigmaFreeLecce.

also thanks to social media, campaigns against stigma (Fig. 2), education activity for student and citizens, started to advertise about the existence of a free program of early intervention in CMHCs and outpatient services of Lecce area [20].

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