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Psychiatric morbidity, functioning and quality of life in young people at clinical high risk for psychosis ☆

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ABSTRACT

Objective: Recent studies suggest that psychotic-like experiences may also act as markers for non-psychotic psychiatric disorders, which may indicate that the focus of research in individuals at high risk (HR) for psychosis needs updating. In this study we thoroughly examined the clinical and functional characteristics of a consecutive cohort of young people at HR for psychosis and compared them to a matched sample of healthy volunteers.

Method: Between February 2010 and September 2012 60 help-seeking HR individuals, aged 16–35, were recruited from CAMEO Early Intervention in Psychosis Service, Cambridgeshire, UK. Forty-five age- and gender-matched healthy volunteers were randomly recruited from the same geographical area. Sociodemographic, psychiatric morbidity, functioning and quality of life measures were compared between both groups.

Results: HR individuals suffered a wide range of DSM-IV psychiatric disorders, mainly within the affective and anxiety diagnostic spectra. In comparison to healthy volunteers, young people at HR reported more suicidal ideation/intention, depressive and anxiety symptoms and presented with remarkably poor functioning and quality of life.

Conclusion: The presence of co-morbid moderate or severe depressive and anxiety symptoms was common in our sample of young people at enhanced risk for psychosis. A HR mental state may be associated not only with an increased risk for psychosis, but also other psychiatric disorders. Our findings may have implications for the future implementation of therapeutic interventions that this population could benefit from.

1. Introduction

There has been a decline in transition rates into psychosis in cohorts of individuals at high risk (HR) of developing psychosis across different centres worldwide, over the last few years (Yung et al., 2007). Different psychological and pharmacological interventions have not significantly reduced transitions in recent randomised controlled trials (McGorry et al., 2012; Morrison et al., 2012). This may suggest that the focus of research in this population group needs updating.

Growing evidence is indicating that psychosis may lie on a continuum, with mild psychotic symptoms or psychotic-like experiences at one end and schizophrenia and related psychotic disorders at the other (Kendler et al., 1996; van Os et al., 2001; Dhossche et al., 2002; Johns et al., 2004; van Os et al., 2009). Recent studies including population-based samples also suggest that nearly 80% of the adolescents who report psychotic-like symptoms may have at least one other psychiatric disorder (Kelleher et al., 2012a, 2012b). Furthermore, co-presence of psychotic symptoms in adolescents and young adults with disorders of anxiety and depression appears to be more prevalent than previously considered, and an etiological and functionally relevant feature (Wigman et al., 2012).

Psychotic experiences may also act as markers for non-psychotic psychiatric disorders in individuals at clinical HR for psychosis. Fusar-Poli et al. (2012) found that 73% of the HR individuals recruited

Abbreviations: BAI, Beck Anxiety Inventory; BDI-II, Beck Depression Inventory, Version II; BLIPS, Brief Limited Intermittent Psychotic Symptoms; CAARMS, Comprehensive Assessment of At-Risk-Mental-States; FEP, First-Episode Psychosis; GAF, Global Assessment of Functioning; HR, High Risk; MANSA, Manchester Short Assessment of Quality of Life; MINI, Mini International Neuropsychiatric Interview; PAF, Postcode Address File; PANSS, Positive and Negative Syndrome Scale; YBOCS, Yale-Brown Obsessive Compulsive Symptoms Scale; YMRS, Young Mania Rating Scale.

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to their study (n = 509) had at least one Axis I comorbid diagnosis, with major depression as predominant diagnosis, followed by anxiety disorders. Similarly, Salokangas et al. (2012) identified comorbid psychiatric disorders in almost 80% of their HR sample (n = 245).

It is therefore important to thoroughly understand the type and severity of psychopathology in people at HR for psychosis in order to develop specific care pathways and interventions that this group could likely benefit from. To achieve this goal, comparisons with healthy volunteers to evaluate the overall psychiatric morbidity and subsequent impact on quality of life and functioning in HR individuals are highly recommended. It is noteworthy that these comparisons are still very limited in the current scientific literature, with only a handful of studies assessing the real impact of HR mental states on functioning and quality of life (Velthorst et al., 2010; Granö et al., 2011; Fusar-Poli et al., 2012).

The aims of this study were to further delineate the clinical manifestations of young people at HR for psychosis at the time of their referral to mental health services and evaluate their level of global functioning, occupational status and quality of life in comparison to a sample of healthy volunteers recruited from the same geographical area.

2. Methods

We compared demographic, psychiatric morbidity, functioning and quality of life measures between help-seeking HR individuals and healthy volunteers recruited from Cambridgeshire, UK.

2.1. Setting

CAMEO (http://www.cameo.nhs.uk) is an early intervention service in psychosis which offers management for people aged 14–35 years suffering from first-episode psychosis (FEP) in Cambridgeshire, UK. CAMEO also accepts referrals of people at HR aged 16–35. Referrals are accepted from multiple sources including general practitioners, other mental health services, school and college counsellors, relatives and self-referrals (Cheng et al., 2011).

2.2. Sample

A consecutive cohort of 60 help-seeking individuals, aged 16–35, referred to CAMEO Early Intervention in Psychosis Service from February 2010 to September 2012 met criteria for HR, according to the Comprehensive Assessment of At Risk Mental States (CAARMS) (Yung et al., 2005). From this assessment, HR individuals were divided into three groups based on whether they were mainly characterised by: i) vulnerability traits (family history of psychosis in first degree relative plus significant drop in functioning levels within past 12 months), ii) attenuated psychotic symptoms, or iii) brief limited intermittent psychotic symptoms (BLIPS). In our sample, all individuals fulfilled criteria for the attenuated psychotic symptoms' group. Seven individuals (11.7%) also qualified for the vulnerability traits' group. Intake exclusion criteria included: i) acute intoxication or withdrawal associated with drug or alcohol abuse or any delirium, ii) confirmed intellectual disability (Wechsler Adult Intelligence Scale — tested IQ <70), or iii) prior total treatment with antipsychotics for more than one week.

During the same period (February 2010–September 2012), a random sample of 45 healthy volunteers was recruited by post, using the Postcode Address File (PAF®) provided by Royal Mail, UK. Healthy volunteers interested in the study could only participate if they were aged 16–35, resided in the same geographical area as HR participants (Cambridgeshire), and did not have previous contact with mental health services. They were recruited for the exclusive purpose of this research.

2.3. Ethical approval

Ethical approval was granted by the Cambridgeshire East Research Ethics Committee.

2.4. Measures

All participants were assessed with sociodemographic (age, gender, ethnicity, education level, marital status, and living accommodation), psychiatric morbidity, functioning and quality of life measures at the time of their referral to CAMEO. The assessments were carried out by senior research clinicians trained in each of the measurement tools. HR participants were also interviewed by senior trained psychiatrists working in CAMEO, using the Mini International Neuropsychiatric Interview (MINI), Version 6.0.0, a brief structured diagnostic interview for DSM-IV Axis I psychiatric disorders (Sheehan et al., 1998).

The Positive and Negative Syndrome Scale (PANSS) for psychotic symptoms was employed to capture the severity of positive symptoms (7 items), negative symptoms (7 items) and general psychopathology (16 items) in a 7-point scale, with higher scores indicating greater severity of illness (Kay et al., 1987). Summary score and sub-domain scores of positive, negative and general psychopathology symptoms were computed.

The Beck Depression Inventory Version II (BDI-II) (Beck et al., 1996) and the Beck Anxiety Inventory (BAI) (Beck et al., 1988) were used to assess depressive and anxiety symptoms respectively. The BDI-II is a widely used self-complete instrument to assess depressive symptom severity in the past two weeks. It consists of 21 items rated on a 4-point scale from absent (0), mild (1), moderate (2) to severe (3). In addition to item scores, a composite score (range 0–63 points) was calculated by summing individual items in the BDI-II. The composite score was used to further divide participants into 4 groups in which scores of 0–13 indicates minimally depressed, 14–19 mildly depressed, 20–28 moderately depressed and 29–63 severely depressed (Dolle et al., 2012). For the purpose of this study, the BDI-II item 9 on current suicidal thoughts or wishes was used to categorize subjects into absent (scoring 0) or present (scoring 1–3) suicidal ideation. Likewise, the BAI is a 21-item self-complete measure of anxiety symptoms also rated on a 4-point scale, from 0 indicating absent to 3 indicating severe. Individual item scores and composite score (range 0–63) were computed. Participants were further divided into 4 groups according to their BAI composite score: scores of 0–7 indicates minimal anxiety, 8–14 mild anxiety, 16–25 moderate anxiety, and 26–63 severe anxiety (Beck and Steer, 1993).

Manic symptoms were assessed using the Young Mania Rating Scale (YMRS) (Young et al, 1978). The scale has 11 items — while 7 items on elevated mood, increased motor activity–energy, sexual interest, sleep, language–thought disorder, appearance and insight were rated from 0 (absence) to 4 (severe), the remaining 4 items on irritability, speech, content and disruptive–aggressive behaviour were rated from 0 (absent) to 8 (severe). A summary score of all the items of the YMRS was calculated (range 0–60).

The Yale–Brown Obsessive Compulsive Symptom Checklist and Severity Scales (YBOCS) (Goodman et al., 1989) were used to examine the presence and severity of obsessions and compulsions. The proportion of subjects having obsessions and/or compulsions in each group was calculated. For those who had at least one obsession and/or compulsion, the mean total severity scores were also generated.

The Global Assessment of Functioning (GAF) is a commonly used functioning scale in psychiatric research (Hall, 1995). The GAF assesses global functioning in the past month. Both symptoms and disability dimensions were assessed using an impression score of 1 to 100, with 10 points separating each level (Endicott et al., 1976), and lower scores representing higher severity of symptoms and poorer level of functioning respectively. Occupational status was also recorded.

Quality of life was assessed using the Manchester Short Assessment of Quality of Life (MANSA) (Priebe et al., 1999). The subjective and objective dimensions of quality of life were captured. For the purpose of this study, the subjective dimension comprising of the following domains was analysed: life in general, health, work and education, finance, leisure, safety, living situation, social and family relations. Each item is rated from 1 (worst) to 7 (best possible satisfaction). The overall mean subjective quality of life score was computed by averaging all the items in the subjective dimension (Eklund, 2009).

2.5. Statistical analysis

All analyses were performed using version 20 of SPSS (SPSS, Inc., Chicago, Illinois). We compared sociodemographic information between HR individuals and healthy volunteers. Clinical morbidity measures including PANSS, BDI-II, BAI, YMRS and YBOCS, functioning measures including GAF and occupational status, as well as subjective quality of life measured by MANSA were further compared between the two groups. All comparisons were made using chi-square test or Fisher's exact test for categorical variables and *t*-test or Mann–Whitney *U* test for continuous variables. A p-value of less than 0.05 represents a significant difference.

3. Results

3.1. Sociodemographic profile

The whole study population had a mean age of 20.7 years (SD = 3.4). Gender was nearly evenly split between male (n = 55; 52.4%) and female (n = 50; 47.6%). Table 1 compares the basic demographics between HR individuals and healthy volunteers. Both groups did not differ in age, gender, ethnicity and current accommodation type. Less HR individuals achieved higher education degrees (p = 0.001) compared to healthy volunteers, and more HR individuals were single (p = 0.033). A significant proportion of HR individuals were on antidepressant or/and anxiolytic medication (41.7%) at the time of their first contact with CAMEO.

Table 1
Sociodemographic comparison between HR individuals and healthy volunteers.

Sociodemographic characteristics[†]	HR (n = 60)	HV (n = 45)	p-Value
Age at study entry, years, mean (SD)	20.2 (2.9)	21.4 (3.9)	0.088[a]
Gender, male, n (%)	31 (51.7)	24 (53.3)	0.866[b]
Ethnicity, n (%)[‡]			
White	56 (93.3)	41 (91.1)	0.722[c]
Mixed	2 (3.3)	3 (6.7)	0.649[c]
Asian	1 (1.7)	1 (2.2)	1.000[c]
Black	1 (1.7)	0 (0)	1.000[c]
Education level, n (%) (9)			
Primary	5 (9.8)	0 (0)	0.058[c]
Secondary	26 (51.0)	10 (22.7)	0.006[c]
Further[§]	17 (33.3)	20 (45.5)	0.298[c]
Higher	3 (5.9)	15 (31.8)	0.001[c]
Marital status, n (%) (7)			
Single	48 (90.6)	33 (73.3)	0.033[c]
Married/co-habiting	5 (9.4)	11 (24.4)	0.057[c]
Divorced/dissolved	0 (0)	1 (2.2)	0.459[c]
Current accommodation type, n (%) (6)			
Detached house	13 (24.1)	15 (33.3)	0.372[c]
Semi-detached house	18 (33.3)	10 (22.2)	0.266[c]
Terraced house	12 (22.2)	12 (26.7)	0.644[c]
Flat	4 (7.4)	7 (15.6)	0.219[c]
Bedsit/studio	1 (1.9)	0 (0)	1.000[c]
Communal establishment	6 (11.1)	1 (2.2)	0.123[c]
Current psychiatric medication, n (%)	25 (41.7)	0 (0)	<0.00[b]
Current psychiatric medication type, n (%)[*]			
Antipsychotics	0 (0)	0 (0)	–
Antidepressants	24 (38.3)	0 (0)	<0.001[c]
Anxiolytics	2 (1.7)	0 (0)	0.505[c]
Both antidepressants and anxiolytics	1 (1.7)	0 (0)	1.000[c]

HR = high risk; HV = healthy volunteers; SD = standard deviation; n = number.
[†]Number of missing observations in brackets.
[‡]'White ethnicity' refers to subjects who are White British, White Irish, or other White backgrounds. 'Mixed ethnicity' refers to those who are White and Black Caribbean, mixed White and Black African, mixed White and Asian, or any other mixed backgrounds. 'Asian ethnicity' refers to those who are Indian or Chinese. 'Black ethnicity' refers to subject from any Black backgrounds.
[§]UK National Vocational Qualifications (NVQs) or A-Levels.
[*]Multiple answers were allowed for those who had any psychiatric medication taken during study entry.
[a] Independent *t*-test.
[b] Chi-square test.
[c] Fisher's exact test.

3.2. Psychiatric morbidity

We obtained MINI DSM-IV diagnoses for 55 of the 60 HR individuals. 38 (69.1%) had more than one DSM-IV psychiatric diagnosis, mainly within the affective and anxiety diagnostic spectra. Primary diagnoses for this group were ranked as follows: major depressive episode, current or recurrent (n = 26; 47.3%) > social phobia (n = 7; 12.7%) = generalised anxiety disorder (n = 7; 12.7%) > obsessive compulsive disorder (n = 5; 9.1%) > bipolar disorder, type II (n = 2; 3.6%) > panic disorder (n = 1; 1.8%) = posttraumatic stress disorder (n = 1; 1.8%). Six HR individuals (10.9%) did not fulfil enough criteria for a DSM-IV Axis I diagnosis.

Table 2 shows that HR individuals had higher scores (i.e., greater symptom severity) in total PANSS and all its sub-domains, including positive, negative and general psychopathology symptoms compared with healthy volunteers (all with p < 0.001). However, all scores suggested a "mildly ill" group with regard to psychotic symptoms (Leucht et al., 2005).

HR individuals also had a higher total BDI-II score (i.e., more depressed) than controls (29.9 ± 12.8 vs. 5.6 ± 5.5, p < 0.001). This difference was significant in all items. We further divided participants into 4 groups according to their total scores in BDI-II. HR individuals were significantly more likely to be severely or moderately depressed (54.0% vs. 0%, p < 0.001 and 20.0% vs. 4.5%, p = 0.025, respectively). We tested if HR individuals who were currently on antidepressants (n = 24) had a higher baseline BDI-II score than those who were not on antidepressants (n = 36). However, no difference on the means of BDI-II sum scores was observed between the two groups (32.7 ± 12.4 vs. 27.8 ± 13.0, p = 0.184). HR individuals had a 72.0% endorsement in suicidal thoughts or intention, as measured with item 9 of BDI-II, whereas only 9.1% of healthy volunteers had positive response in this item (p < 0.001).

Similarly, BAI scores showed that HR individuals had more anxiety symptoms (28.2 ± 11.9 vs. 6.7 ± 5.6, p < 0.001). Indeed, 41 HR individuals (85.4%) suffered moderate or severe anxiety symptoms.

Although HR individuals had a significant higher YMRS score than healthy volunteers (p < 0.001), the mean score was 3.9 (SD = 4.1), suggesting subclinical severity.

Approximately 80% of HR individuals had experienced at least one obsessive symptom. Among those who had any obsession or compulsion, the mean of YBOCS total severity score was significantly higher in HR individuals than healthy volunteers (20.1 ± 5.8 vs. 5.3 ± 1.5, p < 0.001), suggesting moderate and subclinical severity respectively.

3.3. Transitions from HR to FEP

After more than one year of follow-up for each individual at HR in our sample, only 6 (10%) made a transition into FEP. We obtained MINI DSM-IV diagnoses at baseline for 5 of them. 4 had an initial diagnosis of major depression, current or recurrent, and one did not fulfil enough criteria for a DSM-IV mental disorder. None of the HR individuals from this cohort received antipsychotics during the follow-up

Table 2
Clinical comparison between HR individuals and healthy volunteers.

Clinical characteristics[†]	HR (n = 60)	HV (n = 45)	p-Value
PANSS, mean (SD) (6)			
Positive	13.1 (3.2)	7.1 (0.5)	<0.001[a]
Negative	12.4 (5.0)	7.8 (0.9)	<0.001[a]
General psychopathology	32.7 (7.0)	16.3 (1.3)	<0.001[a]
Sum of all items	58.2 (12.1)	31.3 (1.9)	<0.001[a]
BDI-II (11)			
Sum of all items, mean (SD)	29.9 (12.8)	5.6 (5.5)	<0.001[a]
Suicidality (score 1–3), n (%)	36 (72.0)	4 (9.1)	<0.001[b]
Depression subgroup, n (%)			<0.001[b]
Minimal (score 0–13)	5 (10.0)	39 (88.6)	<0.001[b]
Mild (score 14–19)	8 (16.0)	3 (6.8)	0.167[b]
Moderate (score 20–28)	10 (20.0)	2 (4.5)	0.025[b]
Severe (score 29–63)	27 (54.0)	0 (0)	<0.001[b]
BAI (15)			
Sum of all items, mean (SD)	28.2 (11.9)	6.7 (5.6)	<0.001[a]
Anxiety subgroup, n (%)			<0.001[b]
Minimal (score 0–7)	2 (4.2)	29 (67.4)	<0.001[b]
Mild (score 8–15)	5 (10.4)	9 (20.9)	0.165[b]
Moderate (score 16–25)	12 (25.0)	5 (11.6)	0.102[b]
Severe (score 26–63)	29 (60.4)	0 (0)	<0.001[b]
YMRS (7)			
Sum of all items, mean (SD)	3.9 (4.1)	0.5 (1.2)	0.001[a]
YBOCS (13)			
Having obsession, n (%)	37 (77.1)	2 (4.5)	<0.001[b]
Having compulsion, n (%)	34 (70.8)	1 (2.3)	<0.001[b]
Sum of all items, mean (SD)	20.1 (5.8)	5.3 (1.5)	<0.001[a]
Severity subgroups, n (%)			<0.001[b]
Subclinical (score 0–7)	2 (5.4)	3 (100)	0.001[c]
Mild (score 8–15)	5 (13.5)	0 (0)	0.001[c]
Moderate (score 16–23)	20 (54.1)	0 (0)	0.231[c]
Severe (score 24–31)	9 (24.3)	0 (0)	1.000[c]
Extreme (score 32–40)	1 (2.7)	0 (0)	1.000[c]

HR = high risk; HV = healthy controls; SD = standard deviation; n = number; PANSS = Positive and Negative Syndrome Scale, BDI-II = Beck Depression Inventory, Version II, BAI = Beck Anxiety Inventory, YMRS = Young Mania Rating Scale, YBOCS = Yale-Brown Obsessive Compulsive Scale.
[†]Number of missing observations in brackets.
[a] Independent *t*-test.
[b] Chi-square test.
[c] Fisher's exact test.

Table 3
Functioning and quality of life comparison between HR individuals and healthy volunteers.

Functioning and quality of life measures[†]	HR (n = 60)	HV (n = 45)	p-Value
GAF, mean (SD) (3)			
Symptoms	45.4 (8.9)	86.6 (3.8)	<0.001[a]
Disability	48.6 (9.4)	86.7 (3.6)	<0.001[a]
Occupational status, n (%) (7)[‡]			0.061[b]
Unemployed	20 (37.7)	8 (17.8)	0.029[b]
Employed	16 (30.2)	22 (48.9)	0.058[b]
Students	17 (32.1)	15 (33.3)	0.895[b]
MANSA, mean (SD) (11)	3.8 (1.0)	5.6 (0.6)	<0.001[c]
Life as a whole today	3.4 (1.5)	5.6 (1.0)	0.001[c]
Health	3.5 (1.4)	5.4 (1.1)	<0.001[c]
Present mental health	3.0 (1.4)	6.2 (0.8)	<0.001[c]
Job (if working)	4.1 (1.8)	5.4 (1.4)	0.011[c]
Not working (if not working)	3.7 (1.7)	4.0 (1.9)	0.532[c]
Financial situation	3.5 (1.5)	4.6 (1.5)	0.001[c]
Leisure activities	3.9 (1.9)	5.6 (1.3)	<0.001[c]
Number of friends	4.2 (1.8)	5.8 (1.0)	<0.001[c]
Relationships with friends	4.5 (1.7)	5.7 (0.9)	<0.001[c]
Personal safety	4.0 (1.6)	5.8 (0.9)	<0.001[c]
Accommodation	4.6 (1.7)	6.0 (1.2)	<0.001[c]
People one live with (if living with other)	4.7 (1.4)	6.1 (0.9)	<0.001[c]
Living alone (if living alone)	4.0 (–)	–	–
Relationship with family	4.0 (1.4)	5.6 (1.0)	<0.001[c]
Life overall	3.0 (1.4)	5.8 (0.9)	<0.001[c]

HR = high risk; HV = healthy controls; SD = standard deviation; n = number; GAF = Global Assessment of Functioning; MANSA = Manchester Short Assessment of Quality of Life.
[†]Number of missing observations in brackets.
[‡]Employment status is broadly categorized into 3 groups. 'Unemployed' includes subjects who do not have a job, either they are looking for work, not looking for work (e.g., housewife), or not being able to work due to medical reasons. 'Employed' refers to people who have full/part-time employment, or employed but currently unable to work. 'Students' refer to full/part-time students.
[a] Mann–Whitney *U* test.
[b] Chi-square test.
[c] Independent *t*-test.

period, but they were treated with other psychiatric medications, i.e. anxiolytics and/or antidepressants, if clinically required.

3.4. Functioning and quality of life

Table 3 compares functioning, employment status, and quality of life between HR and healthy individuals. HR subjects had poorer functioning, with much lower scores in GAF symptoms and disability than healthy volunteers (45.4 ± 8.9 vs. 86.6 ± 3.8 and 48.6 ± 9.4 vs. 86.7 ± 3.6, respectively, both with $p < 0.001$), suggesting that individuals with HR mental states suffered serious psychiatric symptoms and any serious impairment in social, occupational or academic functioning. Higher unemployment rate was found in the HR group (37.7% vs. 17.8%, $p = 0.029$). HR individuals also reported poorer quality of life (3.8 ± 1.0 vs. 5.6 ± 0.6, $p < 0.001$).

4. Discussion

This study compared psychiatric morbidity, functioning and quality of life between 60 young people at HR for psychosis at the time of their referral to CAMEO and 45 healthy volunteers. Overall, our findings indicate that, beyond psychotic symptoms, there are many other psychopathological conditions that may be interfering in the global functioning of those at HR. More specifically, our study showed that HR individuals i) suffered a wide range of psychiatric disorders and mild psychotic symptoms, ii) reported more suicidal ideation/intention, depressive and anxiety symptoms, and iii) presented with worse levels of functioning, quality of life and employment status than healthy volunteers.

These results are in line with previous evidence suggesting a significant association between HR mental states and several other psychiatric disorders (Fusar-Poli et al., 2012; Salokangas et al., 2012). We found that almost 70% of HR individuals in our sample had more than one DSM-IV Axis I diagnosis. In particular, HR individuals had a statistically significant higher prevalence of moderate/severe depression, anxiety, obsessive–compulsive behaviours, and suicidality than healthy volunteers.

Our results suggest that individuals at HR are a heterogeneous group which tends to present with more than one psychiatric disorder, mainly depression and/or anxiety-related. Suicidal ideation and intention were also very prevalent in our HR cohort. Previous studies have reported similar enhanced risk of suicide in population-based and clinical samples (Preti et al., 2009; Hutton et al., 2011; Kelleher et al., 2012a, 2012b). This could be related to a variety of factors, such as comorbid psychiatric disorders (DeVylder et al., 2012), distress associated with psychotic-like experiences or mild psychotic symptoms, especially auditory hallucinations (Lataster et al., 2010), and mood variability (Palmier-Claus et al., 2012).

Recent studies, both in adolescent and adult populations, have already shown a strong relationship between HR for psychosis and presence of comorbid mood and anxiety disorders (Kelleher et al., 2012a, 2012b; Wigman et al., 2012). These associations might be even stronger at earlier stages of development, where psychotic experiences among young adolescents appear to follow a dose–response pattern in the prediction of a wide variety of future psychopathology (Kelleher et al., 2012a, 2012b). Interestingly, in contrast with previous findings that described a direct relationship between the degree of psychotic symptoms

and comorbid psychiatric disorders in young people, individuals at clinical HR in our sample were affected by mild psychotic symptoms.

Our findings highlight the lack of specificity and predictive value of psychotic symptoms and carry important implications for clinicians and researchers in the field of psychosis. Psychotic experiences appear to be common, not only among those patients who suffer from a psychotic illness, but also from other disorders such as depression and anxiety (Wigman et al., 2012). Although the causal mechanisms of this association are not well understood, it has been hypothesized that a HR mental state may be an indicative marker of risk for multiple psychiatric disorders (Kelleher et al., 2012a, 2012b). During childhood and adolescence, clinical phenotypes of different psychiatric disorders might overlap, reaching a greater differentiation throughout adulthood (Kim-Cohen et al., 2003; Jones, 2013). Also, traumatic events in childhood could eventually manifest as psychotic-like symptoms in the context of non-psychotic psychiatric disorders (Kelleher et al., 2013). Therefore, psychotic and non-psychotic disorders may share similar risk factors and these could have an impact on neurodevelopmental processes that may involve genetic, structural and/or neurobiological changes, resulting in different psychiatric syndromes (Jacobson et al., 2010; Alemany et al., 2011; Murray and Jones, 2012). It is also possible that mild psychotic symptoms experienced by HR individuals may contribute to the development of other psychiatric disorders.

Notably, people at HR in our and other samples (Bechdolf et al., 2005; Fusar-Poli et al., 2012; Zimbrón et al., 2012) endorsed a remarkably poor global functioning and quality of life, which was particularly striking when we compared them to healthy volunteers from the same region. This would justify special attention from mental health services in order to develop appropriate care pathways for a population also characterised by a significant risk of suicidality, regardless of current uncertainties on the mechanisms underlying these presentations. On the basis of our findings, clinical interventions in individuals at HR indentified in early intervention in psychosis services should aim at targeting a broader range of psychopathology, especially mood and anxiety symptoms, rather than just focusing on the treatment and/or prevention of psychosis.

4.1. Limitations

One of the limitations of the study is its cross-sectional nature, where causal inferences on the HR state, psychiatric morbidity and impaired functioning cannot be made. Efforts to follow-up this HR cohort are being undertaken in order to assess if HR mental states are associated with the development of functional difficulties and psychiatric morbidity. Also, the study only included people aged 16–35 years, which might affect the generalisability of our results. However, this is a valuable homogenous cohort with all individuals mainly suffering from attenuated psychotic symptoms. Furthermore, we did not match the study groups on educational level, yet the groups did not differ with respect to age, gender and ethnicity. Finally, we did not include a chronicity criterion to determine whether people with longer duration of HR mental state criteria had a different profile of psychopathology from those with shorter duration.

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Contributors

PBJ is the chief investigator for the research programme that this study is part of. JP and MP are principal investigator and project manager, respectively. All the authors participated in the design and implementation of the study. CH, CM and JP drafted the manuscript. Statistical analyses were carried out by CH and JS. All the authors provided a critical review and final approval of the manuscript.

Conflict of interest

The authors have not transmitted any conflicts of interest based on business relationships of their own or of immediate family members.

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