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EDITORIAL

Hearing voices—The significance of psychotic symptoms among young people☆

Escuchar voces: la relevancia de los síntomas psicóticos en jóvenes

Mary Cannon

Department of Psychiatry, Royal College of Surgeons in Ireland and Beaumont Hospital, Dublin, Ireland

Psychotic symptoms are experienced not just by patients with psychiatric disorders but also by a substantial proportion of the general population. The prevalence of psychotic symptoms appears to decrease with age: meta-analyses show that the median prevalence of psychotic symptoms is 17% among children (9–12-year olds), 7.5% among adolescents (13–18-year olds), and 5% among the general adult population.[1,2] The prevalence of psychotic symptoms also appears to vary between countries, with rates of auditory hallucinations ranging between 0.8% (in Vietnam) and 31% (in Nepal) in the World Health Organisation's World Health Survey.[3] Psychotic symptoms are familial and heritable and share a wide range of social, environmental and developmental risk factors with schizophrenia. [4]

How should we view these symptoms? Are they a forerunner or *forme fruste* for later psychotic disorder or are they a general risk marker for a range of psychiatric illnesses? This editorial will examine the evidence for both of these (not mutually exclusive) viewpoints.

Psychotic symptoms as a high risk paradigm for clinical psychosis

A clinical continuum between psychotic symptoms and psychotic disorder was first demonstrated in an influential paper from the Dunedin study which showed that 11-year old children who reported psychotic symptoms were at a 5- to 16-fold increased risk of schizophrenia-spectrum disorder in adulthood.[5] This finding was replicated in an Australian sample by Welham et al.[6] who showed that self-reported auditory hallucinations at age 14 were associated with increased risk for adulthood psychotic disorder at age 21. More recently, Werbeloff et al.,[7] using Israeli registers, have shown that young adults who reported psychotic symptoms were at 4-fold increased risk of a non-affective psychotic disorder over the course of the next two decades, with the highest risk in the first 5 years. A meta-analysis of cohort studies showed that the yearly risk of conversion to a clinical psychotic outcomes among individuals who have reported psychotic symptoms is 3.5 times higher than among individuals who did not report such symptoms.[8] Therefore it is clear that individuals who report psychotic symptoms are at higher risk of later clinical psychotic disorder than those who do not report such symptoms.

While the rapid nervous system changes that take place in adolescence are recognised to be of great significance in the development of clinical psychosis, the low disease incidence hinders attempts to study the developmental trajectory in large numbers prior to the onset of illness (given that only about one in every hundred children studied will develop schizophrenia). Children and adolescents with psychotic symptoms, who have not yet passed through the period of risk for psychosis represent a particularly valuable population in which to study the aetiology of psychosis for the following reasons: (1) they have not yet passed through the period of risk for psychosis and are more likely to include those truly at risk for conversion, (2) psychotic symptoms (also known as the extended psychosis phenotype) is more prevalent than the clinical (disease) phenotype, thus increasing the population pool for study, (3) psychotic symptoms can be screened for among young people using a validated brief questionnaire,[9] and, (4) studying young people facilitates research into very early neurodevelopmental

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E-mail address: marycannon@rcsi.ie

changes in psychosis particularly those processes involving adolescent brain development.

While much has been learned about children and adolescents with psychotic symptoms, much more remains to be discovered, in terms of genetics, neurocognition, electrophysiology and functional and structural neuroanatomy.[10] Psychotic symptoms among young people are associated with subtle neurocognitive impairments in executive functioning, receptive language and facial emotional recognition.[11–14] Speed of processing appears to be particularly impaired among adolescents with psychotic symptoms,[15] which supports the hypothesis that speed of processing is a core deficit in schizophrenia.[16] Only one brain imaging study has been published to date on this population and it shows intriguing (though preliminary) differences on fronto-temporal activation and grey matter volume.[17] One genetic study, from a Spanish group, has shown an interaction between childhood trauma and the BDNF genotype in increasing the risk for psychotic symptoms.[18] Further studies are needed in these areas which may help to refine the predictive power of these symptoms and to provide further information on the developmental trajectory to psychosis. Nevertheless, the majority outcome for these symptoms in childhood is discontinuation, not clinical disorder —only 20–30% appear to persist over time.[19] Dominguez et al. demonstrated that risk for psychosis was more closely associated with *persistence* of psychotic symptoms over time.[10] Thus, identification of 'persisters' and the risk factors associated with persistence is an important goal.

Psychotic symptoms as a non-specific marker for a range of psychiatric disorders

Although the evidence for psychotic symptoms as a high risk paradigm for later clinical psychosis is compelling, some authors have urged caution at the notion of a ''continuum of psychosis''.[20,21] In fact, the positive predictive values are too low (about 1–2%) to consider psychotic symptoms as ''predictors'' of later psychotic disorder and one would not advocate any intervention based on these symptoms alone.[7] This raises the issue of whether, beyond identifying a high risk group for etiological studies, are psychotic symptoms in childhood and adolescence clinically important?[22]

The issue of co-morbidity of psychotic symptoms, general functioning and other psychopathology has begun to attract attention. Nuevo et al.[3] also found a linear association between number and presence of psychotic symptoms and general level of functioning in an analysis of the World Health Survey data. A clear separation or discontinuity was found between individuals with no symptoms and individuals with symptoms in relation to adverse health impact, and a small linear increase in the adverse impact on health was found as the number of symptoms increased. Therefore the results from this global study pointed to two distinct groups in the population —those with no symptoms and those who are on a putative continuum of psychosis.[3]

Psychotic symptoms in late adolescence have been shown to be associated with a range of non-psychotic disorders on 30-year follow-up.[23] In an Irish adolescent sample, psychotic symptoms were associated with a wide range of diagnosable non-psychotic Axis-1 disorders.[24] In fact, the majority of young people with psychotic symptoms in that sample fulfilled criteria for another disorder, and the strength of the association with other non-psychotic disorders increased from childhood to adolescence, indicating that reporting psychotic symptoms becomes more ''pathological'' with increasing age.[24] Psychotic symptoms were also predictive of multimorbidity (i.e. presence of more than one disorder) and suicidal behaviours.[25] These studies indicate that childhood psychotic symptoms can no longer be considered only as forerunners of adult psychosis but also as markers of general psychological disturbance. Such symptoms should be enquired about among all young people presenting with psychological distress, and, conversely, identification of psychotic symptoms on general enquiry should signal the need for further detailed assessment. Research into longitudinal trajectories of childhood psychopathology should consider all symptoms (psychotic and non-psychotic) rather than adopting an arbitrary dichotomy.[26] Finally, highlighting just how common these symptoms are among young people should help to reduce ''us and them'' view of psychosis and reduce the stigma associated with symptoms such as ''hearing voices''.[27]

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