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Review

Urban living and psychosis – An overview

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ABSTRACT

Since more than half a century, the association of urbanicity with psychosis has been explored. The research interest initially stemmed from the finding of a higher proportion of cases of psychotic disorder coming for treatment from the inner parts of cities. Subsequently, interest in the relationship of urbanicity and schizophrenia expanded and various facets of this association were explored. This narrative review provides an overview of the relationship between urbanicity and psychosis, and evaluates the link from the standpoint of causality. The review further delves into the possible risk factors and mechanisms explaining this association; both biological ones like genetic vulnerability and infections, as well as environmental ones like pollution. Since the literature has primarily emerged from the developed western countries, the review draws attention to the caveats while extrapolating the results to a developing country scenario.

Contents

1. Introduction

Globally with the passage of time, more and more people are living in the cities (Angel et al., 2011). At present at least half of the world population lives in the urban areas (Angel et al., 2011). The growth of cities is most marked in the developing countries where about one third of the population now lives in the urban areas (Cohen, 2004). Living in cities has been suggested to be associated with additional stresses, which in turn have been linked to psychiatric illnesses like schizophrenia. Schizophrenia is one of the major psychotic illnesses associated with significant personal distress and substantial burden to the community (Knapp et al., 2004). The idea that schizophrenia was linked to urbanicity was first floated by Faris and Dunham (1939), who found that rates of this disorder was higher in the areas surrounding center of Chicago city irrespective of race and nationality. The association has been demonstrated in other studies, and subsequently urban birth, urban upbringing and urban residence have been implicated in the genesis of schizophrenia.

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Understanding the association of schizophrenia and urbanicity can be helpful in knowing the community based mechanisms and risk factors of schizophrenia. With a steady trend of increase in urban population in developing countries, understanding the mechanics of this association might help in planning preventive and management strategies. This review provides an overview of the evidence available linking urbanicity and schizophrenia and examines the mechanisms proposed to explain this association.

2. History and evolution of the concept

The beginning of the 20th century saw the emergence of interest on epidemiological determinants of schizophrenia. After Ødegaard's (1932) work on migration and psychosis, Faris and Dunham (1939) reported their findings on link of urbanicity and psychiatric disorders in 1939. They examined the pre-admission neighborhood locations of more than 30,000 patients with psychiatric disorders treated in public and private hospitals of Chicago. They found that center of the city and surrounding areas had higher rates of schizophrenia irrespective of race and nationality, but such an association was not found for affective psychosis. Consequently, the *concentric zone model* of urban organization was proposed for social causation of schizophrenia (Robert et al., 1925). According to this model, the inner urban zones are the most disorganized and unstable communities characterized by isolation and poor communication among residents. Conversely, the outer zones are the most organized and stable communities. There seems to be an inverse relation between social organization and rates of schizophrenia with the least socially organized inner urban zones having highest rates of schizophrenia.

Such findings were later replicated in various cities of North America and Europe (Giggs, 1986; Hare, 1956). Further work delved upon how neighborhood characteristics and social class affected mental illness. Low socio-economic status was found to be associated with psychosis (Hollingshead and Redlich, 1958). Whether lower social status was a cause or a consequence of psychosis was then debated. The 'social drift theory' was proposed suggesting that people with schizophrenia go down the ladder of social class due to the effects of the illness (Goldbeg and Morrison, 1963; Lapouse et al., 1956). With the advent of better techniques in biological psychiatry, focus shifted from psychosocial research to an increasingly biologically oriented one. Various other causative theories of schizophrenia came into existence based upon genetics, infections, substance use disorders, and birth complications. The research subsequently conceptualized schizophrenia as a polygenic disease with considerable gene–environment interaction (Van Os et al., 2008).

The 1990s saw a resurgence of interest in exploring the relationship of schizophrenia to urbanization. The Swedish conscript study found 1.5 times higher incidence of schizophrenia in those with urban background (Lewis et al., 1992). Subsequent large cohort studies showed that risk of schizophrenia and related psychosis was higher in residents of cities than those of rural areas (Marcelis et al., 1998; Mortensen et al., 1999; Van Os et al., 2001). The research in the field has seen a steady growth with studies enquiring into specific questions linking urbanicity and schizophrenic psychosis (Kelly et al., 2010; March et al., 2008; Vassos et al., 2012). The question of etiopathogenesis of schizophrenia has not been fully answered by biological based research alone, and epidemiological determinants of the disorder including urbanicity needs to be evaluated further for better understanding of the disorder.

3. Association of urbanicity and psychosis

Multiple studies have documented the relationship of urban living and psychosis using a range of database sources and methodologies (as depicted in Table 1). The methods of determining psychosis have ranged from national case registries, hospital discharge registers, conscription evaluation data and systematic case finding using standardized instruments. Though most of the studies have found urbanicity to be associated with greater incidence of schizophrenia and psychotic disorders, few studies have findings to the contrary (Grawe et al., 1991; Perälä et al., 2008; Suvisaari et al., 2000; Varma et al., 1997).

Though association of urbanicity and psychosis has been demonstrated, proving causality requires evaluation of consistency of effect, strength of association, dose response relationship,

Table 1
Studies evaluating the association of urbanicity with psychosis.

Author	Place	Case identification	Measure of association
Agerbo et al. (2001)	Denmark	Psychiatric central register	RR 2.77
Allardyce et al. (2001)	United Kingdom	Case notes	IR 1.61
Blazer et al. (1985)	USA	Diagnostic Interview Schedule	OR 2.01
Byrne et al. (2004)	Denmark	Psychiatric central register	RR 2.25
Eaton (1974)	USA, Denmark	Case registers	RR 1.30
Eaton et al. (2000)	Denmark	National psychiatric case registers	RR 4.34
Grawe et al. (1991)	Norway	Case notes	OR 0.98
Kelly et al. (2010)	Ireland	SCID diagnosis	IRR 1.92 (males)/1.34 (females)
Laursen et al. (2007)	Denmark	Psychiatric central register	RR 1.94
Lewis et al. (1992)	Sweden	Conscripts evaluation	OR 1.65
Lundberg et al. (2009)	Uganda	Peters Delusion Inventory	OR 2.1
Marcelis et al. (1998)	Netherlands	National psychiatric case registers	IRR 1.97
Marcelis et al. (1999)	Netherlands	National psychiatric case registers	RR 1.96
McGrath et al. (2001)	Australia	Modified SCAN and OPCRIT	OR 1.05
Mortensen et al. (1999)	Denmark	National psychiatric case registers	RR 2.40
Pedersen and Mortensen (2001)	Denmark	Psychiatric central register, Civil Registration System	RR 2.24
Perälä et al. (2008)	Finland	Interview and case notes	RR 0.76
Schelin et al. (2000)	Denmark	Psychiatric central register	OR 1.40
Sundquist et al. (2004)	Sweden	Demographic and socioeconomic database, hospital discharge register	HR 1.77
Sutterland et al. (2013)	Netherlands	Primary care information database	HR 2.5
Suvisaari et al. (2000)	Finland	Population register, hospital discharge register	RR 0.89
Varma et al. (1997)	India	Present State Examination	OR 0.88
Weiser et al. (2007)	Israel	Psychiatric hospitalization case registry, army recruits	HR 1.07

HR, hazards ratio; IR, incidence rate; IRR, incidence rate ratio; OPCRIT, Operational Criteria for Schizophrenia; OR, odds ratio; RR, rate ratio; SCAN, Schedule for Clinical Assessment in Neuropsychiatry; SCID, Schedule for Clinical Interview for DSM IIIR.