

Socio-economic status and population density risk factors for psychosis: prospective incidence study in the Maltese Islands

Nigel Camilleri MD MRCPsych DCP,^{1*} Anton Grech MD MSc MRCPsych^{2*} and Rachel Taylor East MD MSc³

¹Child and Adolescent Mental Health Service, Northern Deanery and Institute of Neuroscience, Newcastle University, Newcastle, UK, email calutta001@yahoo.com;

²Mount Carmel Hospital, Attard, Malta, and University of Malta, Msida, Malta; ³Mount Carmel Hospital, Attard, Malta

*The first two authors contributed equally to the preparation of this paper

Malta is an archipelago (with three inhabited islands) in the Mediterranean Sea. According to the 2006 census, Malta has a population of just over 400 000 and is the eighth most densely populated country in the world (1272 persons/km²) and the most densely populated of the member states of the European Union (EU). The most densely populated town in Malta is Senglea, with 22 744 persons/km² (situated in the Southern Harbour Area). In comparison, Malta's sister island, Gozo, has a density of 422 persons/km². Over 92% of the population lives in urban areas.

There are three National Health Service units that offer treatment for psychiatric patients. The largest is Mount Carmel Hospital, with 569 beds. Smaller units exist within two general hospitals: Mater Dei Hospital (on the main island) and Gozo General Hospital.

A prospective study of the residents of a large metropolitan city in Brazil found that the incidence of psychosis was 15.8 per 100 000 person-years at risk (95% CI 14.3–17.6) (Menezes *et al*, 2007). This figure is lower than that reported in most epidemiological studies. Findings from the three-centre AESOP study (Kirkbride *et al*, 2006), a UK epidemiological study, concluded that the incidence of all psychotic disorders was 34.8 per 100 000 person-years (95% CI 32.1–37.8). In this study it was suggested that environmental effects may interact with genetic factors in the aetiology of psychosis. Kirkbride *et al* found that the incidence of psychosis varied with place, in that the incidence in the south-east of London (54.5 per capita) was double that of Nottingham (25.1 per capita) and Bristol (22.0 per capita). The point prevalence and lifetime risk have nonetheless been found to be similar in different countries, at, respectively, 140–460 per 100 000 and approximately 1% of the population (Kendler *et al*, 1996).

A number of studies have assessed the relationship between urbanisation and psychosis. A longitudinal birth cohort study carried out in the Netherlands concluded that urban birth was linearly associated with schizophrenia, and that this effect appeared to be increasing over successive generations (Marcelis *et al*, 1998). Another study concluded that individuals who were exposed to urbanisation at birth as opposed to those exposed to urbanisation at the time

of onset of illness were at a higher risk of developing schizophrenia (Marcelis *et al*, 1999). A follow-up study of 4.4 million people in Sweden concluded that urbanisation is associated with a 68–77% greater risk of developing psychosis for both men and women (Sundquist *et al*, 2004).

The things that contribute to urban stress include noise, pollution, health behaviours and social factors such as social fragmentation, social isolation and social inequality (Van Os *et al*, 2000; Van Os, 2004). The incidence of schizophrenia increases consistently with increasing levels of urbanisation in a dose–response fashion. This not only suggests statistical association but also causality (Van Os, 2004).

Research on birth cohorts in Finland has suggested that the increase in the number of patients suffering from psychosis is likely due to socio-economic factors (Haukka *et al*, 2007).

The aim of the present study was to determine the incidence of patients suffering from psychosis and requiring admission to hospital. We also intended to gain further epidemiological information, specifically in relation to population density and socio-economic status, as well as ethnicity, and to examine any differences between the six districts of the Maltese Islands. Based on the evidence from previous studies briefly reviewed above, we hypothesised that a higher incidence of psychosis would be found in the lower socio-economic region, the more densely populated regions and among 'irregular' migrants.

Method

This was a prospective cross-sectional study of the incidence of psychosis in patients requiring admission to hospital. The sample comprised all patients newly admitted, with a diagnosis of psychosis, to a psychiatric ward at any of the three government hospitals between 1 May 2007 and 30 April 2008. There were no exclusion criteria related to age, gender or ethnicity.

At admission, the senior doctor established whether the patient had a psychosis. The patient was then seen by the consultant psychiatrist and multidisciplinary team (MDT) to confirm or dismiss the diagnosis. Only people with a diagnosis of psychosis by the MDT were included in the study.

The regions

Malta is divided into six regions: the Southern Harbour Area, the Northern Harbour Area, the South-East District, the Western District, the Northern District and Gozo and Comino District. The incidence was calculated for each region and then compared statistically.

Data protection

All patients were invited to participate in the study and were free to decline. Informed consent was given. They were informed that all data collected would be anonymous and confidential and that this study would not negatively or positively affect the treatment they received in hospital.

This study was approved by the relevant authorities.

Statistics

All data were input into Microsoft Excel and analysed using SPSS. Confidence intervals were calculated using the standard formula for rates. Gender- and age-specific direct standardisation of data from the migrant on the native population was carried out.

Results

The study cohort comprised 115 people. Satisfactory data were available on 111 patients (96.5%), 67 of whom were male and 44 female. The mean age at index admission was 41.4 years (95% CI 38.3–44.0). The ages ranged from 16 to 87 years.

The incidence of patients with psychosis requiring admission to any hospital on the Maltese Islands was 26.0 per 100 000. The incidence of patients admitted to hospital diagnosed with a non-affective psychosis (schizophrenia) was 15.4 per 100 000 (95% CI 13–21), while the incidence of affective psychosis was 7 per 100 000 (95% CI 5–10) and other types of psychosis (organic and drug induced) 4 per 100 000 (95% CI 2–6) (Table 1). The difference between each group is statistically significant.

The epidemiological results were further analysed by district. The largest incidence of psychosis was found in the Southern Harbour Area (32.1 per 100 000 person-years at risk). The most densely populated area in Malta (the Northern Harbour Area) was found to have an incidence of 28.3 per 100 000. These results were significantly differ-

Table 1 Number of patients admitted

Diagnosis	New cases	Males	Females
Organic disorders, delusions, hallucinations or catatonic stupor	4 (3.6%)	2 (50%)	2 (50%)
Schizophrenia and delusional disorders	49 (44.1%)	27 (55%)	22 (45%)
Acute and transient psychotic disorders	18 (16.2%)	9 (50%)	9 (50%)
Schizoaffective disorders	3 (2.7%)	2 (67%)	1 (33%)
Psychotic disorder due to psychoactive substance use	12 (10.8%)	11 (91%)	1 (9%)
Bipolar affective disorder; current episode manic with psychotic symptoms	12 (10.8%)	8 (75%)	4 (25%)
Severe depressive episode with psychotic symptoms	13 (11.7%)	8 (62%)	5 (38%)

Table 2 Incidence of psychosis by district of Malta

District	No. of patients newly admitted with psychosis	Incidence per 100 000 (95% CI)
Southern Harbour	32	32.1 (31.9–32.3)
Northern Harbour	38	28.3 (28.1–28.4)
Western	8	20.1 (19.9–20.2)
South-East	10	20.9 (20.8–21.1)
Northern	11	22.4 (22.2–22.6)
Gozo and Comino	10	25.6 (25.3–25.9)
Irregular immigrants	6	Approximately 400 (379.8–420.2)
Malta (national total)	115	26.0 (25.9–26.1)

ent from the much lower incidence rates in the less densely populated districts. Gozo and Comino District was found to have a similar incidence to that of the mainland, at 25.6 per 100 000, although still statistically different, as indicated by the confidence intervals in Table 2.

Six of the patients (5%) were irregular migrants. Data drawn from the Malta National Statistics Office show that in 2007 just over 1500 immigrants landed in Malta. The average stay for an irregular migrant is around 12 months, so an approximate estimate for the incidence of psychosis in irregular immigrants is 400 per 100 000 person-years at risk. Even after adjustment for age and gender, rates for irregular migrants were found to be elevated. After direct standardisation, the weighted incidence for those aged 16–18 years was 49. For those aged over 19 years, if the Maltese population had the same risk of psychosis as the migrants we would have had 660 patients.

Discussion

The incidence of psychosis found in this study of the Maltese population is similar to that reported in other epidemiological studies. In our study the incidence differed statistically across the districts of the Maltese Islands. This highlights the important role urbanisation, socio-economic status and migration have in the aetiology of psychosis.

Sociological studies describe the Western District, where the incidence of psychosis was lowest, as the district with highest proportion of academic achievers. The Southern Harbour Area, where there was the highest incidence of psychosis, has the most residents in the lowest socio-economic group, with 41% of residents having no schooling (Camilleri, 2001). The Northern Harbour Area has the highest population density and the second highest incidence of psychosis.

The Gozo and Comino District has a much lower population density, yet the incidence was similar to that on Malta outside the Harbour Areas. This may be due to easier access to psychiatric services. However, it may also be that people living in this small community are more aware of stigma and discrimination, leading to people waiting longer before seeking medical attention. Symptoms may then be more severe, requiring hospitalisation. High expressed emotion, which is often a feature of closely knit families and extended families, could also account for the above results. Another explanation may be the smaller genetic pool.

The incidence of psychosis among irregular immigrants was very high when compared with that of the general

Maltese population and that of other studies. Clinically, one of the most consistent findings among immigrant ethnic groups in Western Europe is an increase in the incidence rate of psychosis. A recent meta-analysis has confirmed that migration is a risk factor for schizophrenia that cannot be solely explained by selection (Cantro-Grae & Shelton, 2005; see also Veiling *et al*, 2008).

Limitations

Our study excluded those suffering from a form of psychotic illness who were treated in the community. Nonetheless, since the Maltese National Health Service does not have an urgent care and home management team, we can expect that most patients suffering from a first episode of psychosis would be admitted to hospital.

The authors acknowledge that this study may suffer from the ecological fallacy: the sample population may not be truly representative of the target population. So the results should be interpreted with care.

Another limitation was that we did not include patients admitted to a private hospital, but, when the study was carried out, the private sector had no admitting units specifically for psychotic patients.

Data were solely collected from medical files; that is, with no interviews of the admitting doctors or patients themselves.

Clinical implications

The results of this study highlight that the incidence of psychosis is variable. In Malta, as in other countries, urbanisation, low socio-economic status and immigration are potential risk factors in the aetiology of psychosis. Higher educational attainment may be a protective factor. Awareness of this by clinicians and service providers can lead to better provision and planning of services.

Acknowledgements

We would like to thank Dr Neville Calleja MD MSc for his input of the statistical data.

References

- Camilleri, F. (2001) *A Day in Her Life: Insights into the Social and Economic Contribution of Maltese Women*. Commission for the Advancement of Women, Ministry of Social Policy, Malta.
- Cantro-Grae, E. & Shelton, J. P. (2005) Schizophrenia and migration: a meta-analysis review. *American Journal of Psychiatry*, **162**, 12–24.
- Haukka, J., Suvisaari, J., Varilo, T., *et al* (2001) Regional variation in the incidence of schizophrenia in Finland: a study of birth cohorts born from 1950–1969. *Psychological Medicine*, **31**, 1045–1053.
- Kendler, K. S., Gallagher, T. J., Abelson, J. M., *et al* (1996) Lifetime prevalence, demographic risk factors, and diagnostic validity of nonaffective psychosis as assessed in a US community sample: the National Comorbidity Survey. *Archives of General Psychiatry*, **53**, 1022–1031.
- Kirkbride, J. B., Fearon, P., Morgan, C., *et al* (2006) Heterogeneity in incidence rates of schizophrenia and other psychotic syndromes. *Archives of General Psychiatry*, **63**, 250–258.
- Marcelis, M., Navarro-Mateu, F., Murray, R., *et al* (1998) Urbanization and psychosis: a study of 1942–1978 birth cohorts in the Netherlands. *Psychological Medicine*, **28**, 871–879.
- Marcelis, M., Takei, N. & Van Os, J. (1999) Urbanisation and risk for schizophrenia: does the effect operate before or around the time of illness onset? *Psychological Medicine*, **29**, 1197–1203.
- Menezes, P. R., Scazufca, M., Busatto, G. F., *et al* (2007) Incidence of first-contact psychosis in Sao Paulo, Brazil. *British Journal of Psychiatry*, **191**, 102–106.
- Sundquist, K., Frank, G. & Sundquist, J. (2004) Urbanisation and incidence of psychosis and depression: follow-up study of 4.4 million women and men in Sweden. *British Journal of Psychiatry*, **184**, 293–298.
- Van Os, J. (2004) Does the urban environment cause psychosis? *British Journal of Psychiatry*, **184**, 287–288.
- Van Os, J., Driessen, G., Gunther, N., *et al* (2000) Neighbourhood variation in incidence of schizophrenia. Evidence for person–environment interaction. *British Journal of Psychiatry*, **176**, 243–248.
- Veiling, W., Susser, E., Van Os, J., *et al* (2008) Ethnic density of neighbourhoods and incidence of psychotic disorders among immigrants. *American Journal of Psychiatry*, **165**, 66–73.

Box 1 Glossary

Bakhara. Special verses written on a sheet of paper that is burnt and the smoke used

Khalwa. Preschool education in traditional healer centres

Kogour. Special type of healing in African culture

Mehaya. Verses written on a sheet of paper that is dissolved in water and drunk

Rogyā. Reading the words of God on a person with mental illness

Sheikh. Holy man

Talasim. Figures and letters and special drawings that have certain meanings

Zar. Ceremony for a person possessed by spirits

The term sheikh is equivalent to traditional healer in this text

primary care level in Sudan, which is why traditional healers are often used for the provision of mental health services.

Generally, traditional healers in Sudan can be divided into two distinct groups: religious healers, influenced by Islamic and Arab culture, such as traditional Koranic healers and Sufi healers; and non-religious healers, influenced by African culture, such as practitioners of *zar*, *talasim* and *kogour* (see Box 1 for glossary). The religious healers in turn may be subdivided into two groups. The first group uses only Koranic treatment, derived from certain verses. This involves reading and listening to the Koran with the active participation of the patient (Bali, 1992). The success of treatment depends on the reliability of the healer and the degree of his or her belief, in addition to the conviction of the patient and his or her belief in the Koran as a source of treatment. The second group uses a combination of both Koran and *talasim*. The types of *talasim* used are mainly squares filled with symbolic letters which have a hidden spiritual dimension conceived only by the sheikhs (holy men). They contain the 99 attributes (names) of God and some other words from ancient divine books. Healers in this subgroup are influential decision makers at the individual, family and community level. They are respected not only by their followers but also by government officials and politicians.

Elsorayi (1985) stated that *kogour* is a typical African practice found in the south of Sudan, where African culture dominates. It is used by healers who claim to have supernatural powers; it deals with 'souls' that affect the body. Such healers use their power to cure disease and to solve other problems, such as the control of rain.

Mohammed (1989) suggested that *zar* came to Sudan from Ethiopia. It is based on the assumption that supernatural agents or spirits possess a person and may generate physical and psychological disorders. The *zar* concept of possession is based on the idea that the spirit makes certain demands that should be fulfilled by the patient or relatives; otherwise this spirit may cause trouble for them all. *Zar* is the dominance of the evil soul over the human being, with the intention of hurting the person. *Zar* is common among Muslims as well as Christians.

Study objectives

Our general objectives were to study and understand the traditional healers' beliefs and practices in relation to people

with mental illness in Sudan. We also sought to assess the possibilities for collaboration between traditional healers and psychiatrists in Sudan.

Method

We conducted a descriptive cross-sectional study of traditional healers' attitudes, beliefs and practices in relation to people with mental illness. The study drew from randomly selected famous traditional healers' centres in Sudan.

Over 3 months (June–August 2009), 30 traditional healers from ten traditional healers' centres were randomly selected. They were approached individually and their consent was obtained before the principal investigator interviewed them with a 15-item structured questionnaire that covered:

- age
- education level
- occupation
- place of work
- previous Job
- length of practice treating people with a mental illness
- how the treatment of people with a mental illness had been learnt
- method of diagnosis
- methods of treatment
- length of time it typically took patients to respond to treatment
- length of time for which patients with mental illness were generally kept in the centre
- how many patients with mental illness were seen every day
- what the healer thought about medical treatment for mental illness
- what the healer thought about patients who took traditional treatment and medical treatment at the same time
- whether it was possible to collaborate over medical treatment and traditional treatment, and if so, how.

Ethical approval was obtained from the Research Ethical Committee of the Sudanese Ministry of Health before the start of the study. Data were analysed using SPSS version 16.

Results

Twenty-eight traditional healers agreed to be interviewed (a 93% response rate). They were aged 38–75 years. Ten of them (36%) had received no formal training in their practice but had learnt it only in their traditional healer centres. Six (21%) of them had been to formal primary school, seven (25%) to secondary school and five (18%) to university. Eleven (39%) were farmers, nine (32%) were teachers in the traditional centres, four (14%) were traders and another four (14%) were previously employed in the government. The number of years of practice of the healers (specifically in relation to treating mental illness) ranged from 10 to 50 years. They had learnt the methods of treatment from their parents and other healers.

Half of them followed certain criteria to diagnose mental illness. They divided mental illness into that which needs the intervention of a traditional healer, such as possession by evil spirits, *jinn* or *shaitan*, and that which needs a doctor's