AN INCIDENCE STUDY OF SCHIZOPHRENIA IN INDIA

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SUMMARY

Under a WHO collaborative study, the Chandigarh center monitored two geographically defined populations over a 2-year period. Using helping-agency-coverage and other methods along with a set of specified criteria, 268 first-onset potentially schizophrenic cases were actively identified. Of these, 232 cases could be assessed in detail which included 209 schizophrenics as per specified ICD-9 or Catego criteria. The annual incidence rates obtained were 4.4 and 3.8 per 10,000 for rural and urban areas, respectively. The rural cohort had a higher incidence for each of the three diagnostic definitions. In the urban cohort, sex and diagnostic definition did not affect the incidence. In the rural cohort, females had a lower incidence for Catego S+ and a higher incidence for other diagnostic definitions.

INTRODUCTION

The reported incidence of schizophrenia from different countries has ranged from 1.1 to 7.2 per 10,000 population (Odegaard, 1946; Hollingshead & Redlich, 1958; Norris, 1959; Walsh, 1969; Hafner & Reiman, 1970; Nielsen, 1976; Helgason, 1977; Shen Yucun et al, 1981). This wide variation could be due to differences in methodology e.g. 'caseness' criteria, screening and assessment methods, inter-rater reliability etc.

With its experience in evolving standardized methodology for cross-cultural research in schizophrenia and depressive disorders (WHO 1973 & 1979; Jablensky et al, 1980; Sartorius et al, 1983), the World Health Organization conducted the study: the Determinants of Outcome of Severe Mental Disorder. Twelve centers from ten countries - Aarhus, Denmark; Agra & Chandigarh, India; Cali, Columbia; Dublin, Ireland; Honolulu & Rochester, USA; Ibadan, Nigeria; Moscow, USSR; Nagasaki, Japan; Nottingham, UK and Prague, Czechoslovakia - participated in this project, jointly funded by WHO and the National Institute of Mental Health, USA as also by the respective field centers. The aim was to study the clinical manifestations and 2-year course and outcome of schizophrenia based on truly representative patient populations across different cultures. Thus, one of the indirect objectives of the study was to identify the cross-cultural incidence of schizophrenic disorders. All the centers participated in this 'core' epidemiological study while selected centers carried out specific sub-studies e.g. on life-events, expressed emotions, functional impairments, social disabilities and family-support systems; our center was involved in the sub-studies on life-events and expressed emotions. We were also able to extend the study to 5 and 7-year follow-ups with financial help from the Indian Council of Medical Research.

The overall design, methods and results of the total study have already been reported (Sartorius et al, 1986; Jablensky et al, 1992). The present paper reports on the findings at the Chandigarh center and compares these to those of the other collaborating centers in this study.

MATERIAL AND METHOD

The study on incidence were carried out in a rural and an urban area. The case finding methods used included first-in-lifetime contact with health-related agencies, case-to-case method (enquiring from index case/family about other potential cases in their catchment area) and key-informant method (enquiring from community leaders about potential cases in their catchment area).

The study was completed in three phases - Preparatory, Intake and Follow-up. Briefly, the preparatory phase focussed on training of the man-power and delineation of the catchment area; the intake phase involved active recruitment of cases in terms of the identification and assessment of all new potentially schizophrenic cases occurring in the catchment area over a period of two years; finally, the follow-up phase involved an active monthly re-assessment of patients over the next two years, and subsequently, five and seven years after initial intake.

In the preparatory phase, a team of psychiatrists and social workers were trained in the use of the instruments and procedures finalized by the WHO, and two catchment areas - one rural and one urban - were identified. The relevant population (based on projections from Census of India, 1971, provided by the Registrar General of India) and health statistics for the catchment areas were collected. All helping agencies that were likely to be contacted by the potential cases in the respective catchment areas were identified. The identified helping agencies were contacted through letters and personal visits for ensuring their cooperation in the referral of potential cases for the study. The case-to-case method and key-informant method were also finalized for identification of potential cases, particularly for use in the rural catchment area and urban slums. Also, methods were finalized to maintain contact with the helping agencies (over the intake period of 2 years) by means of letters and personal visits, and passive follow-up of the patients (patients or their families contacting the research team on their own, for patient-care). The aim of this exercise was to cover all first-onset patients in the catchment area for screening for inclusion in the

study and, once included, for ensuring inclusion in the follow-up.

The Chandigarh center delineated two catchment areas for this study. The urban catchment area was spread over 58 square kilometers; it comprised of 45 urban sectors, 3 labor colonies, 1 peri-urban township and 3 adjoining villages designated as urban agglomerations by the Census of India, 1971. It had, at the midpoint of the intake period of the study, a population of 348,609 persons (including 205,786 in the 15-54 year age-group). This catchment area was characterized by a high growth rate (due to immigration), high literacy and intra-city mobility and by low birth and death rates (Director Health Services, 1977). The area had a well developed network of health facilities which included a post-graduate medical teaching institute with a department of psychiatry, a general hospital with a psychiatrist, one private psychiatrist and about 200 M.B;B.S. medical practitioners. The local general hospital of the armed forces, which had a psychiatry wing, was excluded from the study as it catered mostly to a floating population. The indigenous-medicine practitioners and faith healers were also excluded from the study as it was not possible to know their numbers and addresses. All the identified sources of the network included in the study were contacted personally or through letters and their cooperation ensured. Subsequently, these sources were contacted at regular intervals during the entire period of the study. Since there was still some possibility of losing potential cases from the labor colonies and the urban agglomerations, these areas were further tapped by case-to-case finding and key-informant methods.

The rural catchment area was centered about 50 kms. from Chandigarh in the Raipur Rani Block of Naraingarh Tehsil under the Ambala District of Haryana State. It comprised of 145 villages spread over 455 sq.kms., with a population of 103,868 persons (including 61,642 in the 15-54 age group) at the mid-point of the intake period. The health services available included 1 primary health center, 7 sub-health centers and 10 dispensaries. The network was run by 6 graduate doctors, 60 supporting staff of various cadres and over one hundred community health volunteers (CHVs). Our Department was also running a weekly clinic at the Primary Health Center. In addition to the health services network in the rural catchment area, the religious and traditional healers were covered as well and case-to-case finding and key-informant methods were also used to detect potential cases.

In the intake phase of 24 months, extending from 1st October 1978 to 31st September 1980, regular contact with network of helping agencies was maintained. The cases identified by this network or by case-to-case finding and key-informant methods, were subjected to a Screening Schedule (Appendix I) within one week of identification. If selected by the screening schedule, the case was subjected to a battery of instruments (Appendix II) for detailed assessment of psychopathology, personal and psychiatric history and likely prognosis. The clinical diagnoses (main and alternate) were recorded according to the International Classification of Diseases, 9th Revision (WHO, 1978).

In the follow-up phase, there were two types of contacts between the patient and the research team. The 'passive' contacts were those in which patient and his key-informants contacted the research team for treatment and advice as per their need. The 'active' contacts involved a) a monthly visit by the research team, during which the patient and his family were contacted for brief assessment and treatment and b) repeated follow-up visits by the research team to contact the patient and key informants for detailed assessment (Appendix II) at the end of the first, second, fifth and seventh years.

Leakage And Limitations:

Despite the best efforts to monitor the helping network by periodic personal / postal contacts, there was still the possibility of a few potential cases being missed. This could have been especially so in the urban area as not all helping agencies [e.g. faith healers or indigenous-medicine practitioners] were monitored. It would be assumed here that cases would rather seek help from the health agencies in the areas adjoining the catchment areas. Hence, the registers and / or the case-files of half a dozen such centers were thoroughly scanned for the period July 1, 1978 to September 30, 1980 to trace if any potential case from the catchment areas had been registered. Despite this attempt, it must be acknowledged that a few cases might have been missed. The cases were also lost on account of emigration and intra-city mobility in the urban catchment area. The details of leakage will be reported separately.

Analysis of Data:

All data pertaining to intake and 1-and 2-year follow-ups were regularly sent to the WHO headquarters where the initial data was 'cleaned and processed' to exclude cases that should not have been included in the study, e.g. those with a duration of more than 12 months. In addition, the PSE profiles underwent computer analysis to obtain the Catego diagnoses. For inclusion in the study, the case had to receive a main or alternate diagnosis of ICD-9 codes 295, 297 or 298 (.3, .4, .8 or .9) and / or receive a Catego diagnoses of classes S, P or O. These ICD-9 and Catego diagnoses (of schizophrenia and related disorders) were used to obtain incidence rates for various centers. Similarly, the data from other instruments were analyzed to obtain important socio-demographic and clinical details and their relation to course and outcome.

The age and sex specific annual incidence rates were calculated using the age and sex specific population data from the Sample Registration System, 1982 (Registrar General of India, 1982), using data from the rural areas of Haryana State for the rural catchment area and from the urban areas of the whole country for the urban catchment area.

The morbid risk (the expectancy of developing schizophrenia for a person passing through the entire period of risk between the ages of 15 and 54) was calculated from age and sex specific incidence rates by totalling the annual sex-specific incidence rates for each age-group

(5 for 5-year age groups in our case) and then reducing the figure from per 10,000 to per 100 (Jablensky et al, 1992)

RESULTS

As shown in Table 1, out of a total population of 452,474 persons, 2,655 persons either presenting themselves at the helping agencies or located by case-to-case

Table 1 : Case Intake Data

	Urban	Rural	All
Total Population	348,609	103,865	452,474
5-54 Yrs. Population:			
Total	205,786	61,642	267,428
Male	118,971	31,998	150,969
Female	86,815	29,644	116,459
Cases screened	2,338	317	2,655
Cases identified	199	69	268
Evaluation not possible	32	4	36
Evaluation completed	167	65	232
'Schizophrenia' cohort (ICD-9 and/or Catego)	155	54	209

finding and key-informant methods were screened as potential cases for inclusion in the study. In all, 268 (199 urban and 69 rural) cases were identified on the basis of the screening instrument.

Subsequent to the screening, the initial assessment could not be completed in 32 urban and 4 rural cases. The reasons for this included: having left the catchment area (15 cases), untraceable (12 cases), uncooperative (4 cases) and death (1 case) in the urban area, and uncooperative (3 cases) and having left the catchment area (1 case), in the rural area. Out of the remaining 232 cases, 23 cases did not satisfy the diagnostic criteria for schizophrenia as per ICD-9 or Catego. Finally, 209 cases, including 155 urban and 54 rural cases, constituted the cohort of schizophrenia and related disorders as per the inclusion criteria based on ICD-9 and / or Catego system. The leakage study carried out at the end of the intake period revealed that the study team had missed one case from the urban catchment area and one 'possible' case from the rural area ('possible', because the duration of illness was not known).

The annual incidence rates (per 10,000 population, age 15-54 years) were calculated as per sex, locality and diagnostic distribution. The diagnostic distribution was considered under three diagnostic definitions, two being based on the Catego system. The Catego S+ class constituted a 'narrow' definition based on first rank symptoms while Catego S,P,O classes (including class S+) con-

stituted an 'intermediate' definition. A 'broad' definition diagnosis was based on Catego S,P,O classes and / or first or alternate diagnosis of schizophrenia and related disorders as per ICD-9.

The incidence rates obtained for the total cohort for different diagnostic definitions were 1.0 for Catego S+, 2.7 for Catego S,P,O and 3.9 for broad definition (Table 2). For Catego S+, the highest rates were obtained for rural males (1.6) and the lowest for rural females and urban males (0.8 each). For Catego S,P,O the highest rates were obtained for the rural females (3.8) and the lowest for urban males and females (2.4 each). For the broad definition, the highest rates were obtained for rural females (4.7) and the lowest for urban females (3.7). Overall, the rural cohort obtained higher rates for all the three definitions, the difference being most marked for Catego S,P,O (3.5 vs 2.4) and least marked for 'broad' definition (4.4 vs 3.8).

Table 3: Age, Sex, Locality and Diagnostic definition specific annual incidence rates per 10,000 population, age 15-54 years

Age Groups (years)	Catego S+				Catego S,P,O/ICD-9			
	Urban		Rural		Urban		Rural	
	M	F	M	F	M	F	M	F
15-19	1.14	1.46	1.63	0.51	2.74	3.51	5.69	8.21
20-24	2.14	1.12	1.52	0.88	6.84	3.65	5.33	2.63
25-29	0.46	0.55	1.65	0.59	4.16	4.14	1.65	4.96
30-34	0.29	0.43	1.02	0.00	2.58	2.56	2.04	5.32
35-39	0.37	1.17	0.00	0.00	1.87	4.09	0.00	1.32
40-44	0.00	0.79	1.69	1.59	0.00	2.37	5.07	1.90
45-49	0.00	1.07	0.00	3.32	0.75	1.07	0.00	6.64
50-54	0.00	1.45	3.29	0.00	1.85	2.90	9.87	9.00

The age, sex, locality and diagnostic definitions-specific incidence rates are shown in Table 3. For Catego S+ definition, the highest rates are recorded for rural females in the age group 45-49 (3.32) and rural males in the age group 50-54 (3.29). For urban males, the peak incidence was recorded in the age group 20-24 (2.14), while in all the other age groups the urban males recorded very low rates [lower than those for urban females]. The rural males recorded higher than rural females in all age groups except 35-39 and 45-49.

For the 'broad' definition, the highest rates were recorded among rural males and females in the age group 50-54 (9.87 and 9.0 respectively) and rural females in the age group 15-19 (8.21). The urban females had their peak incidence in the age group 25-29 (4.14). There were no consistent sex differences for different age groups in either the urban or the rural cohort.

Overall, for Catego S+ definition, the incidence peaked for males in the age group 15-24, while there was a clustering of onset among females in the older age groups; for 'broad' definition, no definite age, sex or locality specific pattern emerged.

The sex, locality and diagnostic definition - specific percentage morbid risk for the ages between 15 and 54 are shown in Table 4.

Table 2: Sex, Location and Diagnosis-specific annual incidence rates per 10,000 population, age 15-54 years

Diagnostic definition	Urban			Rural			Total		
	M	F	M+F	M	F	M+F	M	F	M+F
Catego S+	0.8	1.0	0.9	1.6	0.8	1.2	1.0	1.0	1.0
Catego S,P,O	2.4	2.4	2.4	3.2	3.8	3.5	2.6	2.8	2.7
Catego S,P,O /ICD9	3.8	3.7	3.8	4.1	4.7	4.4	3.8	4.0	3.9

Table 4: Morbid risk (%) for age 15-54 years
according to sex, locality and diagnostic definition

	Catego S+				Catego S,P,O/ICD-9		
Urban		Rural		Urban		Rural	
M	F	M	F	M	F	M	F
0.22	0.40	0.54	0.34	1.04	1.21	1.48	2.0

The morbid risk for Catego S+ cases was highest among rural males (0.54) and lowest among urban males (0.22) while for broad definition, the morbid risk was highest among rural females (2.0) and lowest among urban males (1.04).

DISCUSSION:

It is important to note that, in the Indian context, there has been no study on incidence of schizophrenia. This study, with its coverage of a large population in a sizeable geographic area and the usage of a rigorous methodology, yields reliable and useful data.

The case finding methods used in previous research fall into four broad groups: the so-called genealogical random sample methods (Rudin, 1916); the birth-cohort method (Helgason, 1964); the population census method (Stromgren, 1938; Crocetti et al, 1971); and the first-admission method (Odegaard, 1946; Norris, 1959). Each of these methods has advantages and inherent limitations; none can be considered fully adequate for a cross-cultural comparative study.

The method of first-in-lifetime contact, employed in this study, comes closest to the first admission method but represents its extension to non-mental-hospital facilities and services which were earlier rarely monitored in psychiatric epidemiology (e.g. general hospitals, private physicians, the practitioners of traditional medicine, religious healers, and various social agencies. It is conceptually similar to the "first-ever contact" method of determining disease inception (Wing & Fryers, 1976) as a part of the techniques used in psychiatric case register studies. As applied in the present study, the first-in-lifetime contact method allows for the possibility that some schizophrenics may never make contact with any service. The potential cases in the catchment area were identified through a comprehensive network of case finding agencies. The 'key informant interview' and 'case to case' methods were especially helpful in identifying the potential cases in the rural areas and the urban slums. Thus, 'active' recruitment was used by the research team to identify cases.

The leakage of only 2 cases (1 definite and 1 probable), as revealed by the leakage-study, testifies to the thoroughness of the case tracing methods. However, despite the reassuring results of the leakage study, the remote possibility of a small undetected leakage cannot be completely ruled out.

The case-loss between screening and intake is more than two-fold higher in urban as compared to the rural areas; eighty four percent of this loss is either due to the

cases having left catchment area or being untraceable. This is a reflection of the migratory nature of the population in a rapidly developing urban catchment area.

The annual incidence rate of 3.9 per 10,000 population recorded at Chandigarh for 'broad' definition is within the range of 1.7 to 7.2 reported by other earlier studies covering different areas and locations; however, these rates are not comparable due to the varying methodologies used (Odegaard, 1946; Hollingshead & Redlich, 1958; Norris, 1959; Walsh, 1969; Hafner & Reiman, 1970; Nielsen, 1976; Helgason, 1977; Shen Yucun et al, 1981).

The incidence rates of 3.8 and 4.4 for 'broad' diagnoses in urban and rural areas respectively are higher than the rates reported for the other collaborating centers of this WHO study, from 1.6 at Honolulu to 2.8 at Moscow, all of which are from developed countries (Table 5). This difference, however, gets considerably reduced when we consider only Catego S+ diagnosis, which is based on the presence of Schneiderian first rank symptoms. The rates at Chandigarh, 0.9 and 1.2 in urban and rural areas respectively, are in the middle of the range reported from other collaborating centers: from 0.7 at Aarhus to 1.4 at Nottingham. It thus appears that in our catchment areas in Chandigarh, we have a higher incidence of schizophrenia-like psychotic illnesses which may not actually be core schizophrenia by rigorous criteria.

Table 5 : Diagnosis & Sex specific annual incidence rates per 10,000 population, age 15-54 years: Collaborating Centers vs Chandigarh

Annual incidence rate			
Diagnostic definition	Sex	Collaborating* Centers	Chandigarh
Broad (ICD-9 or Catego S,P or O)	Female	1.2 (Aarhus) to 3.1 (Moscow)	3.7 (urban) 4.7 (rural)
	Male	1.8 (Aarhus) to 2.8 (Nottingham)	3.8 (urban) 4.1 (rural)
	All	1.6 (Honolulu) to 2.8 (Moscow)	3.8 (urban) 4.4 (rural)
Narrow (Catego class S+)	Female	0.5 (Aarhus) to 1.4 (Moscow)	1.0 (urban) 0.8 (rural)
	Male	0.9 (Aarhus) to 1.7 (Nottingham)	0.8 (urban) 1.6 (rural)
	All	0.7 (Aarhus) to 1.4 (Nottingham)	0.9 (urban) 1.2 (rural)

*Data from Sartorius et al, 1986.

The sex specific rates for 'broad' definition reveal that, compared to other collaborating centers, the Chandigarh center recorded higher rates for both sexes, especially among females (4.7 and 3.7 in rural and urban areas respectively vs from 1.2 at Aarhus to 3.1 at Moscow) as compared to males (4.1 and 3.8 in rural and urban areas respectively vs from 1.8 at Aarhus and Honolulu to 2.8 at Nottingham). The higher rates for rural cohort are accounted for by higher rates for cases other than Catego S+, especially the Catego S,P,O cases among rural females. The sex-specific rates for Catego S+ are similar in the other

collaborating centers and the two Chandigarh areas. This indicates that while a Catego S+ manifestation of schizophrenia has a similar incidence for both sexes across all collaborating centers, a wider range of other manifestations is noted at the Chandigarh center, more so in the rural cohort, especially among females.

The age-specific incidence rates at the Chandigarh center showing a higher incidence among urban males in age group 15-24 and clustering among females in age group 40-54 for Catego S+, are similar to the pattern at the other collaborating centers. While no age-specific incidence pattern for 'broad' definition emerged at the Chandigarh center, other centers showed clustering among younger age groups, more so among males.

The data on the morbid risk from Chandigarh is generally comparable with the data from the other centers for Catego S+ definition. For 'broad' definition, while the risk in the urban area at the Chandigarh center is similar to that recorded at other centers, the risk in the rural area is highest for the females (2.0 vs 0.47-1.17 at other centers) as well as the males (1.48 vs 0.55-1.08 at other centers).

The finding of an overall narrow range of variation in incidence across different centers and the two sexes (from 1.2 to 4.8 for 'broad' definition and from 0.7 to 1.4 for 'Catego S+' definition) as found in this study, poses new challenges for future research to focus more analytically on the multifactorial etiological model of schizophrenia, so as to establish the nature of complex interaction between genetic and environmental factors.

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