

A Follow-Up Study of Infantile Autism in Hong Kong¹

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All 87 autistic children referred to the Department of Psychiatry from 1976 to 1986 were included as subjects. Their demographic, family, medical, and psychiatric characteristics were described. Sixty-six (75.9%) were traced for follow-up assessment. There was a striking similarity between the characteristics of our sample and those reported in other countries (e.g., sex ratio, intelligence, language ability, behavioral characteristics, and outcome). The finding of less family history of language delay, epilepsy, and sex difference are discussed.

INTRODUCTION

Articles about childhood autism in Chinese children was few. Ney et al. (1979) studied 14 Chinese children in Hong Kong. Tao (1987) described 15 cases of autism in mainland China. It is interesting to find out whether Western and Non-Western children with autism are similar. Ney et al. (1979) claimed that there was a close similarity between Chinese and non-Chinese autistic children. On the other hand, Tao (1987) found a difference in social class distribution. He found more parents of autistic children had a college or above education and a professional level occupation compared with normal children who were picked at random as controls.

Tao (1987) claimed that "rarity of autism in China is a fact" (p. 296). Although he had tried to identify all the cases of autism in Nanjing, which had a population of 4.5 million, he could find only two. In Hong Kong, no epidemiological study on the prevalence of autism had been done. However, autism is probably not a rare condition in a clinic population. Luk and

¹This research was funded by the Committee on Research and Conference Grants, University of Hong Kong.

Lieh-Mak (1985) studied all the children under 16 years old referred to the Department of Psychiatry, University of Hong Kong, from 1977–1983; 76 cases of autism were identified. In a different setting, Chen (1986) found 142 cases of autism referred to a government psychiatric outpatient clinic from 1979–1984. There were 5 cases of autism referred to the Department of Psychiatry, Chinese University of Hong Kong, in 1984–1985 (Wong, 1988). The population of Hong Kong at the end of 1984 was 5.4 million which was similar to that of Nanjing (Hong Kong, Government, 1985). The difference in the number of autism cases in the clinic population between these two places with predominantly Chinese subjects requires further investigation.

Although autistic children had been described in Hong Kong and China, the sample was small and detailed assessment of cases was absent. The present study tried to study the characteristics of autistic children in Hong Kong by using a larger sample and with detailed follow-up assessment.

METHOD

The central registration books from 1976 to 1986 of the Department of Psychiatry, University of Hong Kong, were examined. All cases with a diagnosis of infantile autism, developmental language disorder, mental handicap with autistic features, or other childhood psychosis were found. The department is attached to Queen Mary Hospital, which is a 1,310-bed regional hospital on Hong Kong Island. The department is one of the earliest centers in Hong Kong providing treatment for autism. Cases of autism were referred not only from Hong Kong Island but from all over Hong Kong.

All the case notes were studied by one of the first two authors. All cases that fulfilled the diagnostic criteria of infantile autism (Rutter, 1978) were included as subjects. The diagnostic criteria are (a) an onset before 30 months, (b) deviant social development, (c) deviant language development, (d) stereotypic behaviors and routines, and (e) the absence of delusions, hallucinations, and schizophrenic-type thought disorder.

The study was separated into two parts.

Data Recording From Case Files

(a) Preset questionnaires were used to record down the demographic, family, medical, and psychiatric data.

(b) The Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1986) was used for identification of behavioral symptoms and classification purpose. The scale has been developed and refined, based on over

a decade of use with more than 1,500 children. A score of 15–29.5 was classified as nonautistic, 30–36.5 as mildly–moderately autistic, and 37–60 as severely autistic. Rating was done by either one of the first two authors by reviewing the case files. Although the case notes were not organized systematically, they usually contained the relevant symptoms required for CARS. Discussion between the two authors was frequently made until there was good agreement in scoring.

Follow-Up

All the cases were traced for follow-up. The following instruments were used:

(a) Vineland Social Maturity Scale (Doll, 1965).

(b) Merrill-Palmer Scale of Mental Tests (Stutsman, 1948). If it was too easy, the Raven Progressive Matrix test was used instead (Raven, 1941, 1948, 1956). Local norms were used according to the *Hong Kong Supplement and Guide to the Standard Progressive Matrices* (Hong Kong Government, 1986).

(c) Language ability of the children was tested by the Developmental Language Screening Scale, a locally devised language scale adapted from core contents of well-documented language scales (Lee, Luk, Yu, & Bacon-Shone, 1985).

(d) All the children and their parents were seen for a semistructured interview by either one of the first two authors. The outcome data were entered into a preset questionnaire which consisted of the children's current level of social functioning and problem behaviors.

RESULTS

One-hundred sixty-two cases with diagnosis of infantile autism, developmental language disorder, mental handicap with autistic features, or other childhood psychosis were found. There were 87 children who met the diagnosis criteria of infantile autism, all of whom were included in the present study. There were relatively few cases referred to the Department before 1980. In the last 5 years, the number of new cases referred has been around 10–19 cases per year (see Table I).

Age and Sex

The usual age on presentation was 3–4 years old or younger, 77% of the total; 8% were referred at age above 7 years. There was a trend: Chil-

Table I. Number of Autistic Children Referred by Year

Year	<i>n</i> (<i>N</i> = 87)	%
1976	1	1.1
1977	2	2.3
1980	6	6.9
1981	12	13.8
1982	10	11.5
1983	19	21.8
1984	11	12.6
1985	16	18.4
1986	10	11.5

dren referred in the last 3–4 years were younger. There were 72 boys and 15 girls; the ratio was 4.8:1.

Demographic Characteristics

Social class was determined according to the classification of the General Register Office of England (1966) (Table II). A control group was found by including all the children under 16 years old referred to the same department from March 1987 to December 1988. There were slightly more social class I and fewer class V in the autistic group, but the chi-square test did not show a significant difference.

The mean number of siblings was 2.27 ($SD = 4.51$). Other demographic characteristics are listed in Table III.

Personal History

Personal history was obtained by reviewing case notes. Data were recorded only when they were clearly noted, otherwise they were regarded as unknown. Twelve (13.8%) had problems during pregnancy (e.g., threat-

Table II. Social Class Distribution Percentages

Social class	Autism (<i>n</i> = 87)	Control (<i>n</i> = 96)
I	17.6	10.4
II	17.6	21.9
III	44.6	43.8
IV	18.9	14.6
V	1.4	9.4

Table III. Demographic Characteristics

	<i>n</i> (N = 87)	%
Mother		
Age at birth of child above 35 years	6	6.9
Primary or below education	27	31.0
History of language delay	1	1.1
Father		
Primary or below education	13	14.9
History of language delay	3	3.4

ened abortion or toxemia of pregnancy); 8 (9.2%) had problems during delivery (e.g., prolonged labor and instrument delivery), 8 (9.2%) had problems at birth (e.g., anxiety over breathing), 4 (4.6%) had a birth weight less than 2.5 kg), 26 (29.9%) had a delayed motor milestone.

Psychiatric History

IQ testing was done when it was clinically necessary (e.g., when indicated for placement or treatment purpose). Only 38 (43.7%) children had IQ scores; of these, only 8 had IQ scores greater than 70 (Table IV). Most of the children were assessed by the Merrill-Palmer Scale. Forty-two (48.3%) had been assessed by Vineland Social Maturity Scale; only 6 (14.3%) had a social quotient higher than 70.

All the subjects were assessed with CARS. The mean score for CARS was 37.8 (*SD* = 3.8); minimum score was 30.5; maximum score was 49. According to this rating scale, 60.0% of the sample belonged to the severe autistic group.

Table IV. IQ of 38 Autistic Children on Presentation^a

Score	<i>n</i>	%
Below 20	0	0
20-34	2	5.3
35-49	10	26.3
50-70	18	47.3
Above 70	8	21.1
Unknown	49	

^aOf the 87 autistic children only 38 had IQ scores on presentation.

Follow-Up

Sixty-six (75.9%) children could be traced for follow-up; 58 boys and 8 girls. The ratio was 7.25:1 which was significantly higher than in the original sample (χ^2 test, $p < 0.05$). The length of follow-up varied from 2 to 10 years. After first presentation 41% were over 4 years; only 10.6% were over 8 years old. On follow-up, 86.4% of autistic children were below 12 years of age.

Placement

Most of the children had some educational problem in the preschool period. Only 19 (28.8%) studied in normal kindergarten; 13 (19.7%) received education in kindergartens with special facilities for problem children; 32 (48.5%) did not receive any formal education in the preschool period, they spent some of their time in the day unit of our hospital and the other time at home.

On follow-up, 57.6% of the children were studying in special schools, while 21.2% were studying in normal school. Of the remainder, 12.1% were idle at home, 4.5% were in a training center and 4.5% were unknown.

Drug Treatment

Thirty-nine (45.3%) children received drug treatment for overactivity. The most common prescription was a low dose of haloperidol and melleril. The duration of drug treatment depended very much on the response. In 30 children the duration of drug treatment was more than 1 year.

Symptoms

Many children displayed many symptoms on follow-up (Table V). The most common were inappropriate affect, irritability, overactivity, poor attention and concentration, problems of self-care, feeding problems, and temper tantrums.

IQ and Social Quotient

The majority of the children were in the mentally retarded range of intelligence (Table VI; only 5 had IQ scores above 100. The majority had social quotients below 70; only 2 children had social quotients above 100.

Table V. Symptoms on Follow-Up

Symptom	No. of children		
	Nil	Mild or dubious	Definite
Self-injurious behavior			
Head banging	52	5	9
Biting	55	4	7
Aggressive behavior to others	42	12	12
Motor activity			
Hyperactive	20	15	31
Hypoactive	58	4	4
Clumsy	36	12	18
Poor attention and concentration	8	16	42
Fear/phobia	31	20	15
Depressive mood	51	9	6
Irritability/agitated	17	20	29
Temper tantrum	17	26	23
Inappropriate affect	15	12	29
Sleep problem	52	7	7
Feeding problem	26	15	25
Urinary habit	57	2	7
Bowel habit	57	3	6
Self-cleanliness	20	14	32
Pica	42	12	12
Tics	60	1	5

Table VI. IQ and Social Quotient of Children on Follow-up

Score	IQ (<i>n</i> = 66)		Social quotient (<i>n</i> = 66)	
	<i>n</i>	%	<i>n</i>	%
Below 20	1	1.5	4	6.1
20-34	6	9.1	7	10.6
35-49	17	25.8	18	27.3
50-70	20	30.3	19	28.8
70-100	11	16.7	14	21.2
Above 100	5	7.6	2	3.0
Unknown	6	9.1	2	3.0

Language Ability

Depending on the score on the Language Screening Scale, the children were arbitrarily split into three groups: Group 1, language ability below the

Table VII. Language Ability of Autistic Children

	Language ability		
	Below 2.5 years old (%)	Between 2.5 and 3.5 years old (%)	Above 3.5 years old (%)
Verbal comprehension	51.6	6.3	42.2
Expressive speech	76.6	10.9	12.5
Nonverbal comprehension	67.2	0	12.5
Nonverbal expression	50.0	21.9	28.1
Interest in communication	81.2	7.8	10.9

norms of children aged 2.5 years; Group 2, between 2.5 years to 3.5 years; Group 3, ability above that of 3.5-year-old children.

The majority of the children had the language ability of children below 2.5 year old (Table VII). Only 12.5% could speak like a 3.5-years-old or above.

Onset of Speech

Onset of speech was arbitrarily defined as the time when the child could speak five different single words. Thirty-two had onset below 5 years old, 12 above. At follow-up 22 children could not speak five different single words.

Epilepsy

Seven (10.6%) of the children in the follow-up sample developed epilepsy. All of these had a history of convulsion and had been on anticonvulsant treatment. Six children developed epilepsy before 8 years old and one at the age of 14 years.

Outcome

Depending on their overall social adjustment, children were classified into four groups according to Lotter (1978): good outcome, normal or near normal social life, and satisfactory functioning at school or work; fair outcome, some social and educational progress in spite of significant, even marked abnormalities in behavior or interpersonal relationships; poor outcome, severe handicap, no independent social progress; and very poor outcome, unable to lead any kind of independent existence.

The majority were found to have problems of social adjustment. The proportion for good, fair, poor, very poor, and unknown outcome were 30.3, 47.0, 18.2, 31.9, and 1.5%, respectively.

Table VIII. Relationship Between Outcome and Onset of Speech^a

Outcome	Onset of speech		Total
	Before 5 years	After 5 years	
Good	16	4	20
Fair	15	15	30
Poor	4	7	11
Very poor	0	2	2
Total	35	28	63

^a $\chi^2(3) = 9.35, p < .02.$

It was found that early onset of speech, higher IQ, and higher social quotient predicted better outcome (Tables VIII, IX). The correlation between IQ and social quotient on presentation and on follow-up was high, Pearson's correlations were 0.5188 ($p < .005$) and 0.6333 ($p < .001$), respectively. When the IQ and social quotient score were missing on presentation, the scores on follow-up were used instead. When the group was split into two halves by sex, no significant difference was found between the two groups on IQ social quotient, CARS, onset of speech, and outcome.

DISCUSSION

When our child unit was set up in 1976, few people knew about autism and very few cases were referred to us. When the public and other professionals gained more knowledge of autism, more and more cases were then referred. Since 1981, about 10–20 autistic children were referred to our unit each year. The cases came from all over Hong Kong, and there was no indication that they were a biased sample. The sample in this study was probably representative of the problem of autism among Hong Kong Chinese.

The autistic children of our sample came from all social classes and the social class distribution was similar to the control. The result is in agreement with two recent epidemiological studies (in London, Wing, 1980; and in Sweden, Gillberg & Schaumann, 1982). The finding was different from Tao (1987) in two ways: first, number of cases; and second, social class. We are not sure whether the autistic children in Hong Kong differed from those in China. Detailed epidemiological study is necessary to clarify this difference.

There is a striking similarity between the characteristics of our sample and those reported in other countries. The sex ratio, intelligence, language ability, behavioral characteristic, and outcome are similar to those reported by Rutter and Lockyer (1967), Lotter (1978), and Gillberg and Steffenburg (1987). We also found that higher IQ and onset of speech before 5 years old was a good predictor of outcomes in our sample.

Table IX. Relationship Between Outcome and IQ^a and Social Quotient^b

Outcome	< 20		20-34		35-49		50-69		> 70		Total	
	IQ	SQ	IQ	SQ	IQ	SQ	IQ	SQ	IQ	SQ	IQ	SQ
Good	0	0	0	0	1	2	11	6	8	12	20	20
Fair	1	1	3	2	10	13	12	11	4	0	30	29
Poor	0	2	3	5	6	3	0	2	1	0	10	12
Very poor	1	1	0	0	0	0	0	0	1	0	1	1
Total	2	3	6	7	17	18	23	19	13	14	61	62

^a $\chi^2(12) = 72.1, p < .001.$

^b $\chi^2(12) = 55.29, p < .001.$

Deykin and MacMahon (1979) found that approximately one fifth of autistic children developed seizures by age of 18 years, with the peak period of onset being between 11 and 14 years. Only 10.6% of our sample developed epilepsy. The smaller number could probably be explained by the fact that our sample was younger, only 13.6% were above 12 years of age at follow-up.

Only a small minority has a family history of delayed language development. This was different from other studies that found a family history of speech delay present in about one quarter of cases (Bartak, Rutter, & Cox, 1975; Rutter, Bartak, & Newman, 1971). Some degree of underestimation was probably present in our sample because many of the parents did not know their own developmental milestones unless they were grossly abnormal and we had not seen other informants for history.

In our sample 50.1% had poor or very poor outcome at follow-up. Apparently the prognosis of our sample had better outcome than Lotter's or Gillberg's samples. They used the same classification of outcome and their findings were 62 and 59%, respectively (Gillberg & Steffenburg, 1987; Lotter, 1974). The discrepancy could partly be explained by the fact that our sample was younger and, as has been noted, a significant portion of autistic children deteriorate after adolescence (Gillberg & Schaumann, 1981; Rutter, 1970).

Recent research (Tsai, Stewart, & August, 1981; Lord, Schopler, & Revick, 1982) suggested that autistic girls tend to be more seriously affected than boys. Our sample did not show this difference. We had relatively fewer girls in our sample and fewer girls could be traced for follow-up; this might have affected the result. It is possible that the subjects who could not be traced had a more severe form of autism, and their families might have given up on them. A larger sample may help to resolve this problem.

Generally speaking, our findings were similar to those in other countries. Some of the discrepancies found might be related to the small sample and the relatively short duration of follow-up. Further study with long-term follow-up is necessary to clarify these differences.

REFERENCES

- Bartak, L., Rutter, M., & Cox, A. (1975). A comparative study of infantile autism and specific developmental receptive language disorder: I. The children. *British Journal of Psychiatry*, *126*, 127-145.
- Chen, S. C. L. (1986). Child Psychiatric cases attending a government psychiatric out-patient clinic over 6 years. In T. P. Khoo (Ed.), *Mental health in Hong Kong 1986*. Hong Kong: Mental Health Association of Hong Kong.
- Deykin, E. Y., & MacMahon, B. (1979). The incidence of seizures among children with autistic symptoms. *American Journal of Psychiatry*, *136*, 1310-1312.
- Doll, E. A. (1965). *Vineland Social Maturity Scale: Condensed manual of directions*. American Guidance Service: Circle Pines, MN.
- General Register Office. (1966). *Classification of occupations*. London, England: Her Majesty's Stationery Office.
- Gillberg, C., & Schaumann, H. (1981). Infantile autism and puberty. *Journal of Autism and Developmental Disorders*, *11*, 153-155.
- Gillberg, C., & Schaumann, H. (1982). Social class and autism: Total population aspects. *Journal of Autism and Developmental Disorders*, *12*, 223-228.
- Gillberg, C., & Steffenburg, S. (1987). Outcome and prognostic factors in infantile autism and similar conditions: A population-based study of 46 cases followed through puberty. *Journal of Autism and Developmental Disorders*, *17*, 273-287.
- Hong Kong Government. (1985). *Hong Kong 1985*. Hong Kong: Author.
- Hong Kong Government. (1986). *Hong Kong supplement to guide to the Standard Progressive Matrices*. Hong Kong: Author.
- Lee, P. W. H., Luk, S. L., Yu, K. K., & Bacon-Shone, J. H. (1985). A developmental language screening scale for use in Hong Kong. *Hong Kong Journal of Paediatrics*, *2*, 152-165.
- Lord, C., Schopler, E., & Revick, D. (1982). Sex differences in autism. *Journal of Autism and Developmental Disorders*, *12*, 317-330.
- Lotter, V. (1974). Factors related to outcome in autistic children. *Journal of Autism and Childhood Schizophrenia*, *4*, 263-277.
- Lotter, V. (1978). Follow-up studies. In M. Rutter & E. Schopler (Eds.), *Autism, a reappraisal of concepts and treatment* (pp. 475-495). New York: Plenum Press.
- Luk, S. L., & Lieh-Mak, F. (1985, Sept./Oct.) Child psychiatry in Hong Kong. *Journal of Paediatrics, Obstetrics and Gynaecology*, pp. 15-18.
- Ney, P., Lieh-Mak, F., Chang, R., & Collins, W. (1979). Chinese autistic children. *Social Psychiatry*, *14*, 147-150.
- Raven, J. C. (1941). The standardization of progressive matrices. *British Journal of Medical Psychology*, *19*(Pt. 1).
- Raven, J. C. (1948). The comparative assessment of intellectual ability. *British Journal of Medical Psychology*, *39*, 12-19.
- Raven, J. C. (1956). *Standard Progressive Matrices Sets A, B, C, D, & E* (Revised order 1956). Cambridge, England: University Press.
- Rutter, M., & Lockyer, L. (1967). A five to fifteen year follow-up study of infantile psychosis I. Description of sample. *British Journal of Psychiatry*, *113*, 1169-1182.
- Rutter, M. (1970). Autistic children: Infancy to adulthood. *Seminars in Psychiatry*, *2*, 435-450.
- Rutter, M. (1978). Diagnosis and definition. In M. Rutter & E. Schopler (Eds.), *Autism: a reappraisal of concepts and treatment*, (pp. 1-25). New York: Plenum Press.
- Rutter, M., Bartak, L., & Newman, S. (1971). Autism—A central disorder of cognition and language? In M. Rutter (Ed.), *Infantile autism: concepts, characteristics & treatment* (pp. 148-171). London, England: Churchill-Livingstone.
- Schopler, E., Reichler, R. J., & Renner, B. R. (1986). *The Childhood Autism Rating Scale (CARS) for diagnostic, screening and classification of autism*. New York: Irvington Publishers.
- Stutsman, R. (1948). *Mental measurement of pre-school children*. New York: Harcourt Brace Jovanovich.
- Tao, K. T. (1987). Brief report: Infantile autism in China. *Journal of Autism and Developmental Disorders*, *17*, 289-296.

- Tsai, L., Stewart, M. A., & August, G. (1981). Implication of sex differences in the familial transmission of infantile autism. *Journal of Autism and Developmental Disorders, 11*, 165-173.
- Wing, L. (1980). *Autistic children: A guide for parents*. London, England: Constable.
- Wong, C. K. (1988). Child psychiatry in Hong Kong: I. A retrospective study. *Journal of the Hong Kong Medical Association, 40*, 40-49.