

PREVALENCE OF MENTAL HANDICAP AND ITS SEASONAL VARIATION

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INTRODUCTION

There have been a number of reports suggesting that mental handicaps are more prevalent among those born in the Winter and Spring. These studies fall into two types: firstly those of particular diagnostic categories (e.g. Edwards (1961), Pleydell (1957), Knobloch and Pasamanick (1962) who have studied mongolism, anencephaly and other congenital anomalies) and secondly those of studies of particular bands of I.Q. ranges in the population (e.g. Pintner and Forlano (1943), Berglund (1967), Orme (1963 and 1965)).

Any epidemiological study of the seasonal variation of a particular characteristic such as mental handicap must face the problem of defining of a sample and the population from which it was drawn. Studies of the former type above are hampered in this respect by small numbers. Large scale studies of the latter type are neither fashionable these days nor easy to justify for the general population because of the criticisms of I.Q.s. *per se*. However, it is possible that the use of intelligence test data permits a more accurate means of categorisation to that based on behavioural ratings and administrative definitions of degrees of mental handicap.

In an attempt to get round such problems, Orme (1979) found that the monthly percentages of cases with I.Q.s. three standard deviations less than the mean in a total sample of 713 cases with I.Q.s. two standard deviations less than the mean was significantly inversely correlated with the monthly mean climatic temperature. However, one criticism of this method is that the percentage of cases with I.Q.s. two standard deviations less than the mean could conceivably itself vary in the general population and therefore confound the results.

The only fully satisfactory method for studying such effects is to calculate rates of incidence of cases per 1000 births in such an interval or with such a population that sufficient cases emerge to allow statistical significance to be tested. However, it is not possible to identify all cases of mental handicap at birth and even today many are only recognised when they attend school, particularly if they are only mildly affected. By this age many of the most severely handicapped may already have died. Incidence of cases per 1000 births is therefore very difficult to calculate. A preliminary epidemiological study of this effect could nevertheless be attempted by calculating rates of prevalence/1000 population in particular age-groups at a particular time hoping that biases from deaths will be minimal.

Another more fundamental problem is that even after the effect has been fully described, it will be very difficult to find reasons because so many variables have a potential part to play. Nevertheless, this should not stop investigators from trying to establish whether a significant effect does exist.

We believe this paper is the first to report prevalence variation by season calculated from full identification of both the severely mentally handicapped and E.S.N.(M) children and young adults in a well defined population using the Sheffield Case Register (for details, see Martindale, 1976).

METHOD

All young people referred to the Sheffield Case Register as being severely mentally handicapped or E.S.N.(M) and born between 1st January, 1960 and 31st December, 1979 were included in the sample. The sample was analysed by month and season of birth, sex, five-year age-groups and severity. Population figures for years and quarterly live births were extracted from statistics compiled since 1960 by the Environmental Health Department of Sheffield Area Health Authority which are issued quarterly. From the two sets of figures rates/1000 live births of cases in particular age-groups and born in particular quarter-years were derived and comparisons made between them. It was not possible to derive rates for the two sexes separately.

Although the Register collects details for people born before 1960, these data were not analysed because corresponding population figures from which to derive rates were not available.

RESULTS

There were a total of 1,658 children and young adults in the sample amongst whom the expected excess of males was observed (991 against 667 females). 546 of the sample were classified as severely subnormal and 1,112 as mildly subnormal and the male sex bias of the sample was most marked in the sample of mildly subnormal (676 compared with 436 females) as expected.

Table 1 below shows the rates/1000 population in the full sample of under 20 year olds of mild and severe subnormality for cases born in the four quarters of the year.

Table 1

| Quarter-Year | 1 | 2 | 3 | 4 | Total |
|------------------|------|------|------|------|-------|
| Severity: Severe | 3.9 | 3.8 | 3.8 | 3.5 | 3.8 |
| Mild | 9.3 | 11.4 | 9.0 | 8.2 | 9.5 |
| Total | 13.2 | 15.2 | 12.8 | 11.7 | 13.3 |

The overall pattern of referral rates shown in Table 1 is subject to systematic variation when 5-year age-groups are considered as shown in Table 2 below.

Table 2

| 5 Year Age-Group | « 5 | 5-9 | 10-14 | 15-19 | Total |
|------------------|-------|-----|-------|-------|-------|
| Severity: Severe | (3.7) | 3.2 | 3.5 | 4.6 | 3.8 |
| Mild | N.K. | 6.0 | 8.8 | 13.4 | 9.5 |
| Total | N.K. | 9.2 | 12.3 | 18.0 | 13.3 |

Because of difficulties of categorisation, the rate for severe mental handicap in the under 5's age-group may include a few very young mildly subnormal children and exclude a few very young severely subnormal children.

The mild and total rates for the under 5's age-group are not quoted because relatively few children are identified as E.S.N.(M) before starting school and rates reach a peak in the older age-groups at school leaving age as more and more children are referred for special education throughout their school lives.

Tables 1 and 2 seem to suggest that, after age 5, rates increase up to age 20 for both mild and severe subnormality but the increase is most marked for the mild group in which seasonal variation also appears to be most marked. There is only about 10% variation in rates between the highest quarter (the first) and the lowest quarter (the fourth) for the severely subnormal whereas there is almost a 40% difference between the highest (second) and lowest (fourth) quarters for the mildly subnormal.

In previous papers, in some instances the seasons have been defined differently from the four quarters of the year but the overall pattern of the figures in this paper does correspond with previous work. The observed numbers of referrals in different age-groups and quarter years were compared with figures expected from overall rates if there was no effect of season of birth using the Kolmogorov-Smirnov test (see Siegel, 1956). The only test to reach statistical significance at the .05 level of probability is that for the entire group of 1,112 mildly subnormal referrals. This indicates that the effect is not a large one. Nevertheless, monthly referrals for the age-groups 5-9, 10-14 and 15-19 years do have significant Spearman correlation coefficients of 0.55, 0.82 and 0.85 respectively with the monthly referrals for the entire group of mildly subnormal referrals suggesting that the small effect has persisted over many years. By comparison, equivalent correlation coefficients for the severely subnormal groups are spurious and insignificant and this confirms that it is not possible to try to explain insignificant seasonal variations for this group in terms of different groupings of months used by previous investigators.

Unlike in Orme's (1979) study, monthly referrals do not correlate significantly with monthly mean climatic temperature for any age-group or degree of severity. However, this does not prove that a relationship does not exist in this study. It may be that *monthly rates*, if it was possible to calculate them, *would* demonstrate a relationship.

DISCUSSION

The findings of this survey imply that any seasonal variation in prevalence of mental handicap is of such a small extent that it can only be reliably detected and studied in any detail with any hope of finding causes in very large surveys in well defined populations. It could be that the effect is either not generally applicable to the majority of the mentally handicapped (and only therefore appears as a small effect in a large survey) or is a very small but persistent effect across the entire group. Because the results of this survey are more noteworthy for the larger mildly subnormal group, it seems that the effect may better be explained as the latter. However, the fact that E.S.N.(M) children are known to come primarily from the lower-socio-economic groups (see Martindale, 1980) prevents one from concluding that the effect may be an extension of that for the population in general. It is therefore perhaps worth repeating the point made in the introduction that the use of I.Q. measurements leads to more precise data than the rating E.S.N.(M). This might be particularly true with the present sample aged 19 and below as categorisation can be less reliable (or valid) in childhood.

It must be stated that although the effect of season of birth on rates of mental handicap has been observed for many years, it is still not understood. The effect is probably complex and may include influences not directly related to seasonal factors.

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