

Adolescent outcome for hyperactive children

What happens to children who have been diagnosed as hyperactive when they reach adolescence? A number of studies involving North American populations have now attempted to provide an answer. Most of these were undertaken when the diagnosis of hyperactivity was defined by the *Diagnostic and statistical manual of mental disorders* (DSM II) as a disorder 'characterised by overactivity, restlessness, distractibility and poor attention span, especially in young children'.¹ This diagnosis accounted for about 5.5% of the general elementary school population,² and up to 30-40% of child clinic cases.³ Notably, the definition added that 'The behaviour usually diminishes in adolescence'. This statement was controversial at the time and whether the hyperactive symptomatology disappeared or not, some felt that the disorder acts as a precursor to the development of social, personality, or even gross psychopathological disorders in adult life. With the arrival of DSM III and the conceptual change of hyperactive syndrome to attention deficit disorder, do we know the answer?

Outcome study methodology

Outcome studies of childhood hyperactivity are typically of two types: follow up and follow back.⁴ The problem with the latter is that the subject pool is often untypical of the general population of hyperactive individuals as they are, for example, adult psychiatric patients or adults with continuing hyperactive behaviours. Of the follow up studies, many have failed to use control subjects, which makes it difficult to extrapolate the results to the general population of hyperactive children. Controlled, follow up studies are therefore likely to be the most reliable sources of information. If adolescence is arbitrarily defined as the age group 11-18, eight such studies qualify for inclusion in an analysis.⁵⁻¹²

Drawing conclusions from even these studies is problematic because of the variability of study design. There is, for example, little consistency in the type of control subjects used (for example, sibling controls, supernormal controls) and the degree to which they are matched. If, for example, supernormal controls are used in which subjects have been selected for an absence of any behavioural or psychological disorder, this tends to exaggerate the difference in symptomatology between index and control subjects. Attrition rates,

where reported, range upwards to 40% with only one of the studies exploring the difference between those subjects who were followed up and those who were lost to follow up.¹² Not having this information makes it difficult to assess the representativeness of the subjects studied compared with the original group identified for follow up.

Finally, the selection criteria for index subjects varies between studies. The DSM II diagnostic criteria lack precision but commendably all but one of the studies have defined in more detail the selection criteria used. Even so there is variability, which makes it difficult to reliably combine information from different studies. Despite these drawbacks the studies under review do produce results that are consistent across studies.

Results from the controlled, follow up studies

SYMPTOMATOLOGY

The study by Lambert *et al*¹² showed that the course of the disorder is variable between individuals.¹² By 14 years of age, 20% of their sample were symptom free; 37% were not being treated by hyperactivity but had persistent problems of behaviour, learning, or emotion ('residuals'); and the remainder (43%), had emotional, learning, and behavioural problems and were still being treated for hyperactivity ('still hyperactive'). Gittleman *et al* diagnosed 40% of index subjects at follow up (mean age 18.3 years) as having some form of hyperactive disorder, with 48%, including those with hyperactivity, having a DSM III diagnosis of some type, but mainly in the conduct disorders range.¹¹ No case of major psychiatric illness was identified.

ANTISOCIAL BEHAVIOUR

There is evidence from four studies that some hyperactive children are at risk for developing antisocial behaviours in adolescence. Hoy *et al* found that index subjects were more likely to have received a police caution than control subjects,⁹ and Satterfield *et al*, using police records, found a higher incidence of arrests for index subjects in all socioeconomic groups compared with control subjects.¹⁰ Lambert *et al* also found a significantly higher frequency of school suspensions and trouble with the police than was the case for control subjects.¹² In addition to finding a higher rate of school and non-school antisocial behaviours in index children, Gittleman *et al*

also found a significantly higher rate of substance abuse disorders in index subjects in comparison with control subjects.¹¹

COGNITION

Several studies have investigated the cognitive functioning of index and control subjects and overall it seems that many hyperactive children continue to have poorer styles of attentional performance and problem solving strategies. The studies of Cohen *et al*⁷ and Lambert *et al*¹² found, using the Embedded Figures Test, that index subjects were significantly worse than control subjects in employing effective problem solving strategies. Poorer attentional test performances of index subjects were found in the studies of Hoy *et al*⁹ and Lambert *et al*.¹²

ACADEMIC ACHIEVEMENT

Three studies reported that index subjects were more likely to have to repeat school grades than is the case of control subjects.^{5 9 12} In addition, using more formal measures of educational attainment, Lambert *et al* found that index subjects scored significantly poorer on tests of mathematics and reading comprehension than did control subjects.¹² It is notable that the studies of Minde *et al*,⁵ Gittleman *et al*,¹¹ and Lambert *et al*¹² all showed that index subjects scored significantly more poorly on tests of intelligence within a range of 7–11 points than did control subjects.

Discussion

The various studies reported on indicate that, compared with control subjects, adolescents who were hyperactive as children are more likely to continue to show hyperactive behaviours or other learning, emotional, and behavioural difficulties. Also they are more likely to be engaging in antisocial behaviours and those involving substance abuse. Cognitive difficulties, typically involving problem solving strategies and attentional performance, continue to be poor with related consequences on academic achievement.

What is noteworthy, however, is that the outcome is variable. Both the Gittleman *et al*¹¹ and Lambert *et al*¹² studies suggest that by early adolescence (about 14 years of age) up to 20% of index children are free of psychological or behavioural disorders, with the former study showing that by age 18 this number rises to 52%. Of the remainder, about 50% in each age group were still reported to be hyperactive and have associated problems, with the remaining 50% having problems of conduct and learning with a development towards antisocial and substance abuse behaviours by the time they

reached late adolescence.¹¹ Broadly speaking then the outcome is tripartite and the interesting question is what determines the type of outcome?

The research tends to suggest that therapeutic intervention is not a significant outcome predictor. In all of the studies reviewed, index subjects received a variety of treatments, although in no study was this under full experimental control. In two studies reporting treatment data (Minde *et al*⁵ and Lambert *et al*¹², 100% and 85% respectively of index subjects received stimulant medication, and in the case of the former study, outcome was found to be unrelated to the duration of drug taking. This finding is supported by a number of other studies that have failed to establish the efficacy of stimulant medication used for over a year.¹³ In the Minde *et al*⁵ and Lambert *et al*¹² studies subjects also received other types of treatment. In the latter study, for example, 57% had received special education or tutoring programmes, 19% psychological therapies, and 11% diet or motor treatment. Even so, the intervention efforts failed to improve the outcome for most subjects in their study, and Minde *et al* also failed to show any significant association between these other forms of treatment and outcome.⁵

Data from several studies suggest that those hyperactive children in adolescence who cease to have hyperactive symptoms but show other behavioural problems (residual type) are more likely to have shown higher levels of conduct disorder initially. This is true of the index children in the Weiss *et al*⁶ study and in a further study by Satterfield and Schell.¹⁴ In a more extensive study of outcome predictors in a group of hyperactive children, Paternite and Loney show that aggressive symptomatology is the largest outcome predictor with environmental and family variables also making a further but more modest contribution.¹⁵

There is little evidence to bring to bear on the question of what determines the differential outcome for those two other groups of children: one of which ceases to have psychological problems in adolescence and the other which continues to show hyperactive symptoms. There is, however, suggestive evidence that there may be a cognitive dimension on which these two groups differ. Lambert *et al* found that their 'no problem' group had the characteristic of being more cognitively mature compared with the 'still hyperactive' group.¹² Cognitive maturity is defined as a high score on measures of intelligence, formal reasoning, and academic achievement. It may be therefore, that a relatively superior cognitive ability may serve as a protective factor for the non-aggressive, hyperactive children particularly as it may ensure a better adjustment in the school environment. Conversely, some non-

aggressive hyperactive children may be characterised by several types of cognitive deficits that persist into adolescence and continue to be associated with hyperactive symptomatology.

It will be profitable for future research studies to investigate further the features associated with the different outcomes for children diagnosed as hyperactive in childhood. Cognitive ability may well be an important predictor but better measures will need to be developed of key variables such as attention, cognition, problem solving ability, and impulsivity. Finally, all of the studies here used normal control groups and it will be useful to explore how hyperactive children compared with other psychiatric groups. This will provide information about outcome characteristics which are specific to hyperactivity as opposed to those which accompany psychiatric and psychological disorders in general.

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