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Arch. Dis. Child. 2005;90;245-248
doi:10.1136/adc.2003.039826

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ORIGINAL ARTICLE

The association between hyperkinesia and breakdown of parenting in clinic populations

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Accepted 6 April 2004

Background: There is increasing recognition that child based, as well as parent based factors may be associated with children being excluded from their families. Despite the distress routinely observed among the parents of hyperactive children, there is little research on this in clinic populations.

Aims: To examine removals from home in a typical secondary care population, where hyperkinesia was accurately diagnosed.

Methods: A total of 201 cases were coded using multiaxial ICD-10 criteria and Jarman indices derived from census data.

Results: Hyperkinetic children were more than three times more likely to have suffered removal from home than children with other psychiatric diagnoses, independent of any psychosocial measure.

Conclusion: Hyperkinesia is a specific risk factor for removal from home, which can operate in the absence of other psychosocial stressors. Screening children for hyperactivity is now simple, and the routine paediatric examination for children accommodated by the local authority gives an opportunity for early detection and treatment of hyperactivity in children at risk of family breakdown.

Hyperactivity is the commonest neuropsychiatric disorder of childhood. Its most severe form (hyperkinesia) affects around 1% of UK children,¹ but can be effectively treated with medication.² Hyperactive intrusiveness, impulsivity, and restlessness make these children notoriously difficult to look after, and they stress both their parents and teachers.^{3–5} Behaviour disorders in children are associated with family problems and disruption,⁶ while foster-carers may cease fostering altogether as a result of the fostered children's behaviour.⁷ Though the association between hyperactivity and behaviour disorder is well known,⁸ the association between hyperactivity and family disruption is much less clear. Some researchers have found no association between the broader syndrome of attention deficit hyperactivity disorder (ADHD) and the quality of the family environment,⁹ while others have identified unhelpful parenting styles in hyperkinesia,³ the alleviation of which is associated with better outcome¹⁰ for these children. Irretrievable parenting breakdown leads to fostering or adoption, and there are high rates of ADHD among fostered or adopted children,¹¹ but it is not clear whether, or how, hyperactive children at risk of parenting breakdown would come to the attention of paediatricians or child psychiatrists in the UK. We therefore examined evidence for parenting breakdown in cases of hyperkinesia referred to a secondary care clinic, to see if a diagnosis of hyperkinesia was a separately identifiable risk factor for parenting breakdown in clinic populations.

METHODS

The sample has been extensively described elsewhere.^{12–13} Briefly, it comprised a sample of 201 cases from a typical secondary care clinic, whose case notes were coded using the multiaxial version of the International Classification of Disorders (10th edition) (ICD-10),¹⁴ with particular attention paid to hyperactivity, which was diagnosed as ICD-10 hyperkinesia. Around 10% of the data was missing at random, and was replaced by multiple imputation.^{15–16} There are slight differences between the univariate statistics presented here and those previously published¹³ because the

imputation procedure was repeated, rather than the same imputed data set being used in both papers. None of the differences between the original, or either of the imputed sets were statistically significant (for all variables $p > 0.8$).

Diagnostic classification was into hyperkinesia, and the broad diagnostic groups of no disorder, non-hyperkinetic conduct disorders, emotional disorders, mixed disorders of conduct and emotions, and other disorders. Cases of hyperkinesia comorbid with any other disorder were included in the "hyperkinesia" category. Preliminary analyses¹⁷ had identified the multiaxial ICD-10 psychosocial category of "removal from home carrying significant contextual threat" (ICD-10 code 6.1) as being specifically associated with a hyperkinetic diagnosis (Fisher's exact test, $p = 0.048$). Most cases had problems in more than one psychosocial area, so the remaining categories, which did not individually associate with hyperkinesia, were summed to give a quantitative measure of social adversity from other sources. Jarman underprivileged area (UPA) scores for each case were derived from postcode related census data¹⁸ and included as a separate variable.

Code 6.1 includes children who have been removed to an institution such as a children's home, fostered, or been admitted to hospital for prolonged or multiple admissions, but this sample contained no children with inpatient histories fulfilling the last criterion. Multiaxial ICD-10 also includes a code 9.1, analogous to 6.1 except that the removal from home is a consequence of the child's own disorder or disability. No case was so coded.

The 13 fostered children in the sample showed no preponderance of hyperkinesia (Fisher's exact test, $p = 0.59$) and were more likely to be referred by social workers (Fisher's exact test, $p = 0.001$). Adopted children posed more problems. These seven children comprised 3.5% of the total sample, with marked over-representation of these children in the hyperkinetic group (11.4%:1.8%, Fisher's exact test, $p = 0.02$). However, ICD-10 does not class adoption, as opposed to fostering, as a psychosocial disadvantage and in practice, two adopted children did not warrant a 6.1 coding. Even though adoption may not be a removal from home

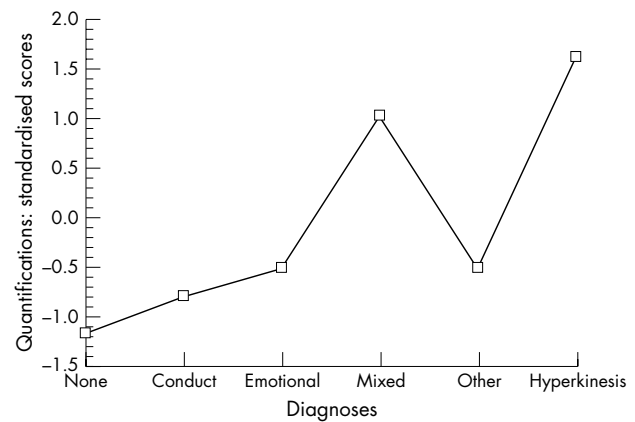
Table 1 Sample characteristics

Item	Mean (SD) or frequency (%)
Total sample size	201
Age (y)	8.1 (2.23)
Male	143 (71.1%)
Female	58 (28.9%)
Number of psychosocial difficulties	2.99 (1.79)
Jarman UPA score	2.80 (15.0)
No psychiatric disorder	16 (8%)
Conduct disorder	51 (25.4%)
Emotional disorder	48 (23.9%)
Mixed disorder of behaviour and emotions	31 (15.4%)
Other disorder	18 (9%)
Hyperkinesia	37 (18.4%)
Removed from home	36 (17.9%)

carrying significant contextual threat, it does necessarily indicate that a child's biological parents were unable to fulfil their roles, so adoption status was combined with code 6.1 for the main analyses.

Other factors could also indicate families at risk of breakdown. Thus 6.5% of the sample were referred by a social worker, but showed no bias towards hyperkinesia (Fisher's exact test, $p = 0.7$). Being subject to Court Orders related to parenting (including Care Orders) showed no bias (Fisher's exact test, $p > 0.99$). Child protection registration was also evenly distributed (Fisher's exact test, $p = 0.54$). Therefore, none of these variables were analysed further. Age was included, as the chances of adversity of all kinds must increase with age, but not gender—only three of the hyperkinetic children were girls.

Following simple univariate and bivariate analysis, categorical regression was used to quantify removal from home in terms of psychiatric diagnosis, Jarman UPA score, and the total number of other psychosocial adversities. This approach uses optimal scaling to convert any categorical variable to a set of numerical, standardised scores, which preserves that variable's characteristic relation with the other variables in the equation. These scores can then be substituted for the non-numerical categorical data in regression equations. The principle may be generalised to all levels of measurement, and non-linear relations. Initially a descriptive technique, it has now been extended to include statistical inference.^{19 20} The procedure is implemented in the program CATREG, now distributed as part of the "Categories" module of SPSS 11.0. For the current study, transforming diagnosis to a quantified variable would scale the diagnostic categories with respect to removal from home, and allow testing of the single hypothesis that there was a significant association between the two variables. The equivalent logistic regression analysis is much less efficient, as it could only test whether any diagnostic category was different from each of the others. However, logistic regression was used to calculate relevant odds ratios. To take into account deviations from linearity in the original data, all continuous variables were specified as

**Figure 1** Quantification of diagnoses with respect to removal from home.

being at the ordinal level of measurement in CATREG, as shown in table 2. Categorical regression estimates the association between independent variables (covariates) by the tolerance statistic; the proportion of a variable's variance not accounted for by the other independent variables in the equation. The tolerances of the transformed variables all lay above 0.98, suggesting substantial independence, so interaction effects were not analysed. Aside from the multiple imputation procedure, all analyses were carried out using SPSS 11.0.

RESULTS

Table 1 presents the demographic characteristics of the sample and descriptive statistics for the variables of interest. Figure 1 shows the quantifications of the diagnostic classes obtained by the categorical regression analysis.

The standardised scores (mean = 0, implying no effect; standard deviation = 1) for the diagnostic quantifications may be read from the y-axis. The scaled diagnoses form two groups. The quantifications of no disorder, conduct disorder, emotional disorder, and other disorders all lie between 0.5 and 1.2 standard deviations below the quantification mean, while mixed disorder and hyperkinesia lie, respectively, at 1 and 1.6 standard deviations above it. As the quantification is positively associated with removal from home (see table 2), hyperkinesia is the diagnostic category that most strongly predicts it. Table 2 presents the regression coefficients (slopes) of all the independent variables (covariates).

Diagnosis is significantly associated with removal from home. Both the Jarman UPA indices and the number of other psychosocial diagnoses were associated with removal from home in the expected direction, but the association was with younger, rather than increasing age.

Binomial logistic regressions using the same variables indicated that hyperkinetic children were 3.2 times more likely ($p = 0.018$) to have experienced removal from home than all other diagnostic categories, and 4.3 times more likely

Table 2 Regression coefficients of optimally scaled independent variables

	Standardised coefficients				
	Beta	SE	df	F	Sig
Diagnoses (nominal scaling)	0.208	0.062	5	11.185	0.000
Jarman UPA index (ordinal scaling)	-0.431	0.063	8	47.403	0.000
Other psychosocial diagnoses (ordinal scaling)	0.242	0.062	4	15.025	0.000
Age (ordinal scaling)	-0.195	0.062	7	9.754	0.000

Dependent variable: removed from home (nominal scaling).

What is already known on this topic

- Children with hyperactivity are at risk of developing conduct problems, and frequently benefit from diagnosis and subsequent specific treatment, including medication.
- Children with conduct problems are over-represented in the care system, and their symptoms can lead to parenting breakdown, but the significance of hyperactive symptomatology is less clear.
- Effective screening tools for hyperactivity now exist, and can substantially improve detection rates.

($p = 0.006$) when cases with mixed disorders were excluded from the analysis. With hyperkinetic cases excluded, mixed disorders of conduct and emotions were 2.6 times more likely ($p = 0.076$) to have experienced removal from home than the other remaining diagnostic categories.

There is thus a significant association between a hyperkinetic diagnosis and removal from home, which cannot be accounted for by other social disadvantages.

DISCUSSION

Hyperkinetic children seen in clinic are at least three times more likely to have experienced removal from home than other clinic attenders. This relates specifically to the hyperkinetic diagnosis, not to any associated psychosocial difficulties. It is already known that medicating such children may improve family functioning,²¹ so prompt detection and treatment of hyperkinetic children at risk of exclusion from their families may help keep them at home.

In the UK, the ability to detect hyperactivity in children at risk of family breakdown has recently been enhanced by the questionnaire pack that accompanies the National Assessment Framework for Children in Need.²² This includes the Strengths and Difficulties Questionnaire (SDQ), which can be a useful screening tool for detecting hyperactivity in community samples.²³ Use of such screening tools can substantially improve detection rates of hyperactivity in referred populations.¹² Paediatricians could use the SDQ as part of the mandatory medical screen for looked-after children, giving them the opportunity to diagnose, treat, or refer on cases at high risk of hyperactivity, who are on the threshold of family breakdown. Though social workers are aware of hyperactivity, most do not understand its significance or treatment²⁴ and so may not think to refer cases for assessment. The dataset gives some support to this view, as fostered children were more likely to have been referred by a social worker but had no excess of hyperkinesis, while the sample's adopted children, who did have more hyperkinesis, were never referred by a social worker.

Unfortunately, this study lacks sufficient power to investigate the suggestion of a weaker association between removal from home and mixed disorders of conduct and emotion.

Being a clinic sample, the associations identified derive both from the conditions' characteristics and the referral process. This may be the reason for the direction of the association between age and removal from home, particularly as none of the variables in this dataset modulated the association. Children removed from home are likely to present more difficulties than children who are not, and so they may reach the clinical threshold for referral sooner. Floor effects would prevent this being demonstrable in a clinic sample. While these findings may thus not generalise to non-referred cases, the sample is typical for children

What this paper adds

- Severe hyperactivity (hyperkinesis) is a specific risk factor for parenting breakdown, increasing the risk at least threefold.
- A policy of using screening instruments for hyperactivity at the mandatory medical examination when children are accommodated by the local authority could help detect these children.

attending a child psychiatry clinic, and there is little difference between hyperactive children seen by child psychiatrists and those seen by paediatricians.²⁵ Our results are therefore likely to apply to cases seen by paediatricians in their ordinary practice.

The diagnostic category used was that of hyperkinesis, not ADHD. Hyperkinesis forms a homogeneous subset within ADHD, non-hyperkinetic ADHD including a much larger and more heterogeneous population, so these associations may not generalise to non-hyperkinetic ADHD. However, hyperkinetic children are the most disabled, and typically need methylphenidate to improve.²⁶ Given that much of the long term morbidity of hyperactivity arises from the development of comorbid behaviour problems,²⁷ reducing family breakdown in this group might improve the prognosis of those children most severely disabled by their hyperactivity.

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Competing interests: none declared

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ARCHIVIST

Women power in Nepal

People, even the illiterate, the poor, and the deprived, *do* take an interest in their own welfare and *are* capable of helping themselves. Consider one of the most beautiful, most fascinating, and poorest of countries—Nepal. The average annual income is about £133 (US \$240). Most women (57%) are illiterate. They give birth to an average of 4.4 children, and pregnancy complications kill one mother for fewer than 200 livebirths. One in 25 babies born alive is dead within 4 weeks and one in 40 of all babies born after 28 weeks gestation is born dead. Almost all babies are born at home and at few births is there a trained health worker. But the situation is far from hopeless. Researchers there (Dharma S Manandhar and colleagues *Lancet* 2004;**364**:970–9, see also comment: *ibid*: 914–5) have shown the power of organised women’s groups.

The Makwanpur district is southwest of Kathmandu, where the foothills meet the plains. The 400 000 people depend on subsistence farming. The local administrative unit is the “village development committee (VDC)” of which there are 43 in Makwanpur. Twenty-four of these VDCs were allocated into pairs and the members of each pair were randomised—one to intervention and the other to control—by tossing a coin. The average VDC covered an area of 60 square kilometres and had a population of about 7000. In every intervention VDC a local woman was appointed facilitator. She had to be literate but it was considered important that she should not be a health professional. She was given brief training in perinatal health issues. Her task was to set up monthly women’s group meetings in each of nine wards per VDC and to support the women in their discussions of maternal and neonatal problems. The groups were encouraged to identify and prioritise problems, and to develop strategies to address them. This was done over the first ten of the monthly meetings, and in subsequent meetings the women got down to implementing and assessing their strategies. The emphasis throughout was on participatory learning rather than instruction. The women asked for, and were given, more information about perinatal health. No funding was given for group activities but they did things such as collecting money for mother and baby care, organising stretcher schemes, handing out clean delivery kits, and visiting pregnant women. Health centres in both intervention and control VDCs were provided with basic neonatal equipment from research funding. Between 1 November 2001 and 31 October 2003 there were 3190 pregnancies in intervention VDCs and 3524 in control VDCs. The neonatal mortality rate was 26 per 1000 in intervention VDCs and 37 per 1000 in control VDCs. Maternal mortality was 69 vs 341 per 100 000 (2 in 2899 vs 11 in 3226). The stillbirth rate was 24.6 vs 23.3 per 1000 births. The improvements in the intervention VDCs were associated with increases in antenatal care uptake, institutional delivery, presence of a trained attendant at delivery, and hygienic care. Only 8% of married women of reproductive age ever attended the group sessions but their influence clearly spread. The cost per newborn life saved was estimated at somewhat less than £2000.

Puts a new slant on the old cry of “Power to the people”, doesn’t it? The buzz phrase is “demand-side intervention”. To coin a Churchillian phrase, “some demand, some power, some people”!