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Physical Illness
A Risk Factor in Anorexia Nervosa

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Reports have appeared in the literature suggesting an association between physical illness and the later development of anorexia nervosa. The histories of 326 patients with anorexia nervosa were examined for physical illness. A higher rate of severe physical illness was found in this group when compared with controls suggesting that it should be regarded as a risk factor for anorexia nervosa. No statistically significant differences were found when illness was examined by time in relation to onset of anorexia, system involved, or when subjects were stratified by age. Possible explanations for the observed association are discussed.

Ryle (1936) first suggested that there was an association between a history of severe physical illness and the later development of anorexia nervosa. From his series of 49 anorexic patients, he identified an older group for whom operations and illnesses appeared to play a leading part in the predisposition to the condition. Dally (1969) found that for 38 of his series of 140 patients with anorexia nervosa, the patients' mothers considered that there had been undue physical ill-health during the daughters' life before the onset of anorexia nervosa. The disorders included asthma, tuberculosis, congenital blindness, squint and deafness following otitis media. Recently reports of cases of specific conditions coexistent with anorexia nervosa have appeared, for example, Turner's syndrome (Pitts & Guze, 1963), (Kron *et al*, 1977), urogenital abnormalities (Halmi & Rigas, 1973) diabetes mellitus (Fairbairn & Steel, 1980; Szmukler & Russell, 1983) and neurofibromatosis (Fitzpatrick *et al*, 1983).

Apart from physical illness being a cause of vulnerability to anorexia nervosa, it has been suggested (Dally 1969; Beaumont *et al*, 1978) that physical illness may precipitate the onset of anorexia nervosa. Physical illness was hypothesised to induce a physiological anorexia which subsequently developed into true anorexia nervosa. Head injury also has been cited as a precipitant (Damlouji & Ferguson, 1985) of anorexia nervosa.

In the setting of a large-scale epidemiological study it has been possible to examine the relationship between anorexia nervosa and physical illness. Two hypotheses were specifically examined:

(1) that excessive physical illness earlier in life renders an individual vulnerable to the later development of anorexia nervosa, i.e. should be considered among the risk factors for this condition;
(2) that acute physical illness can act as a precipitant for anorexia nervosa in at least a subgroup of cases.

Method

Subjects

The subjects of this study were a group of patients fulfilling the criteria formulated by Russell (1970), for anorexia nervosa. This index group were patients who were referred to the Academic Department of Psychiatry at the Royal Free Hospital for the management of anorexia nervosa between 1972 and 1981.

They were compared with two control groups. The first control group was an age/sex matched population chosen at random from the lists of a large local general practice, which was chosen as the doctors routinely recorded details of past medical history when a patient was first seen. The practice served a population similar in social class to our index group. The second control group was female schizophrenic patients admitted to the psychiatric ward of the Royal Free between 1973 and 1983 and under the age of 35 years at the time of admission. This second control group was included because, unlike the first, the patients were referred to a psychiatric department and therefore would have had histories recorded in a similar manner to the index group.

Data collection

For the index group, coded data were derived from the history recorded at the patient's initial assessment interviews and for the schizophrenic control group data were similarly coded from the admission history. For the general practice

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control group all relevant information until the time of case note scrutiny was recorded. The data coded included episodes of physical illness until the time of onset of anorexia nervosa or schizophrenia in the two psychiatric groups.

Illnesses were coded into two groups, 'distant' and 'recent'. Distant illnesses were those which developed more than 2 years before onset (or case note scrutiny in the general practice group), and recent illnesses were those which had occurred within 2 years preceding onset.

The criterion for inclusion as a 'distant' illness was that a definite diagnosis was made and that admission to hospital or treatment in a specialist outpatient clinic occurred. Distant illnesses were further subclassified into perinatal illness occurring in the first year of life, operative illnesses which had necessitated operation under general anaesthetic, non-operative illness and chronic illnesses, persistently present for more than 2 years before onset or case-note scrutiny.

The criterion for inclusion as a recent illness was broader, so that all illnesses which might bring about a significant physiological anorexia could be coded. All illnesses were included where it appeared from case-notes that the patient had taken more than 2 weeks off work or school. Thus, for example, glandular fever and severe influenza occurring within 2 years of onset were included even though no specialist treatment had been received. For further analysis, illnesses were classified again according to principal system involved. The fifteen subheadings are shown as part of Table III.

Results

Subjects

Data were collected for 326 patients with anorexia nervosa, 105 general practice controls and 61 schizophrenic controls. The mean age of onset of anorexia nervosa was 18.7 years (s.d. 6.5) and of schizophrenia 22.6 years (s.d. 6.2 years) (t-test $P<0.01$). The mean age of the general practice control group at the time of case-note examination was 19.3 (s.d. 7.5 years), which was not significantly different from the index group.

Distribution of illnesses

Table I compares the number of physical illness episodes amongst the members of the three groups. The anorexic patients were significantly more likely to have had physical illness than both the control groups and are also more likely to have had several episodes than controls. ([χ^2 $P<0.001$] in each case.)

Analysis of illness episodes

Analysis of episodes of illness in relation to onset (or case-note scrutiny) is shown in Table II. The index group tend to have more episodes of illness, both distant and recent, but the differences do not reach statistical significance when groups are compared on individual categories.

Analysis of episodes of illness according to system involved is shown in Table III. There were no significant differences when specific categories were compared between groups, but a trend for the anorexia group to have more episodes of illness in most categories is noticeable.

Alimentary vs non-alimentary illnesses

Subjects who had had at least one episode of illness in the anorexia nervosa group and general practice group were further examined by classifying illnesses into alimentary and non-alimentary categories. It was hoped thereby to examine whether illnesses which were more likely to have involved disturbances of eating and a physiological anorexia were more associated with the later development of anorexia nervosa. No statistically significant differences were found between the anorexia nervosa and general practice control groups in the ratio of non-alimentary to alimentary illness for either 'recent' or 'distant' illnesses.

Age of onset of anorexia and illness

Finally, an attempt was made to examine whether a history of undue physical illness might be associated with the development of anorexia nervosa in a particular age group as had been suggested by Ryle (1936). A comparison of the index group and general practice control group stratified by age of the subject showed an expected association of more 'distant' physical illness with age in both groups in the older age band. For all ages the excess of physical illness in the anorexia nervosa group reported in Table I occurred. The results did not suggest, however, that anorexia nervosa developing in an older age group was more likely to be associated with a history of undue physical illness.

Discussion

This study has attempted to examine the relationship between a history of physical illness and the later development of anorexia nervosa. Before discussing the findings it is important to examine methodological problems which may have influenced the findings obtained and conclusions which can be drawn.

TABLE I
A comparison of distribution of episodes of illnesses in index and control groups

Number of physical illnesses per individual	*Anorexic patients* $n=326$ %	*GP controls* $n=105$ %	*Schizophrenia controls* $n=61$ %
0	37	62	70
1	35	28	18
2	19	6	12
3	9	4	0

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TABLE II
The analysis of 'distant' and 'recent' episodes of illness in index and control groups

Illness episodes	*Anorexia nervosa group n = 326* %	*GP Group n = 105* %	*Schizophrenia group n = 61* %
No illness	27	54	63
Perinatal	2	0	3
Non-operative >2 years ago	18	10	17
Operative >2 years ago	25	22	14
Chronic illness	6	2	0
Non-operative <2 years ago	13	4	0
Operative <2 years ago	9	8	3

TABLE III
Comparison of illness episodes classified by system affected between index and control group

Illness episodes	*Anorexia nervosa group n = 326* %	*GP group n = 105* %	*Schizophrenia group n = 62* %
No illness	26	56	63
Specific generalised	5	3	2
Non-specific generalised.	3	1	0
Alimentary	12	6	6
Central nervous system	5	1	6
Endocrine	1	0	0
Ear, nose and throat	15	10	4
Opthalmological	4	1	0
Dental	1	0	0
Urological	2	0	0
Cardiovascular	1	1	3
Respiratory	7	2	7
Musculoskeletal	6	5	0
O and G	5	7	7
Haematological	2	1	0
Dermatological and cosmetic	4	6	2

The subjects of this study were patients attending a tertiary referral centre for anorexia nervosa. As such they may be chronic, established or unusual cases not wholly representative of all anorexic cases. It is possible that physical illness is over-represented in those referrals. In contrast, the general practice control group was chosen to represent a normal sample of subjects matched for age, sex and similar in social class. However, subjects who had never visited their general practitioner were excluded, implying that this control group would be biased in favouring illness episodes, thus making it more difficult to observe any significant excess of physical illness in the anorexia group, if it existed.

A possible second source of error arises from the different methods of data recording between the hospital and general practice patients. The schizophrenia control group had been inpatients and therefore had histories similar in type to the index group. One problem is that physical illness as an alternative diagnosis is more likely in anorexia nervosa and therefore may have been recorded more carefully in the anorexia nervosa subjects. This, however, is unlikely to have been an issue in relation to the general practice control group where in addition to routine recording of past medical history, a record of all attendances was kept. There is no reason to believe that clinical history-taking would have been different in the two different settings and so it seems unlikely that an illness of sufficient severity to be classified would have escaped recording in this second control group.

In chronic anorexia nervosa, difficulties may arise in determining accurately the date of onset of the eating disorder, thereby leading to difficulties in determining whether a physical illness preceded or postdated onset. As there was however no significant excess of alimentary vs non-alimentary episodes in the recent illness category, it seems unlikely that this has caused a significant bias.

The major findings of this study then is that there was an excess of physical illness episodes in the

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backgrounds of subjects with anorexia nervosa, when compared with general practice and schizophrenia controls. Attempts were made to specify the characteristics of this excess of illness episodes. However, analysis of illness as classified by 'distant' or 'recent', or by system involved did not yield any statistically significant difference between index and control groups. No particular association for illnesses which cause a physiological anorexia was discerned. The attempt to evaluate the hypothesis that there is a particular relationship between physical illness and anorexia nervosa for the older age group found no evidence to substantiate this.

The first hypothesis suggested, that physical illness earlier in life renders an individual vulnerable to later anorexia nervosa, is supported by the findings of this study. While there is an excess of physical illness in the period immediately preceding the onset of anorexia nervosa when compared with controls this excess is not significantly more than that found when examining more distant illness. This suggests that a history of severe physical illness is a non-specific risk factor for anorexia nervosa rather than specifically a precipitant as suggested by the second hypothesis.

There are several possible explanations for this observed association between anorexia nervosa and past physical illness. The first possibility is that there is a direct aetiological relationship in a certain group of patients. This suggestion seems unlikely as one would expect to observe physical illnesses with specific characteristics being particularly linked to the development of anorexia nervosa. In this study no such specific characteristics were observed. A second possibility is that some other factor, possibly genetic, predisposes to the development of physical illness and to anorexia nervosa. Again this seems unlikely as one would expect to find some differentiation within the types of physical illness observed and a higher than expected prevalence of physical illness in the relatives of patients with anorexia nervosa. There is little evidence to support the latter suggestion. Halmi *et al* (1977) report that gastrointestinal disorders are not uncommon in the relatives of patients with anorexia nervosa, while Kalucy *et al* (1977) found maternal migraine to be common. These reports are of interest but do not constitute strong evidence for there being an excessive prevalence of physical illness in the families of anorexics.

A third possibility is that the observed association between physical illness and anorexia nervosa is mediated through some other factor. Minuchin *et al* (1978) has suggested that relationships in the anorexic's family are characterised by overprotection and enmeshment. It does seem plausible that such a pattern of relationships might be initiated during an episode of serious illness. While it is possible that emotional disorders in such families may present as physical illness and be recalled as such, the explanation that illness triggers potentially pathological relationships within the family, seems the most plausible and warrants further investigation.

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