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EDITORIAL

Follow-up studies of anorexia nervosa: a review of research findings[1]

There has been a recent spate of studies on the course of anorexia nervosa which call for collation, review and analysis. The practical value of such a synopsis is related to the fact that only by means of longitudinal investigations can the efficiency of treatment be judged. As long as the aetiology of the illness remains incompletely understood therapeutic measures must be symptomatic, and the outcome of the disease may reflect its natural history as well as therapeutic intervention. This survey represents the fruits of a systematic analysis of the available literature. It presents, first, the general aspects of follow-up studies, then their results, followed by factors influencing prognosis, and some implications for further research.

1. GENERAL DESCRIPTION

The follow-up reports analysed here are drawn from 45 studies in the English and German languages, published between 1953 and 1981. Their general characteristics are summarized in Table 1. In the main, the work has been concerned with two themes: the effectiveness of different methods of treatment, and the identification of prognostic factors. The number of patients examined varies between 6 and 140. Studies with the smallest number of patients (Niederhoff *et al.* 1975; Bhanji & Thompson, 1974) deal with tests of the effectiveness of systematically-applied forms of treatment – purely medical treatment and behaviour therapy. Theander (1970) and Dally (1969) studied 94 and 140 patients respectively; these larger numbers reflect the longer follow-up periods of the two investigations.

In order to gather evidence on the course of anorexia nervosa Morgan & Russell (1975) make a plea for a follow-up of at least 4 years. They assume that anorexia nervosa has a rather long duration, so that improvement and recovery may take several years. An examination of the available studies revealed some findings which meet this contention and others which were obtained too near the termination of treatment to represent stable follow-up data (e.g. Tolstrup, 1965; Crisp, 1965, 1966; Bhanji & Thompson, 1974; Brady & Rieger, 1975). Longer follow-up periods were attained in the studies of Farquharson & Hyland (1966), Theander (1970), Cremerius (1978) and Ziolko (1978).

Most of the data on the age of onset relate to the type of anorexia nervosa which begins in young adults, but a number of authors (Lesser *et al.* 1960; Blitzer *et al.* 1961; Tolstrup, 1965; Warren, 1968) have also examined patients whose illnesses began before puberty. Some workers have regarded the age of onset as a diagnostic criterion (e.g. Thomä, 1961; Dally & Sargant, 1966; Ziegler & Sours, 1968; Brady & Rieger, 1975; Feighner *et al.* 1972), and it may be questioned whether patients whose symptoms appear first at the age of 40 (Morgan & Russell, 1975) or even 59 (Seidensticker & Tzagournis, 1968) qualify as genuine cases of anorexia nervosa.

As can be seen from Table 1, the diagnostic criteria which are employed in many studies are often incomplete or inadequately described. This hinders comparison between findings, since it is possible that different types of patient were included. Further, the variations in approach and diagnostic criteria of those studies with more comprehensive information render comparative assessment difficult. It would clearly be desirable to adopt diagnostic criteria which are relevant to anorexia

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Table 1. *Sample characteristics of follow-up studies of anorexia nervosa*

Study	Sample size: Patients at follow-up (no.)	Sample size: Drop-out rate (%)	Duration of follow-up (years): I	II	III	IV	Age at onset of the disease (years)	Diagnostic criteria	Therapeutic measures
1. Kay (1953)	33	13·1	5–> 10	—	—	—	16–20	AN, AM, WL	PT, MT
2. Beck & Brøchner-Mortensen (1954)	25	10·7	—	—	1–23	—	11–31	AN, AM, WL	MT
3. Williams (1958)	42	14·3	3–21	—	—	—	13–40*	n.a.	MT
4. Lesser *et al.* (1960)	15	0	—	1–17	—	—	10–16	n.e.d.	MT
5. Thomä (1961)	18	40·0	—	—	0·6–7	—	13–25	AN, AM, VO	PT
6. Blitzer *et al.* (1961)	15	n.a.	n.a.	—	—	—	7–14	WL	PT, MT
7. Meyer (1961)	20	n.a.	—	—	10–17	—	n.e.d.	n.a.	n.e.d.
8. Tolstrup (1965)	28	0	—	—	0·5–12	—	7–24	n.a.	PT, MT
9. Frahm (1965)	30	8·8	—	—	3	—	15–18	n.a.	MT
10. Frazier (1965)	39	n.a.	—	—	5–20	—	9–35	WL, HY, NMI Distorted body image	PT, MT
11. Kay & Shapira (1965)	60	7·7	—	—	3–10	—	20–22	n.a.	MT
12. Crisp (1965, 1966)	21	n.a.	—	—	0·1–3·6	—	n.a.	n.a.	PT, MT
13. Farquharson & Hyland (1966)	15	6·2	—	—	20–30	—	13–23	n.a.	PT, MT
14. Dally & Sargant (1966)	57	n.a.	—	—	—	3–5	17–19	AN, AM, WL, NMI, NPD	MT
15. Warren (1968)	18	0	2·6–11	—	—	—	10–15	n.a.	PT, MT
16. Seidensticker & Tzagournis (1968)	53	11·7	—	—	—	1–> 10	10–59	AN, WL, NMI, NPD	PT, MT
17. Browning & Miller (1968)	36	n.a.	2–32	—	—	—	n.a.	AN, WL, NMI, NPD	PT, MT
18. Ziegler & Sours (1968)	26	77·4	—	—	1–34	—	10–15	AN, WL, NMI	n.a.
19. Dally (1969)	140	0	—	—	—	< 17	11–33	AN, AM, WL	MT
20. Theander (1970)	94	2·1	—	—	—	6	11–34	Disturbed eating attitude and body image	PT, MT
21. Valanne *et al.* (1972)	30	0	—	—	1–15	—	11–16	AN, AM, NMI, NPD	PT, MT
22. Halmi *et al.* (1973)	36	14·3	1–30	—	—	—	< 15 (N = 13) > 15 (N = 23)	Feighner *et al.* criteria	n.a.
23. Bruch (1973)	38	13·3	1–19	—	—	—	20–26	Distorted body image	PT, MT
24. Bhanji & Thompson (1974)	7	63·6	—	—	—	0·2–6	14–34*	n.a.	BT, MT
25. Niskanen *et al.* (1974)	48	n.a.	—	—	1–18	—	13–32	AN, WL, NMI, NPD	PT, MT
26. Silverman (1974)	27	6·9	—	—	—	6	9–15	n.a.	PT, MT
27. Morgan & Russell (1975)	41	0	—	—	> 4	—	11–40	AN, AM, WL, HY, LA	PT
28. Brady & Rieger (1975)	15	6·2	—	—	0·4–4	—	15–34*	AM, WL	BT
29. Pierloot *et al.* (1975)	32	0	—	—	—	1–6	12–25†	AN, AM, WL, NMI, NPD	PT, BT, MT
30. Niederhoff *et al.* (1975)	6	0	—	—	—	1–4	11–15	n.a.	MT
31. Beumont *et al.* (1976)	31	n.a.	—	—	—	0·3–2	Mean = 17	AN, WL, NMI, NPD	n.a.
32. Halmi *et al.* (1976)	79	16·8	1–50	—	—	—	< 25 (N = 69)	Feighner *et al.* criteria	n.a.
33. Willi & Hagemann (1976)	20	0	—	Mean = 11	—	—	Mean = 19·5	AN, AM, WL (VO, HY, LA, BU)	PT, MT
34. Rosman *et al.* (1976)	53	0	—	—	—	0·3–4	9–21	AN, distorted body image	FT
35. Goetz *et al.* (1977)	30	0	—	5–20	—	—	9–16*	WL, distorted body image, NMI	PT
36. Sturzenberger *et al.* (1977), Cantwell *et al.* (1977)	26	21·2	—	—	—	Mean = 4·9	11–16	Feighner *et al.* criteria	In-patient treatment
37. Stonehill & Crisp (1977)	38	13·3	—	—	—	4–7	Mean = 20*	n.a.	PT, MT

Table 1. (*cont.*)

Study	Sample size: Patients at follow-up (no.)	Sample size: Drop-out rate (%)	Duration of follow-up (years): I	II	III	IV	Age at onset of the disease (years)	Diagnostic criteria	Therapeutic measures
38. Garfinkel *et al.* (1977)	42	n.a.	Mean = 5	—	—	—	11–20	Feighner *et al.* criteria	PT, (FT, BT) MT
39. Pertschuk (1977)	27	6·9	—	—	—	0·3–3·9	14–34*	Feighner *et al.* criteria	BT, MT
40. Cremerius (1978)	11	15·4	—	—	—	26–29	Puberty	n.a.	PT, MT
41. Ziolko (1978)	28	0	—	—	—	5–20	14–18	n.a.	PT, MT
42. Petzold (1979)	44	4·5	—	—	—	Mean = 2·7	13–29	n.e.d.	PT (FT), MT
43. Hsu *et al.* (1979)	100	2·8	—	—	1–18	—	13–32	n.e.d.	PT, MT
44. Schütze (1980)	49	22·3	—	—	—	0·3–8·6	Puberty	n.a.	PT, MT
45. Rollins & Piazza (1981)	35	50·0	—	—	> 2	—	Mean = 13·7	WL, weight phobia, distorted body image	n.a.

I, related to onset of the disease; II, related to onset of therapy; III, related to termination of therapy; IV, starting point not described; * at hospital admission; † at termination.

AN = anorexia; AM = amenorrhoea; WL = weight loss; VO = vomiting; HY = hyperactivity; LA = laxative abuse; BU = bulimia; NMI = no known medical illness; NPD = no other known psychiatric disorder.

BT = behaviour therapy; FT = family therapy; MT = medical treatment; PT = psychotherapy; n.a. = not assessed; n.e.d. = not exactly described.

as a syndrome and also find general acceptance in clinical practice. Despite much criticism (Andersen, 1977; Fries, 1977; Rollins & Piazza, 1978), these desiderata appear to be best fulfilled by the criteria of Feighner *et al.* (1972).

Treatment regimes of internal medicine and of psychotherapy are included in the follow-up studies under survey. The two types of procedure are mostly used in combination, seldom individually. With only a few exceptions (Dally & Sargant, 1966; Rosman *et al.* 1976; Garfinkel *et al.* 1977; Petzold, 1979), the studies on the effectiveness of certain forms of treatment employed smaller patient-samples than those which concentrated on prognostic factors. This difference may have something to do with a lack of sufficient subjects on whom a particular therapeutic procedure could be systematically carried out. The psychotherapeutic procedures of behaviour therapy and family therapy have been applied with increasing frequency in recent years.

The extent to which treatment programmes exert a long-term positive influence on the course of anorexia nervosa is assessed differently by various workers. On the basis of their follow-up results, several authors support the view that there is neither a specifically effective form of treatment for anorexia nervosa, nor any qualitative differences between therapeutic regimes (Kay, 1953; Frazier, 1965; Browning & Miller, 1968; Theander, 1970; Morgan & Russell, 1975; Bhanji & Thompson, 1974; Garfinkel *et al.* 1977; Cremerius, 1978). Others, however, have attempted to prove the effectiveness of their methods of treatment by reference to their follow-up results (e.g. Frahm, 1965; Dally & Sargant, 1966; Rosman *et al.* 1976; Niederhoff *et al.* 1975; Petzold, 1979). Most of the findings presented in these studies should be viewed critically. Either they involved too few subjects; or the follow-up periods were too short; or the evaluation of response was based on too small a number of criteria.

2. FOLLOW-UP RESULTS

Because of the difficulty of collecting objective information from samples of anorexic subjects, most workers appear to have limited themselves to the collection of more subjective data, basing their investigations on material obtained from former patients, supplemented in part by relatives and doctors, without employing standardized questionnaires or interviews by an independent observer. Such a method of investigation must considerably distort follow-up results and lessen their value

Table 2. *Results of follow-up-studies of anorexia nervosa*

Study	Normalization of: Weight (%)	Menstruation (%)	Eating behaviour (%)	Psychiatric status (%)	Psychosocial adaptation (%)	Chronicity (%)	Mortality rate (%)	Improvement rate (%)
1. Kay (1953)	~ 50	55	35	DS = 6 NS = 40 OS = 6	Family = 9 Occupation = 3	21	18	r = 12 i = 48
2. Beck & Brøchner-Mortensen (1954)	64	68	68	n.a.	Marriage = 60 Children = 52	16	4	'Excellent health' = 80
3. Williams (1958)	55	n.a.	n.a.	n.a.	Marriage = 28 Children = 14 Occupation = 55	7	19	r = 55 i = 14
4. Lesser *et al.* (1960)	60	n.a.	n.a.	HP = 53 OP = 27 SP = 20	Good/fair = 87	13	0	Good/fair = 87
5. Thomä (1961)	36	73	41	n.a.	Marriage = 5 Children = 9 Occupation = 45	13	3	r/i = 33
6. Blitzer *et al.* (1961)	n.a.	n.a.	60	DP = 87	Improvement in general personality = 60	0	7	r = 60 i = 33
7. Meyer (1961)	n.e.d.	90	35	HP = 15 OP = 75 SC = 15	n.a.	35	15	i = 35
8. Tolstrup (1965)	n.a.	n.a.	n.a.	n.a.	Marriage = 18	14	0	Good = 22 Fair = 63
9. Frahm (1965)	n.e.d.	67	97	n.a.	100	0	0	~ 100
10. Frazier (1965)	n.a.	n.a.	28	SC = 28	Occupational/social relationships = 28	31	8	Markedly i = 28 Slightly i = 33
11. Kay & Shapira (1965)	~ 50	~ 40	~ 40	DS/OS = 27 NS = 34 SC = 3	Marriage = 34	27	17	Markedly i = 34 Partly i = 34
12. Crisp (1965, 1966)	71	44	52	DS = 4	Marriage = 28 Sexuality = 9	n.e.d.	9	43
13. Farquharson & Hyland (1966)	n.e.d.	83	87	NS = 20 SC = 7	67	7	0	r = 67
14. Dally & Sargant (1966)	60–72	69–72	55–67	DS = 3 OS = 3 SC = 3 Psychopathy = 6 Phobias = 3–7	Marriage = 33–41 Occupation = 6–15 Good = 60–72	~ 3–6	n.a.	60–72
15. Warren (1968)	55	55	61	DS = 5 NS = 39 SC = 5	Marriage = 5 Sexuality = 28	28	11	61
16. Seidensticker & Tzagournis (1968)	63	69	n.e.d.	n.a.	'Active and productive life' = 38	31	13	Fair = 38 Partly fair = 30
17. Browning & Miller (1968)	75	~ 50	50	n.a.	n.a.	16	8	i = 50 Moderately i = 25
18. Ziegler & Sours (1968)	n.e.d.	n.e.d.	n.e.d.	n.a.	Marriage = 46	11	5	n.e.d.
19. Dally (1969)	69	59	n.e.d.	DS = 24 OS = 11 SC = 1 Phobias = 10 Hypochondriasis = 23	Marriage = 31 Occupation = 25	29	3	69
20. Theander (1970)	63	76	63	DS = 29 OS = 13 SC = 1 Anxiety = 13	Marriage = 50	7	10	i = 63
21. Valanne *et al.* (1972)	n.e.d.	n.e.d.	47	NS = 27 PS = 13	Marriage = 13 Children = 7 Occupation = 90 Independence from the family = 23	17	0	Free of symptoms = 10
22. Halmi *et al.* (1973)	41	55	n.e.d.	DS = 27 NS = 61	Marriage = 34 Occupation = 36 Sexuality = 32	14	16	r = 25 i = 23 Moderately i = 23

Table 2. (*cont.*)

Study	Normalization of: Weight (%)	Menstruation (%)	Eating behaviour (%)	Psychiatric status (%)	Psychosocial adaptation (%)	Chronicity (%)	Mortality rate (%)	Improvement rate (%)
23. Bruch (1973)	61	n.a.	~ 33	SC = 10	33	13	8	r = 33
24. Bhanji & Thompson (1974)	43	28	57	n.a.	n.a.	43	0	Good = 14 Fair = 43
25. Niskanen *et al.* (1974)	n.e.d.	n.a.	n.e.d.	BS = 2 NS = 57	Marriage = 12 Children = 10 Occupation = 48	n.a.	8	42
26. Silverman (1974)	n.e.d.	n.e.d.	n.e.d.	SC = 15	n.a.	18	0	'Well functioning' = 33
27. Morgan & Russell (1975)	68	50	33	DS = 45 OS = 23	Occupation = 73 Sexuality = 60	29	5[a]	Good = 39 Fair = 27
28. Brady & Rieger (1975)	77	36	n.a.	n.a.	Family/ occupation/ social relationships: good = 38	23	7	Good = 38 i = 38
29. Pierloot *et al.* (1975)	50	50	50	n.e.d.	Good social functioning = 50	34	0	r = 50 i = 16
30. Niederhoff *et al.* (1975)	66	66	66	SP and OS = 50	Normalization of life = 83	16	0	Good = 66 Fair = 16
31. Beumont *et al.* (1976)	41[b] 21[c]	n.a. n.a.	41[b] 21[c]	HP[b] = 6, OP[b] = 76 HP[c] = 50, OP[c] = 57	n.a. n.a.	29[b] 79[c]	0 0	41[b] 21[c]
32. Halmi *et al.* (1976)	n.a.	n.a.	n.a.	ED = 2 SC = 1 HP = 4	n.a.	11	21	r = 51
33. Willi & Hagemann (1976)	15	63	31	ED = 5 DS = 50 SC = 5	Marriage = 60	25	5	r = 35 i = 35
34. Rosman *et al.* (1976)	n.a.	n.a.	n.a.	n.a.	Family/school/ occupation: Good = 88	6	0	r = 86 i = 8
35. Goetz *et al.* (1977)	87	92	n.e.d.	HP = 47 OP = 40 SC = 13	Good = 60	17	0	Good = 60 Fair = 23
36. Sturzenberger *et al.* (1977), Cantwell *et al.* (1977)	77[d] 83[e]	70[d] 83[e]	81[d] 83[e]	DS = 67[d], 56[e] OS = 19[d], 44[e] Phobias = 7[d], 6[e]	Occupation/ social relationships/sexuality: good = 46[d], 67[e]	n.e.d.	0	Good = 67
37. Stonehill & Crisp (1977)	68	68	n.a.	n.e.d.	Good/fair = 71	7	n.e.d.	68
38. Garfinkel *et al.* (1977)	58	49	29	n.a.	Good = 7 Fair = 41 Occupation = 49	n.a.	2	i = 50
39. Pertschuk (1977)	67	37	n.e.d.	DS = 7	Family/ occupation/ social relationships: Good = 44	22	0	r = 7
40. Cremerius (1978)	n.e.d.	n.e.d.	n.e.d.	NS = 9 PS = 36	Occupation = 45 Sexuality = 18	36	18	45
41. Ziolko (1978)	n.e.d.	96	~ 50	DS = 25 PS = 3	Marriage = 35 Occupation = 89	25	3	r = 60 i = 28
42. Petzold (1979)	n.e.d.	25	54	n.a.	School/ occupation/ social relationships = 61	16	11	r = 27 i = 45
43. Hsu *et al.* (1979)	64	54	37	OS = 22	Marriage = 29 Children = 14 Sexuality = 83 Occupation = 82	20	2	Good = 48
44. Schütze (1980)	57	57	57	n.a.	57	21·5	0	i = 57
45. Rollins & Piazza (1981)	65	64	n.e.d.	n.e.d.	79	14	0	r/i = 69

BS = borderline symptoms; DS = depressive symptoms; NS = neurotic symptoms; OS = obsessive-compulsive symptoms; ED = endogenous depression; PS = psychosis; SC = schizophrenia; DP = depressive personality; HP = hysterical personality; OP = obsessional personality; SP = schizoid personality. r = recovered; i = improved; n.a. = not assessed; n.e.d. = not exactly described.

[a] Including $N = 2$ patients with death due to other causes.

[b] Patients with weight loss due to diet, food refusal, and exercising.

[c] Patients with weight loss due to habitual vomiting and abuse of purgatives.

[d] Information obtained by the parents.

[e] Information obtained by the patient.

unless the patients' veracity can be established. Very few authors used standardized tests in their follow-up investigations (e.g. Seidensticker & Tzagournis, 1968; Browning & Miller, 1968; Theander, 1970; Stonehill & Crisp, 1977; Sturzenberger *et al.* 1977). The principal results are summarized in Table 2.

With regard to *weight restoral*, there was insufficient information in many of the papers, partly because relatively few of the authors appear to have included weight as a factor to be studied (e.g. Blitzer *et al.* 1961; Halmi *et al.* 1976). In some investigations the weight of former patients is recorded, but conclusions concerning subsequent weight-levels are limited by ambiguity (Tolstrup, 1965; Farquharson & Hyland, 1966), an absence of exact data (Rosman *et al.* 1976) or a restriction of measurement to the average weight gain (Ziolko, 1978; Petzold, 1979). A large majority of the studies establish a weight restoral of between 50 and 70%, and some present increases of between 70 and 80%. Such good results are more often observed in patients whose illnesses began at an early age (Sturzenberger *et al.* 1977; Rosman *et al.* 1976; Warren, 1968). The lowest figure of 15% is reported in the study by Willi & Hagemann (1976), who recorded weight restoral in only 3 of their 20 subjects, while 10 of them were described as 'stably but slightly underweight'. The mean weight of patients examined after treatment was 21% below average.

Goetz *et al.* (1977) reported the highest figure: at the time of their follow-up 26 patients of their total of 30 (87%) had a normal body weight, though this was not precisely defined. In relation to other assessments this statistic takes on a different significance. In terms of psychosocial adjustment, for example, 60% of the patients did well. Weight restoral alone cannot therefore be taken as sufficient evidence of recovery from anorexia nervosa. Only after a number of factors have been assessed can an assessment of the course of anorexia nervosa be properly formulated.

Amenorrhoea is widely held to be an essential diagnostic criterion in female patients from puberty onwards. A *normalization of menstrual function* is therefore seen as an index of recovery or improvement. As with weight restoral, most studies report rates of normalization between 50 and 70%; an early onset of the disease was associated with better rates of improvement. This suggests that the criteria of change are inter-related, since a return of menstruation is usually dependent on a satisfactory weight-level (Dally, 1969). Higher rates of normalization are reported by Meyer (1961), Farquharson & Hyland (1966), Goetz *et al.* (1977) and Ziolko (1978). Bhanji & Thompson (1974), Beumont *et al.* (1976) and Petzold (1979) all present lower figures. Inspection of the studies reveals further that the higher rates are associated with longer follow-up periods, and the lower percentages with shorter periods. This correlation can be interpreted as suggesting that longer periods of observation increase the probability of a normalization of menstrual functioning.

The assessment of the *normalization of eating disorders* is particularly difficult when based on information derived from former patients, to whom food is a topic charged with emotion. This may partly explain the wide fluctuation of between 30 and 70% in published studies.

The best results (97% of normalization) were achieved by Frahm (1965), who employed purely medical treatment. It is not, however, possible to judge whether this figure would have remained at this level after a follow-up period longer than 3 years. The poorest result (21%) is reported by Beumont *et al.* (1976), who studied a group of patients among whom purgative abuse and vomiting were especially prominent symptoms. Long-term improvements of 20–50% emerge from most follow-up reports, but it was not possible to deduce the extent to which a return to normal eating patterns exerted a positive effect on weight and menstruation. The findings suggest a tendency towards no more than a limited interaction. Willi & Hagemann (1976), for example, report that while 31% of their patients showed normal eating patterns and 63% achieved regular menstruation, only 15% demonstrated weight restoral.

The varying forms of *psychiatric diagnosis* associated with anorexia nervosa make it difficult to draw general conclusions. Depression and obsessive–compulsive states or personality structure assume a prominent place in many studies. The frequency of depressive symptoms or personality traits fluctuates between 3 and 87%, with an average of 31%. The highest estimate of 87% comes from Blitzer *et al.* (1961), though the patients in this study were very young. In most studies depressive symptoms were recorded with moderate frequency (e.g. Halmi *et al.* 1973; Morgan &

Russell, 1975; Willi & Hagemann, 1976; Sturzenberger *et al.* 1977) or rarely (Kay, 1953; Crisp, 1965; 1966; Dally & Sargant, 1966; Warren, 1968; and Pertschuk, 1977). Similar differences, ranging from 3% to 83%, are reported for the frequency of obsessive–compulsive symptoms and personality traits associated with anorexia nervosa. Sturzenberger *et al.* (1977), Cantwell *et al.* (1977), Beumont *et al.* (1976) and Meyer (1961) all furnish high estimates, while the lowest come again from Dally & Sargant (1966) and Kay (1953).

The development of a psychotic disorder in cases of anorexia nervosa is recorded by most authors as occurring in fewer than 10% of cases, though some studies provide a higher estimate (Meyer, 1961; Frazier, 1965; Silverman, 1974; Goetz *et al.* 1977; Cremerius, 1978). The older notion that anorexia nervosa was in some instances a form of schizophrenic disorder has been largely abandoned. On the basis of present knowledge, the emergence of a psychotic state appears to be a separate condition which develops independently, and the possibility of mis-diagnosis cannot be excluded in some cases.

The effects of anorexia nervosa extend to the patient's social environment. The *relationship to the social environment* therefore becomes another factor in the assessment of recovery, though again it is difficult to obtain relevant data on the subject's behaviour in school, at work, in the family, in marriage, on their attitudes to sexuality and on their social contacts. Although it is relatively easy to assess scholastic, occupational and mental performance it is more difficult to evaluate the quality of social contacts, especially when the criteria are ill defined. Some of the information must therefore be treated with reservation. Furthermore, the varied forms in which the information is presented compounds the difficulty of integrating the studies with the aim of reaching general conclusions. In studies which grade their findings 'good–fair–poor', the most common estimate of recovery is 50–80%, with younger patients exhibiting the better rates of improvement (Sturzenberger *et al.* 1977; Rosman *et al.* 1976). If other studies are included, however, then the figure of 50–80% appears to be too high.

According to Dally & Sargant (1966), patients can be said to have reached a condition of *chronicity* if they continue to display symptoms after 5 years despite suitable treatment. The rates of cases becoming chronic were less than 20% in the studies reviewed, and some workers report no chronicity (Blitzer *et al.* 1961; Frahm, 1965). These latter findings, however, are probably atypical: Blitzer *et al.*, for example, included samples of very young patients; and Frahm's follow-up period of 3 years was too short. The highest figure for chronicity (79%) is provided by Beumont *et al.* whose patients achieved weight reduction by means of vomiting and purgative abuse. The rate of less than 20% chronicity cited by the majority of studies differs from the much-quoted observation that anorexia nervosa is a chronic disease in one third of cases (Meyer, 1961; Willi & Hagemann, 1976; Cremerius, 1978).

The mortality rate for anorexia nervosa has been calculated as 7–15% (Sours, 1969). Among the studies under review there was a range of 0–21%, the highest figure coming from Halmi *et al.* (1976). The two largest sub-groups were those reporting no mortality, followed closely by those with a mortality rate of less than 10%.

Estimates of the *rate of improvement* are dependent on the criteria adopted. Some workers emphasize psychological adjustment, without reference to specifically anorexic symptoms (e.g. Lesser *et al.* 1960); others prefer the presence or absence of clinical symptoms (e.g. Thomä, 1961); all too often, no information is provided on the criteria employed (Blitzer *et al.* 1961). Some workers also demand undisturbed social behaviour or the full restitution of mental health (e.g. Tolstrup, 1965).

In view of such diverse criteria, it is not surprising that the published rates of improvement vary between 10 and 86%, the majority falling between 30 and 50%. The assumption of a one third improvement, however, appears to represent an underestimate, just as the assumption of a one third chronicity rate is excessive. High rates of improvement are reported by Frahm (1965), Lesser *et al.* (1960), who relied largely on medical treatment, and Rosman *et al.* (1976) for whom family therapy was the mainstay.

3. PROGNOSTIC FACTORS

One of the chief aims of carrying out follow-up studies in the study of anorexia nervosa lies in the identification of possible prognostic factors, favourable or unfavourable. The more important are listed below.

(a) Age of onset

Most workers associate an early onset with a favourable prognosis (Lesser *et al.* 1960; Frazier, 1965; Theander, 1970; Halmi *et al.* 1973, 1976; Morgan & Russell, 1975; Pierloot *et al.* 1975; Willi & Hagemann, 1976; Sturzenberger *et al.* 1977; Hsu *et al.* 1979). A few authors (Tolstrup, 1965; Warren, 1968; Browning & Miller, 1968; Garfinkel *et al.* 1977), on the other hand, report no prognostic distinction between illnesses of early and late onset. Seidensticker & Tzagournis (1968) regard an onset up to the age of 30 as prognostically favourable, and Dally (1969) even claims that the prognosis of anorexia nervosa commencing before the age of 14 is unfavourable.

(b) Hysterical personality structure

This is seen as progressing with a favourable course by Lesser *et al.* (1960), Blitzer *et al.* (1961), Kay & Shapira (1965), Rollins & Blackwell (1968), Dally (1969), Kalucy *et al.* (1976) and Goetz *et al.* (1977).

(c) Parent–child relationship

Good relations between the patient and his/her parents are said to indicate a good outcome by several workers (Kay & Shapira, 1965; Dally, 1969; Crisp *et al.* 1974; Morgan & Russell, 1975; Hsu *et al.* 1979), but this is questioned by Pierloot *et al.* (1975) and Theander (1970).

(d) Duration of symptoms

A short history prior to hospitalization or a brief episode of illness augurs well according to Kay & Shapira (1965), Dally & Sargant (1966), Seidensticker & Tzagournis (1968), Pierloot *et al.* (1975), Morgan & Russell (1975) and Hsu *et al.* (1979). Browning & Miller (1968), by contrast, regard this factor as insignificant.

(e) Duration of in-patient treatment and number of readmissions

These factors emerge as unconnected with the course of the condition from the work of Browning & Miller (1968), Dally (1969) and Morgan & Russell (1975), but suggest a good prognosis according to other studies (Seidensticker & Tzagournis, 1968; Theander, 1970; Halmi *et al.* 1973, 1976; Garfinkel *et al.* 1977).

(f) Socioeconomic status

Anorexics from the upper social classes fared better in the studies of Seidensticker & Tzagournis (1968), Halmi *et al.* (1973, 1976), Kalucy *et al.* (1976), Garfinkel *et al.* (1977) and Hsu *et al.* (1979), but carried no prognostic significance in the reports of Dally (1969) and Theander (1970).

(g) Disturbances of body perception

A diminution of these disturbances after weight increase has been reported as suggesting a good outcome by Slade & Russell (1973), Garfinkel *et al.* (1977) and Kalucy *et al.* (1977). Slade & Russell (1973) and Kalucy *et al.* (1977) report that a good outcome is related to a correction of such perceptual disturbances as a result of weight increase.

(h) Hyperactivity and dieting

The exclusive use of these methods to reduce weight is regarded as pointing to a favourable outcome by Beumont *et al.* (1976), but as unimportant prognostically by Halmi *et al.* (1973, 1976) and Pierloot *et al.* (1975).

(i) Specifically unfavourable prognostic factors

These include *vomiting* during the onset and course of anorexia nervosa (Theander, 1970; Halmi *et al.* 1973; Crisp *et al.* 1974; Beumont *et al.* 1976; Garfinkel *et al.* 1977; Hsu *et al.* 1979); *purgative abuse* and *bulimia* during the onset and course of the condition (Theander, 1970; Halmi *et al.* 1973; Beumont *et al.* 1976; Willi & Hagemann, 1976; Kalucy *et al.* 1976; Hsu *et al.* 1979); *extreme loss of weight* (Dally, 1969; Morgan & Russell, 1975; Hsu *et al.* 1979); *depressive* and *obsessive–compulsive symptoms* (Halmi *et al.* 1973); *chronicity*, associated particularly with obsessive–compulsive personality traits (Lesser *et al.* 1960; Kay & Shapira, 1965; Dally, 1969; Bhanji & Thompson, 1974; Kalucy *et al.* 1976; Goetz *et al.* 1977); *older maternal age* (Dally, 1969; Theander, 1970; Halmi *et al.* 1973); *premorbid developmental and clinical abnormal phenomena* (Dally, 1969; Morgan & Russell, 1975); *high rates of physical complaints* (Halmi *et al.* 1973; Stonehill & Crisp, 1977); *acute body perception disturbances* (Garfinkel *et al.* 1977; Kalucy *et al.* 1977); *neuroticism* (Dally, 1969; Pierloot *et al.* 1975); *psychological test-results suggestive of psychosis* (Pierloot *et al.* 1975); the *masculine sex* (Kalucy *et al.* 1977); and *marriage* (Seidensticker & Tzagournis, 1968; Kalucy *et al.* 1976; Hsu *et al.* 1979; except for the study of Willi & Hagemann, 1976).

4. CONCLUSIONS

In toto, research on the course of anorexia nervosa does not constitute a unified whole. In addition to the numerous methodological problems, many of the conclusions are probably drawn from atypical samples. Furthermore, the proportion of dropouts during re-examination, which reaches a maximum figure of 77% with an average of 11%, has not been subjected to a systematic test of trends in respect of individual characteristics. The extent to which certain findings are representative has therefore remained insufficiently analysed. It could be that the methods used for re-examination exercised a strong influence on the proportion of drop-outs. It is even possible that it is precisely the least reliable examinations – those relying on information obtained from telephone enquiries or from relatives – which actually lead to lower drop-out rates than structured examinations carried out in direct contact with the patient. The inadequate sampling of follow-up data is also indicated by the contradictory assessment of some prognostic factors. In view of the fact that most of these factors are described in relative isolation from one another, it cannot be determined which of them is the more significant.

In the light of these considerations we may formulate the needs of any future research dealing with the course of anorexia nervosa. First, the diagnostic classification of symptoms must be documented unequivocally in order to enable changes to be assessed and studies to be compared with one another. In addition, future studies should not rely on restrictive categories of patient populations.

It is necessary to record not only syndrome-specific variables but also aspects of general psychopathology and psychosocial adjustment, both at the onset as well as during the course of the illness. For these reasons, uni-dimensional follow-up studies which restrict themselves, for example, to the criterion of body weight are relatively useless. Furthermore, the criteria of psychosocial adjustment, if such are to be evaluated, must be operationalized so that crossvalidation and verification become feasible.

Whether they are retrospective or prospective, follow-up studies must specify not only the proportion of drop-outs but also ascertain whether these subjects differ in any essential respects from other patients and so make it possible to judge to what extent the studies are representative. Since the natural history of anorexia nervosa cannot be assessed in less than 4 years, it is necessary to observe patients for at least this period or to establish that it is possible to achieve an equally reliable forecast within a shorter time.

Follow-up results should be based on a direct re-examination and not on indirect questions to relatives and friends or on telephone calls. At the same time, the reliability of any procedures must be documented or demonstrated. For this purpose use should be made of standardized procedures, i.e. interviews and questionnaires.

A multidimensional strategy of evaluation would facilitate an assessment of the determinants of prognosis. An adequate number of samples must be obtained, and the data should be analysed by appropriate multivariate techniques. Research into anorexia nervosa which employs these criteria will be in a better position than hitherto to report more accurately on the course of the condition.

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