British Journal of Psychiatry (1995), **167**, 380–384

A Follow-up Study of Seasonal Affective Disorder

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Background. The long-term course of seasonal affective disorder has not been well studied.
Method. Using the Structured Clinical Interview for DSM-III-R, we interviewed 75% of a sample of 124 subjects diagnosed from five to eight years previously as fulfilling DSM-III-R criteria for recurrent major affective disorder, seasonal pattern.
Results. In the follow-up period, 38% of the sample continued to fulfil DSM-III-R criteria for seasonal illness; 28% had recurrent major depressive disorder, but no longer displayed a seasonal pattern; 18% were completely well with no further depression; 6% had subsyndromal symptoms; and 5%, although not meeting DSM-III-R criteria for seasonal illness, were still displaying constant periodicity. A short duration of index episode and a high frequency of illness predicted a continuing seasonal course of illness.
Conclusion. Diagnostic criteria for seasonal affective disorder need to be further refined, possibly restrictively, if they are to be used to predict the future course of seasonal illness.

Previous studies of seasonal affective disorder (Rosenthal *et al*, 1984; American Psychiatric Association, 1987) have described the symptomatology of the condition (Thompson & Isaacs, 1988), investigated the role of phototherapy in treatment (Yerevanian *et al*, 1986; Stinson & Thompson, 1990) and identified an apparent biological marker (Thompson *et al*, 1990). However, the validity of the diagnosis will be found to depend partly upon the stability of the regular timing of recurrences (or periodicity). The purpose of this study was to carry out a follow-up of patients 5 to 8 years after diagnosis of seasonal affective disorder.

Method

Beween August 1985 and October 1988, 124 patients fulfilling DSM-III-R criteria for recurrent major depressive disorder, seasonal pattern, were assessed at Charing Cross Hospital, London, by the research team under the direction of Professor Thompson. Patients seen before 1987 were diagnosed by Thompson's own modification of the criteria of Rosenthal *et al* (1984), a stricter definition of SAD, but one which also fulfils DSM-III-R criteria (Thompson & Isaacs, 1988).

Records of the initial assessment included the Schedule for Affective Disorders and Schizophrenia–Lifetime Version (SAD-L; Endicott & Spitzer, 1978), the Seasonal Pattern Assessment Questionnaire (SPAQ; Rosenthal *et al*, 1984), the Seasonal Screening Questionnaire (SSQ, Rosenthal *et al*, 1984) and the subject's last known address and telephone number.

Eighty-two patients were traced via personal contact or with the help of the SAD Association. The 42 remaining subjects were traced by the Office of Population, Censuses, and Surveys and contacted via their current Family Health Services Authority (FHSA). Subjects agreeing to take part in the study were interviewed with the SPAQ and the Structured Clinical Interview for DSM-III-R (SCID-NP) (non-patient edition), which has superseded the SADS-L (Spitzer *et al*, 1990). Particular emphasis was placed on the mood syndrome sections of the SCID interview. The "overview" section, as well as recording demographic data, included the timing to the nearest month and the symptoms of episodes of illness since the initial diagnosis of SAD. Information from the SCID also provided data on the subsequent treatment during follow-up.

The course of the illness during the follow-up period was then classified as follows:

(a) *seasonal*: meeting DSM-III-R criteria for the follow-up period alone without reference to illnesses before the initial assessment
(b) *non-seasonal*: episodes of depression in the follow-up period not meeting the seasonality criteria of DSM-III-R because they occurred outside the required 60-day window
(c) *in remission*: no further episodes of major depressive disorder.

The clinical associations of these three groups were sought from the data recorded at the follow-up interview. Clinical predictors of the future course of

illness were explored from the information collected at the first assessment including the SPAQ's two main variables:

(a) *seasonality score* (calculated as the numerical total of the change score for (i) sleep length (ii) social activity, (iii) mood, (iv) weight, (v) appetite and (vi) energy)
(b) *global score* (one question that asked whether subjects felt the changes with the seasons were a problem for them and, if so, whether this was "mild, moderate, marked, severe, or disabling", giving a 0–5 response).

Data were analysed with the Statistical Package for the Social Sciences, PC+ Version 4.0. Statistical analyses with one-way ANOVA across the three groups for continuous variables and the Pearson χ^2 test for categorical data were used. Where significant differences emerged ($P \leqslant 0.05$), the nature of this was determined by comparing pairs of the three groups with either the unpaired Student's *t*-test (continuous data) or the Pearson χ^2 test (categorical data).

Results

Course of illness

Of the original sample, 93 subjects (75%) were traced and interviewed. Fourteen could not be traced, 10 had emigrated, and seven refused interview. The respondents were categorised into the three mutually exclusive groups described in the Method section. Five patients were of 'uncertain' seasonality in that they did not strictly meet DSM–III–R criteria for recurrent affective disorder, seasonal pattern and yet were clearly displaying a relatively constant periodicity. One patient committed suicide and one patient had a diagnosis of dysthymia. These have not been included in further analyses.

The seasonal and non-seasonal groups differed in the months which were affected by depression, confirming the differences between them (Fig. 1). Of those 23 subjects who reported no further major depressive episodes, six complained of recurrent depressive symptoms in the winter that did not reach the threshold for major depressive disorder. To avoid uncertainty as to how to define this borderline group of 'subsyndromal SAD', we did not include them in further analysis. Therefore the three main groups for further comparison comprised the following:

(a) definite (DSM–III–R) seasonal ($n = 35$; 38%)

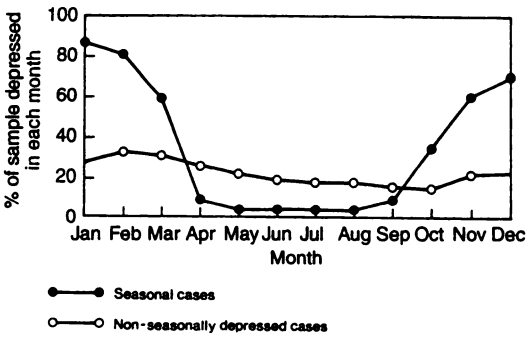

Fig. 1 Monthly rate of depression in seasonal and non-seasonal cases (1987–92).

(b) definite non-seasonal recurrent depression ($n = 28$; 30%)
(c) those completely well in follow-up period ($n = 17$; 18%).

Differences between groups at follow-up

The variables which showed significant differences among the groups are summarised in Table 1.

Treatment

Those who remained well in the follow-up period were significantly less likely to have seen their general practitioner (GP) or a psychiatrist, or have taken tricyclic antidepressants, than those who persisted with seasonal depression or developed non-seasonal illness (Pearson χ^2 24.32, d.f. = 2, $P < 0.001$; χ^2 13.19, $P = 0.001$; and χ^2 10.76, $P = 0.005$, respectively).

Table 1
Statistically significant differences among the three groups

	Group 1 $n = 35$	Group 2 $n = 28$	Group 3 $n = 17$	
GP treatment	22 (63%)	20 (71%)	0 (0%)	***
Psychiatrist	9 (26%)	14 (50%)	0 (0%)	**
TCA	14 (40%)	12 (43%)	0 (0%)	**
Light box	20 (57%)	19 (68%)	5 (29%)	*
Sleep disturbance	24 (69%)	26 (93%)	0 (0%)	*
SPAQ score of 3 or more	$n = 31$	$n = 26$	$n = 14$	
Social activity	19 (61%)	11 (42%)	2 (14%)	*
Mood	27 (87%)	14 (54%)	6 (43%)	**
Global score	22 (71%)	10 (38%)	3 (21%)	***
Seasonality score (s.d.)	15.5 (5.0)	12.8 (6.1)	10.6 (5.5)	*

TCA = tricyclic antidepressant. *** $P < 0.001$; ** $P < 0.01$; * $P < 0.05$.

https://doi.org/10.1192/bjp.167.3.380 Published online by Cambridge University Press

There was no significant difference between those with continuing seasonal depression and those whose depression became non-seasonal in terms of GP treatment, tricyclic antidepressant medication (χ^2 $P>0.05$), or psychiatric care (χ^2 with Yates correction 2.98, $P=0.08$).

Major depressive symptoms

Comparison of the non-obligatory major depressive symptoms between the seasonal and non-seasonal depressives showed that those with seasonal illness were less likely to complain of sleep disturbance (χ^2 with Yates correction 4.22, $P=0.04$). However, there was no significant difference in the proportion with hypersomnia or insomnia.

The remaining depressive symptoms did not reveal any significant difference between the two depressed groups.

Light treatment

Across the three groups, there was a significant difference in the use of light treatment (Pearson χ^2 6.43, $P=0.04$). Those in remission were less likely to use lights than the depressed patients as a whole (χ^2 with Yates correction 5.03, $P=0.025$), especially the non-seasonal group (Pearson χ^2 with Yates correction 4.83, $P=0.028$), but not the seasonal group ($P>0.05$).

In subjects who had used light treatment, there was no significant difference among the three groups in the time of day of use or perceived benefit.

SPAQ scores

Those with persistent seasonal illness had higher scores on change in mood, social activity, and global seasonality (χ^2 11.23, $P<0.01$; χ^2 8.73, $P=0.01$; and χ^2 11.4, $P<0.01$, respectively).

The seasonality score (combined symptoms) was also significantly different among the three groups (one-way ANOVA, $F=4.23$, $P=0.02$), distinguishing between those whose seasonal illness persisted and those in remission (χ^2 with Yates correction 7.68, $P<0.01$).

Predictors of the future course of illness

Several factors identified at initial assessment predicted future seasonality.

Firstly, the estimated duration of each depressive illness discriminated among the three groups (one-way ANOVA, $F=4.23$, $P=0.02$) and between the seasonal (DSM-III-R) and non-seasonal groups (t value -2.8, d.f. $=61$, $P<0.01$).

Secondly, the same number of episodes of illness should indicate greater seasonality if there have been, for example, five in five years, as compared with five in 20 years. A higher frequency would suggest that the biological variable which is the substrate for seasonal mood changes is strong enough to produce an illness in most years regardless of social and physical environmental variables. To test the relationship of this to the future course of illness, we constructed a new variable referred to as 'frequency of illness':

$$\text{Frequency} = \frac{\text{number of episodes}}{(\text{age at last} - \text{age at first episode})}$$

This differentiated the three groups (one-way ANOVA, $F=3.72$, $P=0.03$), and distinguished between those continuing with seasonal illness and the non-seasonal depressed group (t value 2.84, d.f. $=51.3$, $P<0.01$).

Thirdly, all five patients meeting criteria for cyclothymic personality persisted with seasonal illness. This number was too small for comment on the statistical significance.

Fourthly, the extent to which long-term personality could be described as "cheerful, optimistic, enthusiastic, energetic, active, ambitious, and involved with people and activities" from the SADS-L questionnaire was a significant predictor of remission (χ^2 6.62, $P=0.04$), but low scores on the trait did not distinguish the seasonal from the non-seasonal course.

Fifthly, no difference among the three groups was found in the original year of diagnosis with SAD, suggesting that the minimum length of the follow-up was sufficient to eliminate possible bias in diagnosis resulting from inadequate time for three episodes to have occurred, or from the small change in diagnostic criteria on publication of DSM-III-R.

None of the following important factors predicted the course of illness:

(a) time off work or impaired social function
(b) previous treatment received
(c) individual symptoms of major depressive disorder from Research Diagnostic Criteria or diurnal variation of mood, sadness, irritability, or anxiety during episodes of depression
(d) polarity of mood disorder, number of previous episodes, age at first episode, or age at last episode
(e) presence of other comorbid diagnoses
(f) any of the variables from the SPAQ at initial assessment
(g) family history of depression (seasonal or non-seasonal).

Discussion

We believe that this is the first medium-term follow-up study of the natural history of a clinical series of patients diagnosed with SAD. The original sample of 124 subjects was highly selected to be representative of patients described in early reports of the syndrome. We followed up 93 (75%) cases. From the latter, we have identified three relatively small groups for analysis ($n=35$, 28, and 17, respectively). Hence, our statistical analyses have often involved small cells to test our individual hypotheses of predictability and differences among the three groups at follow-up. The interviews used on the two occasions differed slightly, and there were slightly different diagnostic criteria. Subjects were interviewed by telephone and no information from an informant was obtained, although in cases where precise timing, nature, or treatment of illness were unclear, we obtained further information from the subject's GP.

Of the original sample, 38% persisted with DSM-III-R seasonal illness in the follow-up period. However, it is important to note that the follow-up period is considerably shorter than the time allowed to make a lifetime diagnosis of SAD when subjects were first seen. By strict DSM-III-R criteria, subjects who have had no further episodes of depression since initial assessment would still have a lifetime diagnosis of SAD by virtue of their previous episodes. By this approach, 63% (or 68% if the uncertain cases were included as well as six subsyndromal cases) of our original sample could be diagnosed as having had or still having SAD.

However, it is more informative to interpret these results as showing that about one-third of those with SAD will have a remission shortly after first contact or, arguably, did not have SAD at all.

As might have been expected, the estimated duration of each episode of illness appeared to predict future seasonality. The longer the duration of the depressive illness, the less likely were seasonal factors to influence the condition. It must be noted, however, that this 'estimated duration' is a subjective estimate of the longest duration of an episode. Frequency of depressive episodes also predicted ongoing seasonality in the recurrently depressed groups.

In contrast to several case series (Rosenthal *et al*, 1984; Wirz-Justice *et al*, 1986; Thompson & Isaacs, 1988), our study did not find any difference among the three groups with respect to sex distribution, time off work, treatment received (except tricyclic antidepressants), atypical symptoms of depression, or family history of seasonal illness or depression.

Short-term follow-up studies (Rosenthal *et al*, 1984; Thompson, 1986) suggest that in the winter after diagnosis about two-thirds of a SAD group suffer relapse. Thompson & Isaacs (1988) followed up into the winter 51 patients diagnosed with SAD during the summer of 1985. Thirty-four (67%) of these became depressed in the following winter, while 17 (33%) did not. The only differences that emerged between the two groups at screening were that those becoming depressed were more likely to report broken sleep in the winter, and to have a greater previous use of minor tranquillisers, both effects of weak predictive value. Neither of these has been borne out in our study.

Gisin & Wirz-Justice (PhD thesis University of Basel) have carried out a two to five year follow-up study of 39 SAD patients. Ten (26%) continued to fulfil Rosenthal's criteria, eight (21%) had completely remitted, while 17 (44%) had subsyndromal SAD.

Leonhardt *et al* (1994) using a self-rating scale at weekly intervals over 2.5 to 8.25 years found that out of 26 patients seasonal recurrence persisted in nine, seven remitted, four were chronically depressed and six had a diffuse pattern. These are broadly consistent with our interview-derived results in a larger sample.

In summary, our findings suggest that 30% of patients who are diagnosed as having DSM-III-R seasonal pattern to recurrent depressive disorder have non-seasonal recurrent depression in the follow-up period, and 18% experience complete remission. Some predictors of continuing seasonality have been identified which should be used to refine the diagnostic criteria and which suggest that the DSM-III-R definition was too broad. DSM-IV (American Psychiatric Association, 1994) has recently broadened it still further and it is suggested that this change should be reversed.

Acknowledgements

Mr Rakeja was supported by a Marchwood Priory Research Fellowship and by a Medical Research Council Grant.

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(*First received 9 May 1994, final revision 3 January 1995, accepted 6 February 1995*)