Lack of association between seasonality and psychopathology in psychiatric outpatients

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Abstract

There exists an extensive literature documenting the impact of seasonality on rates of depression, atypical depression, bulimia, and suicide. In the present report drawn from the Rhode Island Methods to Improve Diagnostic Assessment and Services (MIDAS) project, we reviewed the results of 1500 diagnostic evaluations of patients who presented to our psychiatric outpatient practice between 1995 and 2001. We sought to determine whether seasonal fluctuations in psychopathology were discernible at the level of how patients present for psychiatric treatment. Contrary to our hypotheses, we did not find (1) higher rates of onset of major depressive disorder in the spring and fall, (2) higher rates of depressive symptoms or rates of atypical depression in the winter, (3) higher rates of bulimia in the winter, or (4) higher rates of suicidal ideation in the spring. We conclude from these results that the association between seasonality and psychopathology may not be discernible at the level of presentations to an outpatient psychiatric practice.

Keywords: Major depressive disorder; Atypical depression; Bulimia; Suicide; Seasonality

1. Introduction

The relationship between psychopathology and seasonality has long been recognized (Jackson, 1986; Wehr and Rosenthal, 1989). In seasonal affective disorder (SAD), the cyclic recurrence of depressive episodes according to the seasons is the hallmark of the disorder. Prospective studies that have followed patients diagnosed with SAD at baseline have confirmed that a significant percentage of such patients have a clear seasonal component to their illness (Leonhardt et al., 1994; Sakamoto et al., 1995; Schwartz et al., 1996). Fall and winter appear to be the most common seasons for SAD episodes to occur, though a minority of SAD patients experience their recurrences in the spring or summer (Boyce and Parker, 1988; Kasper et al., 1989; Rosen et al., 1990). Explanations for the increased depressive incidence in the fall and wintertime include a neurophysiological reaction to decreased light exposure, shorter and colder days leading to decreased outdoor activity and

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Seasonal fluctuations are not unique to SAD. A large community survey found that depressed subjects who do not meet criteria for SAD nevertheless experience higher rates of symptomatology in the winter months (Kasper et al., 1989), a finding that has been replicated by others (Kasper and Kamo, 1990; Müller et al., 1991; Pande et al., 1992; Rosen et al., 1990). Not only are rates of depressive illness higher in these months, but the presentation appears to be distinct. Depressed patients in winter months more commonly present with increased appetite, hypersomnia and lethargy (Garvey et al., 1988; Hardin et al., 1991; Kasper et al., 1989; Rosenthal et al., 1984; Sakamoto et al., 1995; Thompson and Isaacs, 1988; Wirz-Justice et al., 1986)—symptoms that are all associated with the atypical features subtype. Mania may also demonstrate a seasonal pattern, with some studies (Symonds and Williams, 1976; Walter, 1977), but not others (Silverstone et al., 1995; Whitney et al., 1999), demonstrating a peak in summer months.

In addition to reports indicating that mood disorders fluctuate during the course of the year, there is evidence suggesting that the prevalence of bulimia is higher in the wintertime as well (Blouin et al., 1992; Hardin et al., 1991; Lam et al., 1991; Lam and Goldner, 1998). It has also long been thought that rates of suicide peak in late spring and early summer, though two studies have not been able to confirm this (Parker and Walter, 1982; Zung and Green, 1973). We are not aware of any reports that have suggested that anxiety disorders fluctuate throughout the course of the year, and one study examining rates of admissions to a psychiatric hospital over the course of 6 years found no seasonal fluctuation in admissions for non-affective illnesses (Eastwood and Stiasny, 1978).

While these reports provide strong evidence suggesting an association between seasonality and psychopathology, there are several caveats to this literature that should be noted. First, the method of recruitment in many studies was through advertisement or referrals for individuals with specific symptom profiles; these types of studies are susceptible to the ‘self-fulfilling prophecy’ bias. Second, the majority of these studies relied on retrospective reports. Third, studies that have found a seasonal component to psychiatric illness have not consistently replicated which months of the year or seasons patients are at greatest risk.

In the present study, we sought to determine whether seasonal fluctuations in psychopathology were discernible at the level of an outpatient psychiatric practice. That is, can clinicians expect to see differences in rates of psychopathology depending on what month of the year it is? To examine this question, we reviewed the diagnostic evaluations of 1500 consecutive patients who presented to our outpatient psychiatric practice during 1995–2001 and who participated in the Rhode Island Methods to Improve Diagnostic Assessment and Services (MIDAS) project. Although we did not assess SAD per se, if the symptomatology and prevalence rates of mood disorders, suicidality and bulimia fluctuate in a predictable manner through the course of the year, then we would expect that the types of patients presenting for treatment might reflect this. Thus, based upon the results of the 1500 diagnostic evaluations, we hypothesized that as a function of month of presentation (1) major depression would be a more common presentation in the winter (December through February), (2) the onset of the major depressive episodes for which patients present to our practice would be highest in the spring (March through May) and fall (September through November), (3) depressed patients presenting for treatment in the wintertime (December through February) as opposed to other times of the year would more commonly present with atypical features, (4) bulimia would more commonly present in the winter (December through February), and (5) rates of suicidal ideation would be highest in April and May.
2. Method

All subjects were psychiatric outpatients who presented for treatment at the Rhode Island Hospital Department of Psychiatry outpatient practice from December of 1995 through May of 2001. Rhode Island Hospital is located in Providence, Rhode Island, which is situated at the 41st degree of latitude in southern New England.

During their initial telephone screening, all patients except those with clear cognitive deficits were invited to participate in a research diagnostic evaluation prior to meeting with their treating clinician. Patients were referred from diverse sources including the Rhode Island Hospital emergency room or inpatient psychiatric unit, primary care doctors, or therapists in the community; others were self-referred. The present analysis is composed of the first 1500 patients who participated in the ongoing MIDAS project. This research protocol was approved by the Rhode Island Hospital’s Institutional Review Board and all participating patients provided informed, written consent.

During their first visit, which usually occurred 2–3 weeks following the initial telephone screen, consenting patients were interviewed with the Structured Clinical Interview for DSM-IV (SCID) (First et al., 1997). All diagnoses were made according to DSM-IV criteria. The SCID was supplemented with several items drawn from the Schedule for Affective Disorders and Schizophrenia (SADS) (Endicott and Spitzer, 1978), which rates symptomatology during the preceding week. Relevant items for the present study drawn from the SADS include those that assessed hyperphagia, hypersonnia, leaden paralysis and suicidal ideation. The first three of these items were rated dichotomously as being present or absent. The last item, suicidal ideation, was rated on a 7-point scale where a rating of 0 corresponds to no suicidal ideation and a rating of 6 corresponds to ‘very extreme’ suicidal ideation. As in our previous work (Posternak and Zimmerman, 2002), we transformed this ratings into a dichotomous variable so that all patients rated 2 or higher (corresponding to mild to very extreme suicidal ideation) were considered to be positive on this item. In addition to these ratings, Global Assessment of Functioning (GAF) scores were obtained by the diagnostic rater for each patient following the baseline evaluation (Endicott et al., 1976).

All raters were psychologists or college graduate research assistants who underwent extensive training. Further details regarding the baseline evaluation, the training of the diagnostic raters, and the reliability ratings for psychiatric diagnoses are presented elsewhere (Posternak and Zimmerman, 2002; Zimmerman and Mattia, 1999).

The calendar date on which each diagnostic evaluation was performed was recorded, and data from all evaluations performed in each of the 12 calendar months were pooled together and compared. The calendar months, of course, do not coincide exactly with the seasons. Therefore, we have grouped them in the following manner as has often been done in other studies assessing seasonality. March, April and May were considered spring months; June, July and August were considered summer months; September, October and November were considered fall months; and December, January and February were considered winter months. Because there was considerable variation in the overall number of diagnostic evaluations performed each month, all comparisons were made with percentages (mean monthly rates) rather than raw numbers (one of the reasons for the variations in number of subjects per month is that the data were compiled from December of 1995 through May of 2001; therefore, only 5 years of data were available for the summer and fall months compared to 6 years for the winter and spring months). All hypothesized comparisons were made using a two-tailed \( \chi^2 \) test with a \( P \)-value set at 0.05. For post-hoc analyses, the \( P \)-value was set at 0.01.

Our sample consisted of 923 (61.5%) females and 577 (38.5%) males. The mean age was 37.7 ± 12.7. The majority (88.3%) were white, 3.7% were black, 3.1% Portuguese, 2.3% Hispanic, 0.9% Asian and 1.7% were classified as ‘other.’ Six hundred and eighteen (41.2%) patients were currently married, 468 (31.2%) were never married, 79 (5.3%) were living with someone, and the remaining 335 (22.3%) were separated, widowed, or divorced. The overwhelming majority (\( n = 1340, 89.3% \)) had at least a high school diploma.
Diagnostically, 749 (49.9%) patients received a current diagnosis of major depression, of which 59 (3.9%) were diagnosed with bipolar I or II disorder. Seven hundred eighty-seven patients (52.5%) received a current anxiety disorder diagnosis, 22 (1.5%) were diagnosed with schizophrenia, schizoaffective disorder, or schizophreniform disorder, and 167 (11.1%) were diagnosed with a current drug or alcohol use disorder. The mean GAF score of the entire sample was 53.3 ± 11.1.

Of the 405 patients who presented in the winter, 215 (53.1%) received a current major depressive disorder diagnosis. In comparison, 534 of 1095 (48.8%) of the patients who presented in the remaining three seasons received a major depressive disorder diagnosis ($\chi^2 = 2.2, d.f. = 1, P = 0.14$, NS). January (58.7%), September (57.4%) and October (53.8%), had the highest rates of presentation for major depressive disorder, while April (41.7%) had the lowest rate (Table 1). In the subset of 59 (3.9%) patients who presented with bipolar depression (I or II), the summer months June (5.5%), July (6.1%), and August (8.2%) had the highest prevalence rates, with a smaller peak in the winter months: December (5.2%), January (4.5%), and February (6.0%). Post-hoc comparison of rates of bipolar depression revealed significantly higher rates in the summer/winter months compared to spring/fall ($\chi^2 = 9.0, d.f. = 1, P = 0.003$).

Because patients do not necessarily present in the same month that their depressive episode onsets, and because we were interested in examining this feature as well, we performed the following analysis. Of the 749 patients who presented with a current major depressive disorder diagnosis, we excluded 374 patients whose episode duration was noted to be longer than 12 months. The rationale for excluding these patients is that our confidence in establishing the exact month of onset for episodes lasting more than 1 year would be relatively low. Of the 375 patients whose episode duration was less than a year, we were able to calculate the month of onset by subtracting the duration in months from the calendar month of presentation. Contrary to our hypothesis, a spring/fall month of onset ($n = 194; 52\%$) was not significantly more common than a winter/summer onset ($n = 181; 48\%$) ($\chi^2 = 0.45, d.f. = 1, P = 0.50$). As can be seen from Table 1, the last 6 months of the calendar year (July through December) all had higher rates of onset than the first 6 months of the calendar year. Of the 375 patients in this sample, 245 (65.3%) had an onset of illness in the last 6 months of the calendar year ($\chi^2 = 35.2, d.f. = 1, P < 0.001$). Finally, we performed a sub-analysis that included only those patients who had an episode duration of 3 months or less ($n = 217$), but once again a similar number of depressed patients presented in the winter/summer ($n = 110$) compared to the spring/fall ($n = 107$).

Among the 749 patients diagnosed with a current major depressive disorder, 174 (23.2%) met DSM-IV criteria for the atypical features subtype. Fifty-six of 215 (26.0%) of the depressed patients who presented in the winter months met DSM-IV criteria for the atypical features subtype, compared to 118 of 534 (22.1%) who presented in the remaining seasons—a difference that was not statistically significant ($\chi^2 = 1.34, d.f. = 1, P = 0.25$). Inspection of Table 1 reveals that the prevalence of atypical features was significantly more common in January through May (27.7%) compared to June through December (18.8%), a difference that was statistically significant ($\chi^2 = 8.2, d.f. = 1, P = 0.004$). Seasonal fluctuations of the individual atypical symptoms revealed a less consistent pattern. Hyperphagia was prominent in the winter months (November through January) and also peaked in April and May. Hypersomnia was most prominent in December, January and March, while leaden paralysis displayed no consistent pattern.

Contrary to our hypothesis, suicidal ideation was no more prominent in April and May than the remainder of the year. Rather, it was most prominent in the late summer and early fall, peaking in September. Because suicidal ideation may be a poor marker of suicidal behavior, we performed a second analysis examining rates of extreme or very extreme suicidal ideation according to the SADS. In this analysis, suicidality was more prominent in April and May (6.3%) compared to the remainder of the year (4.6%), though this difference was not statistically significant ($\chi^2 = 1.45, d.f. = 1, P = 0.23$).
<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
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<tbody>
<tr>
<td>N patients</td>
<td>1500</td>
<td>155</td>
<td>134</td>
<td>158</td>
<td>156</td>
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<td>97</td>
<td>101</td>
<td>119</td>
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<td>116</td>
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<tr>
<td>Depression</td>
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<td>91 (58.7)</td>
<td>66 (49.3)</td>
<td>78 (49.4)</td>
<td>65 (41.7)</td>
<td>72 (49.0)</td>
<td>57 (51.8)</td>
<td>44 (44.9)</td>
<td>48 (49.5)</td>
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<td>64 (53.8)</td>
<td>48 (44.0)</td>
<td>58 (50.0)</td>
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<td>Bipolar depression</td>
<td>59 (3.9)</td>
<td>7 (4.5)</td>
<td>8 (6.0)</td>
<td>5 (3.2)</td>
<td>3 (1.9)</td>
<td>1 (0.7)</td>
<td>6 (5.5)</td>
<td>6 (6.1)</td>
<td>8 (8.2)</td>
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<td>2 (1.8)</td>
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<td>Mania/hypomania</td>
<td>18 (1.2)</td>
<td>2 (1.3)</td>
<td>1 (0.7)</td>
<td>1 (0.6)</td>
<td>1 (0.6)</td>
<td>5 (3.4)</td>
<td>1 (0.9)</td>
<td>0 (0.0)</td>
<td>2 (2.1)</td>
<td>3 (3.0)</td>
<td>0 (0.0)</td>
<td>1 (0.9)</td>
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<tr>
<td>Onset of Episode*</td>
<td>375 (8.3)</td>
<td>25 (6.7)</td>
<td>19 (5.1)</td>
<td>28 (7.5)</td>
<td>30 (8.0)</td>
<td>13 (3.5)</td>
<td>15 (4.0)</td>
<td>41 (10.9)</td>
<td>37 (9.9)</td>
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<td>40 (10.7)</td>
<td>44 (11.7)</td>
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<td>Episode duration</td>
<td>217 (14.5)</td>
<td>26 (16.8)</td>
<td>19 (14.2)</td>
<td>25 (15.8)</td>
<td>14 (8.9)</td>
<td>12 (8.2)</td>
<td>19 (17.3)</td>
<td>6 (6.1)</td>
<td>16 (16.5)</td>
<td>21 (20.8)</td>
<td>20 (16.8)</td>
<td>15 (13.8)</td>
<td>24 (20.7)</td>
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<tr>
<td>Atypical depression</td>
<td>174 (23.2)</td>
<td>28 (30.8)</td>
<td>18 (27.3)</td>
<td>21 (26.9)</td>
<td>16 (24.6)</td>
<td>20 (27.8)</td>
<td>9 (15.8)</td>
<td>9 (20.5)</td>
<td>9 (18.8)</td>
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<td>11 (17.2)</td>
<td>11 (22.9)</td>
<td>10 (17.2)</td>
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<tr>
<td>Hypomania</td>
<td>262 (17.5)</td>
<td>34 (21.9)</td>
<td>22 (16.4)</td>
<td>23 (14.6)</td>
<td>29 (18.6)</td>
<td>32 (21.8)</td>
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<td>18 (15.1)</td>
<td>23 (21.1)</td>
<td>21 (18.1)</td>
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<tr>
<td>Hyperphagia</td>
<td>201 (13.4)</td>
<td>26 (16.8)</td>
<td>17 (12.7)</td>
<td>27 (17.1)</td>
<td>19 (12.2)</td>
<td>20 (13.6)</td>
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<td>15 (14.9)</td>
<td>12 (10.1)</td>
<td>12 (11.1)</td>
<td>18 (15.5)</td>
</tr>
<tr>
<td>Leaden paralysis</td>
<td>268 (17.9)</td>
<td>27 (17.4)</td>
<td>33 (24.6)</td>
<td>25 (15.8)</td>
<td>27 (17.3)</td>
<td>30 (20.4)</td>
<td>19 (17.3)</td>
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<td>19 (19.6)</td>
<td>17 (16.8)</td>
<td>17 (14.3)</td>
<td>21 (19.3)</td>
<td>17 (14.7)</td>
</tr>
<tr>
<td>Bulimia/BED*</td>
<td>68 (4.5)</td>
<td>3 (1.9)</td>
<td>8 (6.0)</td>
<td>5 (3.2)</td>
<td>8 (5.1)</td>
<td>11 (7.5)</td>
<td>2 (1.8)</td>
<td>5 (5.1)</td>
<td>8 (8.2)</td>
<td>6 (5.9)</td>
<td>2 (1.7)</td>
<td>7 (6.4)</td>
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<tr>
<td>SI present*</td>
<td>216 (14.4)</td>
<td>19 (12.3)</td>
<td>23 (17.2)</td>
<td>22 (13.9)</td>
<td>23 (14.7)</td>
<td>19 (12.9)</td>
<td>15 (13.6)</td>
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<td>21 (17.6)</td>
<td>12 (11.0)</td>
<td>17 (14.7)</td>
</tr>
<tr>
<td>Serious SI*</td>
<td>74 (4.9)</td>
<td>4 (2.6)</td>
<td>4 (3.0)</td>
<td>7 (4.4)</td>
<td>10 (6.4)</td>
<td>9 (6.1)</td>
<td>7 (6.4)</td>
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<td>7 (5.9)</td>
<td>7 (6.4)</td>
<td>8 (6.9)</td>
</tr>
</tbody>
</table>

*All percentages are calculated based on the number of patients who presented that month (e.g. January: n=155) except where indicated. Bold typeface indicates the prevalence rate in that month is higher than the mean.

*Prevalence rates are based on the subset of patients with an episode duration of 1 year or less.

*Percentages are based on a total of 749 patients.

*BED = Binge eating disorder. This cohort also includes 41 patients with subthreshold bulimia.

*SI = Suicidal ideation. These figures derived from those patients who were given a SADS rating of 2–6 (mild to very extreme) on the SI item.

*SI = Suicidal ideation. These figures derived from those patients who were given a SADS rating of 5–6 (extreme to very extreme) on the SI item.
Only 14 of the 1500 patients in the present study received a current diagnosis of bulimia. Therefore, to assess seasonal fluctuations in bulimic behavior, we included patients who met the subthreshold diagnosis for bulimia ($n=13$) and binge eating disorder ($n=41$). Contrary to our hypothesis, we found non-significantly lower rates of bulimia and binge eating in the wintertime (14 of 404; 3.5%) compared to the remainder of the year (54 of 1095, 4.9%) ($\chi^2 = 1.49$, d.f. = 1, $P=0.22$, NS).

Finally, because some studies have suggested that seasonal fluctuations may be more prominent in women than men, we reanalyzed each of our a priori hypotheses including only female subjects ($n=923$). No statistically significant seasonal fluctuations were found.

3. Discussion

The results of the present study are unequivocal: seasonality had no predictable impact on how patients presented to our psychiatric practice as a function of the time of year. We can only speculate as to the reasons why our hypothesized results were so uniformly negative.

First, our assessment battery did not include any instrument such as the Seasonal Pattern Assessment Questionnaire (SPAQ), which directly inquires about seasonality. Instead, seasonality was assessed cross-sectionally by examining prevalence rates of various disorders and symptoms across 6 years of evaluations. Despite the indirect methodology, if as many as 10%–15% of all depressed patients meet criteria for SAD, and a large percentage of the remaining patients also demonstrate sub-threshold fluctuations, then the impact of the seasons should be discernible in a sample size as large as ours. Of course, if rates of other disorders also fluctuated across the seasons, then the relative prevalence of major depressive disorder (compared to other disorders) in the wintertime would be no greater. However, we examined the rates of each of the anxiety disorders listed in DSM-IV and found no evidence of seasonal fluctuation.

Another possible explanation is that as a brief disorder, SAD patients do not seek treatment at psychiatric outpatient practices, but rather are treated by general practitioners or go untreated because of confidence that the depression will remit in the spring. The study by Faedda et al. (1993), would appear to refute this possibility since they found that 146 of 1507 (9.7%) psychiatric outpatients met criteria for SAD.

A third possible explanation is that there might be great variability in lag time between when a depressive episode onsets and when a patient presents for treatment. Such variability would tend to obscure the impact of seasonality on our results.

A fourth possible explanation is that chronic, treatment-refractory patients might be overrepresented in our sample, and that this might negate any seasonal component to our findings. We found in fact that one-half (49.9%) of our depressed sample had an episode duration of greater than 1 year. However, when we performed sub-analyses that included only patients with a 12-month or less episode duration, and another one including only patients with a 3-month or less episode duration, no evidence of seasonality was found.

Another possible explanation is that we made a series of a priori hypotheses regarding which months of the year we expected to find elevated rates of affective disturbances. Most studies examining seasonality have not made such hypotheses in advance. It is much more difficult to confirm predicted patterns than to elicit any pattern. Furthermore, studies that have found significant seasonal findings have not consistently replicated the same peak months or months of onset, perhaps due to differing geographic and climactic conditions. Thus, our hypotheses were based on a somewhat inconsistent literature. Finally, it is quite possible (and in fact likely) that the association between seasonality and psychopathology does not correspond exactly to calendar months. The seasonal fluctuation of psychopathology therefore may not co-vary with the four 3-month divisions we utilized in our analyses.

In reviewing the literature, it would seem that studies that have assessed depression and suicide as a function of hospital admission rates (Eastwood and Peacocke, 1976; Eastwood and Stiasny, 1978; Parker and Walter, 1982) or death certificates registries (Bazas et al., 1979; Durkheim, 1951; Eastwood and Peacocke, 1976; Meares et
al., 1981; Parker and Walter, 1982; Souètre et al., 1987; Zung and Green, 1973) have either failed to replicate or have demonstrated less robust and consistent results than epidemiological studies (Kasper et al., 1989; Rosen et al., 1990).

One possible explanation for this discrepancy is that epidemiological studies rely on the SPAQ, which inquires about seasonality without assessing major depression itself. It might be that sleep, appetite and emotion fluctuate through the course of the year, but the prevalence of major depression does not. Another possibility is that since the SPAQ relies on retrospective report, it is susceptible to recall bias. Arguing against this possibility is the study by Kasper et al. (1989), where a subset of subjects who were interviewed over the phone were followed up with in-person interviews and it was found that the SPAQ underestimated prevalence rates. A third possibility is that many factors influence treatment-seeking and hospitalizations, and reviewing hospital records, psychiatric evaluations, and death registries might be too insensitive a method to elicit the seasonal nature of these disorders.

References


