INTRODUCTION

Sleep-related breathing disorders (SRBDs), such as obstructive sleep apnea and upper airway resistance syndrome, are characterized by repetitive upper airway obstructions during sleep. These diseases’ main symptoms are loud snoring, disrupted nocturnal sleep, and excessive daytime sleepiness. The course is usually progressive, and profound functional impairment and/or life-threatening complications can occur.1 According to recent, extensive population-based surveys on SRBDs, SRBD prevalence is relatively high, especially among obese middle-aged and older adults,2,3 and SRBDs constitute a major public health problem.4,5

A diagnosis of SRBD is stressful because of the disorder’s progressive course and associated significant physical and psychological distress. Many studies have documented that patients with SRBD experience mood changes, psychological dysfunction,6,7 and an impaired quality of life.8 Coping has been defined as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person.”9 Researchers view coping as a response to perceived stress and considered it to be particularly important for mediating life stresses and the onset of a psychiatric illness, especially depression.9 It has two widely-recognized major functions: regulating emotions or distress (emotion-focused coping) and managing the problem causing the distress (problem-focused coping). In most stressful encounters, individuals use both forms of coping proportioning the...
amount of each form according to how the individual appraises the encounter. The type of coping strategies one uses influences one’s feelings. Researchers have thought that the use of cognitive coping strategies reduce the depression levels individuals experience, while the use of avoidance (emotion-focused) coping strategies correlate with higher levels of depression and anxiety. Although little consensus exists regarding which coping strategies are effective for dealing with stress, in practice, studies have often implied that active coping behaviors, such as problem-solving and seeking social support, are “adaptive,” whereas suppression coping such as avoidance and distancing, are “mal-adaptive.”

During the past few decades, reports in the medical and psychological literature have increasingly focused on strategies for coping with chronic illness. However, researchers know little about the strategies patients with SRBD employ to cope with their illnesses or the extent to which these coping strategies affect patients’ psychological distress, such as depression. Knowledge regarding psychological distress and coping strategies in patients with SRBD would be useful for developing a comprehensive treatment for such patients.

This study examined the following hypotheses:

a) Patients with SRBD are under higher stress and more depressed than is the general population.

b) Patients with SRBD are likely to use more emotion-focused than problem-focused coping.

c) Patients’ emotion-focused coping correlates positively with daytime sleepiness, perceived stress, and depressive mood, while problem-focused coping correlates negatively with these same parameters.

**METHODS**

**Participants**

Study participants were 170 patients (Males, 132; Females, 38) with SRBD drawn from the Stanford Sleep Disorders Clinic. We selected them because they had received diagnoses of SRBD after undergoing nocturnal polysomnographic testing, and they had fully completed all questionnaires.

Normal controls were 71 individuals (Males, 42; Females, 29). This group comprised Stanford Sleep Disorders Clinic staff members and people recruited through local newspaper advertisements who were free of sleep disorders and other illnesses that might affect their physical or psychological well-being.

**Measurements**

To collect the data for this study, we used a self-report survey comprising five sections. Part 1 of the survey elicited demographic data. Parts 2, 3, 4, and 5 were the Epworth Sleepiness Scale (ESS), the Perceived Stress Scale (PSS), the Beck Depression Inventory (BDI), and the Ways of Coping Questionnaire (WCQ), respectively. SRBD patients completed all five parts. In addition to the demographic section, the control group completed the Stanford Sleep Questionnaire, to rule out other specific sleep disorders.

**Demographic survey**

Part 1 asked each participant for their age, gender, ethnic background, educational level, marital status, and general health information.

**Epworth Sleepiness Scale**

The ESS is a brief, self-administered questionnaire that its creators have proposed as a simple method for measuring daytime sleepiness in adults. The ESS asks the participant to rate, on a scale of 0-3, the chances that they would doze in eight common, specific daily-life situations (0 = would never doze; 3 = high chance of dozing). The ESS score is the sum of the eight item scores and ranges from 0 to 24. Reportedly, ESS score correlates significantly with the individual’s severity of obstructive sleep apnea syndrome.

**Perceived Stress Scale**

The PSS is a brief, easy-to-administer measure of the degree to which one appraises situations in one’s life as stressful, and it has proven, substantial reliability and validity. The PSS consists of 10 items that respondents rate to express how unpredictable, uncontrollable, and overloaded they find their lives (0 = never; 4 = very often). Scores range from 0 to 40. Higher scores indicate higher levels of perceived stress. In this study, we used a cut-off score of 14 to define whether a respondent was under high stress. In general, neither sex nor age affects the relationship between PSS score and its validity criteria, and the general population’s mean score was below 14 in Cohen’s study. We employed the scoring method described by Cohen for this study, computing the total severity score to represent the respondent’s level of perceived stress.

**Beck Depression Inventory**

The BDI is one of the most widely-used psychiatric rating scales for depression. It consists of 21 items, each representing a symptom related to the diagnosis of depression. Patients respond by rating each symptom item with a score ranging from 0 (absent) to 3 (severe). Items are summed for the total depression score. Scores range from 0 to 63. A higher BDI score indicates more severe depressive symptoms and a higher probability of major depression. Beck and Beamesderfer urged users to base BDI cut-off scores upon the clinical decisions for which they are using the instrument. We adopted Nielson and Williams’ cut-off scores, which they developed to use in their study of depression in ambulatory medical patients: a score of 0 to 13 is within the normal range, whereas a score of 14 to 16 indicates mild depression, 17 to 20 indicates moderate depression, and 21 or more indicates severe depression.
Ways of Coping Questionnaire
The WCQ is a 66-item questionnaire that assesses the “thoughts and actions individuals use to cope with the stressful encounters of everyday living.” The WCQ is derived from the cognitive-phenomenological theory of stress and coping of Lazarus and Folkman. The WCQ contains a broad range of coping and behavioral strategies that people use to manage internal and external demands in a stressful encounter. The WCQ’s psychometric properties have been thoroughly documented.

Lazarus and Folkman distinguished two types of coping in the WCQ: problem-focused coping (25 items) and emotion-focused coping (25 items). Problem-focused coping aims at managing or altering the problem causing the distress, and individuals are more likely to use it when they evaluate conditions as being amenable to change. The problem-focused coping items consist of items measuring Confrontive Coping, Seeking Social Support, Planful Problem-Solving, and Positive Reappraisal. On the other hand, emotion-focused coping aims at regulating an individual’s emotional response to a problem, and people likely use such coping when they judge that they can do nothing to modify threatening, harmful, or challenging conditions. The emotion-focused coping item consists of items that measure Distancing, Self-Control, Accepting Responsibility, and Escape-Avoidance.

The WCQ asks participants to recall a recent stressful event and indicate the frequency with which they used a particular coping strategy in response to that event (0 = does not apply or not used; 3 = used a great deal). The questionnaire is scored on eight empirically-derived scales. The respondent’s scores on all of a scale’s items are summed to compute that scale score, which is then divided by the number of items in that scale, to permit comparisons across scales. Scores range from 0 to 10. Items loading on each factor are added together to create total scores for problem-focused and for emotion-focused coping. A higher score on a WCQ subscale indicates the respondent used that coping strategy more often.

Procedures
Clinic personnel who had informed potential subjects about the study mailed out the questionnaire packages, stating, “We are conducting a study. If this does not bother you, please fill it out and bring it with you when you visit our clinic.” A consent form was included in the package. This study was approved by the Committee on Human Subjects at Stanford University Hospital.

Statistics
The data were analyzed using the Proc GLM procedure of the SAS software program V6.12. To test the differences among the groups, we used analyses of covariance (ANCOVAs). In addition, we computed the least square adjusted means (for age, sex, marital status, and educational level) and pairwise differences. Means for patient and control groups were compared by student’s t-tests. We performed comparisons between groups via Duncan grouping and computed Pearson partial correlation coefficients among sets of variables in the SRBD patients.

Because we found significant differences between the groups regarding age, gender, educational background, and marital status, we controlled for these socio-demographic variables.

RESULTS

Participants’ characteristics
The patients’ mean age was 48.4 years, ranging from 19 to 80, and the controls’ mean age was 40.7 years, ranging from 19 to 80 (p < 0.001). Of the patients, 77.7% were male, whereas 59.1% of the control were male (p < 0.01). The mean years of education for patients and controls were 20.2 (± 18.9) and 16.6 years (± 2.8), respectively (p < 0.05). In the patient group, 65% were married, as were 56% of the controls (p < 0.05). Approximately 68% of the patients and 66% of the controls were Caucasian (p = 0.87).

Among the patient group, 149 (87.6%) had diagnoses of obstructive sleep apnea, and 21 (12.4%) had diagnoses of upper airway resistance syndrome, based on clinical histories and diagnostic sleep studies. The mean respiratory disturbance index (RDI) and the mean lowest oxygen saturation for patients were 26.2 (± 28.4) and 76.9 (± 22.9%), respectively.

ESS, PSS, and BDI
The mean ESS score for patients was 10.7 (± 5.6), and for controls, 6.5 (± 4.2; p = 0.001). The mean PSS score was 16.5 (± 7.3) for patients and 12.1 (± 5.3) for controls (p = 0.001). The mean BDI score for patients was 8.9 (± 7.5), and for controls, 3.8 (± 4.0; p = 0.001). Based on the PSS cut-off score of 14, we classified 104 patients (61.2%) and 25 controls (35.2%) as undergoing high stress levels. Based on the BDI cut-off score of 14, 37 patients (21.8%) and 1 control (1.4%) were depressed. These data support hypothesis (a) by revealing significant differences between the groups.

Use of coping strategies
A comparison of the type of coping strategies used by patients and controls revealed no significant differences between the two groups. Adjustment for possible confounding factors (i.e., age, gender, education, and marital status) did not change this pattern of results. The data comparing Problem-Focused Coping and Emotion-Focused Coping does not support hypothesis (b), instead showing the patient group used significantly more Problem-Focused than Emotion-Focused Coping (p < 0.005).

Correlations between coping strategies and RDI, ESS, PSS, and BDI
We used Pearson partial correlations to discern the directions and strengths of the relationships between coping strategies and other variables, as follows: RDI severity, daytime sleepiness complaint level, perceived stress level, and reported depressive mood
level (Table 1-4). We considered a correlation as significant when partial $r$ was higher than 0.3, with a $p$ value of less than 0.001.

**Correlation with RDI**

The patients were divided into three subcategories according to their RDIs: mild (RDI 0-20), moderate (RDI 21-40), and severe (RDI 41 or more). The mild RDI severity subgroup used Self-Control more compared to the severe RDI severity group ($p < 0.05$). We found no significant differences among the groups, except in Self-Control, between the groups with mild and severe RDI severity (Table 1). As Table 5 shows, RDI also did not correlate significantly with any other variables.

**Correlation with ESS**

When we divided patients into four groups according to ESS scores - non-sleepy (scores of 0-7) and mild (8-12), moderate (13-16), and severe (17-24) sleepiness - Duncan grouping revealed that individuals who complained of greater daytime sleepiness used every kind of coping strategy except Seeking Social Support and Accepting Responsibility (Table 2).

As Table 5 shows, among the patients four coping strategies (Emotion-Focused and Problem-Focused) correlated positively with level of daytime sleepiness. The patients who reported excessive daytime sleepiness were more likely to use Distancing (partial $r = 0.32$, $p = 0.0003$), Self-Controlling (partial $r = 0.45$, $p = 0.0001$), Escape Avoidance (partial $r = 0.30$, $p = 0.0006$), and Planful Problem-Solving (partial $r = 0.41$, $p = 0.0001$). ESS score correlated positively with Emotion-Focused Coping (partial $r = 0.33$, $p = 0.0001$), and Problem-Focused Coping (partial $r = 0.41$, $p = 0.0001$) and Problem-Focused Coping (partial $r = 0.30$, $p = 0.0006$).

**Correlation with PSS**

When we divided the patients into two groups according to their levels of perceived stress, either non-stressed (score of 13 or less) or stressed (score of 14 or more), we found the stressed group used more Self-Controlling, Accepting Responsibility, Escape-Avoidance, and Positive-Reappraisal strategies (Table 4).

As Table 5 shows, the patients who were more likely to use Escape-Avoidance (partial $r = 0.47$, $p = 0.0001$) and Self-Controlling (partial $r = 0.38$, $p = 0.0001$) reported higher levels of perceived stress. Perceived stress also correlated significantly with Emotion-Focused Coping (partial $r = 0.44$, $p = 0.0001$) and BDI score (partial $r = 0.66$, $p = 0.0001$). However, perceived stress did not correlate significantly with Problem-Focused Coping (partial $r = 0.10$, $p = 0.2858$).

**Correlation with BDI**

When we divided the patients into two groups according to their BDI scores (non-depressed, 13 or less; depressed, 14 or higher), we found the depressed group used significantly more Self-Control ($p = 0.0001$), Seeking Social Support ($p < 0.05$), Escape-Avoidance ($p = 0.0001$), and Emotion-Focused Coping, compared to the non-depressed group (Table 4).

As Table 5 shows, among the patients two Emotion-Focused Coping Strategies, Escape-Avoidance (partial $r = 0.37$, $p = 0.0001$) and Self-Control (partial $r = 0.34$, $p = 0.0001$), correlated positively with patient depression level. The BDI, therefore, correlated significantly with Emotion-Focused Coping (partial $r = 0.33$, $p = 0.0001$), but it did not correlate significantly with Problem-Focused Coping (partial $r = 0.06$, $p = 0.5375$). The BDI also correlated with a higher perceived stress level (partial $r = 0.66$, $p = 0.0001$).

The data from the Pearson partial correlations clearly support hypothesis (c), showing a reasonably positive correlation between Emotion-Focused Coping and ESS, PSS, and BDI. However, the lack of significant correlations between Problem-Focused Coping and ESS, PSS, and BDI was not significant.

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**Table 1. Comparison of coping strategies by respiratory disturbance index (RDI)**

<table>
<thead>
<tr>
<th>Types of coping strategy</th>
<th>RDI &lt; 20*</th>
<th>20 ≤ RDI ≤ 40</th>
<th>RDI &gt; 40</th>
<th>t-test for LS mean (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>6.6 ± 3.6 (6.8)</td>
<td>5.8 ± 3.3 (5.6)</td>
<td>6.0 ± 4.0 (6.5)</td>
<td>NS</td>
</tr>
<tr>
<td>DIS</td>
<td>5.1 ± 3.5 (5.6)</td>
<td>5.0 ± 2.7 (5.8)</td>
<td>4.6 ± 2.8 (5.2)</td>
<td>NS</td>
</tr>
<tr>
<td>SC</td>
<td>9.9 ± 3.6 (9.9)</td>
<td>8.1 ± 4.3 (7.8)</td>
<td>8.7 ± 4.3 (8.6)</td>
<td>0.0250 for a vs b</td>
</tr>
<tr>
<td>SSS</td>
<td>7.8 ± 4.7 (8.1)</td>
<td>7.1 ± 4.7 (6.4)</td>
<td>6.5 ± 4.4 (6.9)</td>
<td>NS</td>
</tr>
<tr>
<td>AR</td>
<td>4.0 ± 2.9 (4.1)</td>
<td>4.0 ± 3.0 (3.9)</td>
<td>3.2 ± 2.6 (3.1)</td>
<td>0.0654 for a vs c</td>
</tr>
<tr>
<td>EA</td>
<td>7.9 ± 5.6 (8.8)</td>
<td>6.7 ± 5.2 (7.0)</td>
<td>6.4 ± 6.9 (7.0)</td>
<td>NS</td>
</tr>
<tr>
<td>PPS</td>
<td>9.8 ± 4.4 (9.7)</td>
<td>9.0 ± 4.2 (8.8)</td>
<td>8.7 ± 4.0 (8.9)</td>
<td>NS</td>
</tr>
<tr>
<td>PR</td>
<td>7.6 ± 5.2 (8.5)</td>
<td>5.9 ± 4.4 (6.3)</td>
<td>6.7 ± 5.1 (7.7)</td>
<td>0.0648 for a vs b</td>
</tr>
<tr>
<td>PFC</td>
<td>31.8 ± 13.7 (33.1)</td>
<td>28.1 ± 12.8 (27.4)</td>
<td>27.8 ± 13.7 (30.1)</td>
<td>0.0610 for a vs c</td>
</tr>
<tr>
<td>EFC</td>
<td>27.0 ± 12.4 (28.4)</td>
<td>24.1 ± 10.5 (24.7)</td>
<td>23.0 ± 13.4 (23.9)</td>
<td>0.0642 for a vs c</td>
</tr>
</tbody>
</table>

Numbers represent M ± SD (LS mean). Coping scales were computed by summing the respondents’ scores on all of the items and were then divided by the number of items in each scale in order to permit comparisons across scales.

Perceived Stress, Depression, Coping Strategies, SRBD

The significant positive correlation between Problem-Focused Coping and ESS did not support the latter half of hypothesis (c).

DISCUSSION

This study's main results show that the patients with SRBD involving daytime sleepiness are under higher stress, report a more depressed mood, and, in general, use a greater number of problem-focused (as opposed to emotion-focused) coping strategies. The patients and controls used similar coping strategies; however, those who had higher scores regarding daytime sleepiness, perceived stress, and/or depressive mood used emotion-focused coping significantly more often.

As hypothesized, the patients' reported daytime sleepiness complaints, perceived stress, and depressive moods were of a clinically significant level. Excessive daytime sleepiness is an important SRBD symptom, since impaired alertness may lead to personal, familial, and social

Table 2. Comparison of coping strategies by scores of Epworth Sleepiness Scale (ESS)

<table>
<thead>
<tr>
<th>Types of coping strategy</th>
<th>ESS &lt; 8n = 56 (32.9%)</th>
<th>8 ≤ ESS ≤ 12n = 44 (25.9%)</th>
<th>ESS &gt; 12n = 70 (41.2%)</th>
<th>t-test for LS mean (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>4.8 ± 3.4 (5.4)</td>
<td>6.9 ± 3.5 (7.3)</td>
<td>7.1 ± 3.6 (7.5)</td>
<td>0.0108 for a vs b</td>
</tr>
<tr>
<td>DIS</td>
<td>4.1 ± 3.0 (4.6)</td>
<td>4.3 ± 2.9 (5.0)</td>
<td>6.1 ± 3.3 (6.7)</td>
<td>0.0005 for a vs c</td>
</tr>
<tr>
<td>SC</td>
<td>7.8 ± 4.2 (7.9)</td>
<td>8.9 ± 3.3 (8.9)</td>
<td>10.9 ± 3.6 (11.0)</td>
<td>0.0001 for a vs c</td>
</tr>
<tr>
<td>SSS</td>
<td>6.4 ± 4.7 (7.0)</td>
<td>7.6 ± 4.1 (7.9)</td>
<td>8.0 ± 4.8 (8.1)</td>
<td>0.0069 for a vs c</td>
</tr>
<tr>
<td>AR</td>
<td>3.2 ± 3.0 (3.4)</td>
<td>4.0 ± 2.3 (4.0)</td>
<td>4.1 ± 2.9 (4.2)</td>
<td>NS</td>
</tr>
<tr>
<td>EA</td>
<td>5.6 ± 4.0 (6.4)</td>
<td>7.2 ± 5.8 (8.1)</td>
<td>8.9 ± 6.1 (10.0)</td>
<td>0.0007 for a vs c</td>
</tr>
<tr>
<td>PPS</td>
<td>7.8 ± 4.3 (8.0)</td>
<td>9.5 ± 4.0 (9.7)</td>
<td>10.6 ± 4.0 (10.7)</td>
<td>0.0471 for a vs b</td>
</tr>
<tr>
<td>PR</td>
<td>6.0 ± 4.4 (7.1)</td>
<td>6.9 ± 4.8 (7.8)</td>
<td>8.2 ± 5.5 (9.1)</td>
<td>0.0269 for a vs c</td>
</tr>
<tr>
<td>PFC</td>
<td>25.1 ± 12.9 (27.6)</td>
<td>30.9 ± 13.0 (32.7)</td>
<td>33.9 ± 13.5 (35.4)</td>
<td>0.0574 for a vs b</td>
</tr>
<tr>
<td>EFC</td>
<td>20.8 ± 11.4 (22.3)</td>
<td>24.5 ± 10.8 (26.1)</td>
<td>30.1 ± 12.8 (31.8)</td>
<td>0.0001 for a vs c</td>
</tr>
</tbody>
</table>

Numbers represent M ± SD (LS mean).

Table 3. Comparison of coping strategies by scores of Perceived Stress Scale (PSS)

<table>
<thead>
<tr>
<th>Types of coping strategy</th>
<th>PSS ≥ 14n = 104 (61.2%)</th>
<th>PSS &lt; 14n = 66 (38.8%)</th>
<th>t-test for LS mean (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>6.8 ± 3.5 (6.9)</td>
<td>5.5 ± 3.7 (6.0)</td>
<td>0.1356</td>
</tr>
<tr>
<td>DIS</td>
<td>5.5 ± 3.3 (5.8)</td>
<td>4.2 ± 2.9 (4.8)</td>
<td>0.0526</td>
</tr>
<tr>
<td>SC</td>
<td>10.2 ± 3.6 (10.0)</td>
<td>7.9 ± 4.1 (7.7)</td>
<td>0.0004</td>
</tr>
<tr>
<td>SSS</td>
<td>7.7 ± 4.7 (7.7)</td>
<td>6.8 ± 4.5 (7.5)</td>
<td>0.8272</td>
</tr>
<tr>
<td>AR</td>
<td>4.4 ± 2.8 (4.3)</td>
<td>2.8 ± 2.6 (2.7)</td>
<td>0.0008</td>
</tr>
<tr>
<td>EA</td>
<td>9.2 ± 5.6 (9.5)</td>
<td>4.3 ± 4.8 (4.9)</td>
<td>0.0001</td>
</tr>
<tr>
<td>PPS</td>
<td>9.7 ± 4.0 (9.6)</td>
<td>8.8 ± 4.7 (9.0)</td>
<td>0.4043</td>
</tr>
<tr>
<td>PR</td>
<td>8.1 ± 5.2 (8.6)</td>
<td>5.6 ± 4.4 (6.8)</td>
<td>0.0274</td>
</tr>
<tr>
<td>PFC</td>
<td>32.3 ± 13.5 (32.7)</td>
<td>26.8 ± 13.3 (29.4)</td>
<td>0.1188</td>
</tr>
<tr>
<td>EFC</td>
<td>29.4 ± 11.5 (29.7)</td>
<td>19.3 ± 11.3 (20.2)</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Numbers represent M ± SD (LS mean).
Our patients had a mean ESS score of 10.7, which indicates clinically significant daytime sleepiness. The patient subgroup complaining of daytime sleepiness was more depressed and additionally showed higher coping strategy mean values (except for in the seeking social support and accepting responsibility strategies), compared to patients without excessive daytime sleepiness. Since the number of coping strategies utilized indicates the extent of the coping effort, these results suggest that the excessive daytime sleepiness symptom caused them to expend more effort on coping than did their counterparts.

This study suggests that patients with SRBD are under higher stress and perceived greater stress in daily life than did controls. Of the 170 patients and 71 controls, 104 patients (61.2%) and 25 controls (35.2%) reported that they were under a high level of stress, which was significantly different. Compared with their counterparts, the group with the higher perceived stress level was more likely to use all kinds of coping strategies and to be more depressed. It is not surprising that their responses to the WCQ indicate their greater need to cope by their engagement of a greater variety of coping strategies, which indicates a higher stress level. Of the 170 patients, we classified 37 (21.8%) as depressed, using the BDI cut-off score of 14. This percentage is slightly lower than that the literature generally reports regarding medically ill patients. Patients with SRBD commonly report depression, although some researchers do not find any evidence of depression in SRBD patients. Researchers think that the causes of such patients' depression stems from physical and psychological distresses secondary to their SRBD symptoms, such as excessive daytime sleepiness, fatigue, poor cognitive function, and social dysfunction. It is also possible that SRBD-related symptoms alone do not lead directly to depressive mood but rather work indirectly, through their effects on stress and coping processes. For example, having symptoms of SRBD may lead to stress in personal, familial, occupational, and social aspects of one's life, and coping strategies, in turn, influence these stressful conditions' effects. Those who actively cope with these stressful conditions may not experience increased depression, whereas those who use detached coping strategies may experience increased depression. This interpretation is consistent with the theory that views coping processes as mediators of the relationship between stress and adaptational outcomes such as depression.
associates directly with an increased depressive mood.

Counter to our expectation, we found no significant difference in coping strategies used between the patients and the controls. Based on the conceptual model and empirical studies, we expected emotion-focused coping would correlate positively with stress and depressive mood, while problem-focused coping would correlate negatively with stress and depressive mood. A review of the literature on general human adaptation indicates that many factors, e.g., age, gender, educational level, marital status, and ethnicity, play important roles as confounding factors in an individual's choice of coping behaviors. The types of coping strategies both patient and control groups used, however, remained the same after controlling for the above socio-demographic variables. This may have been due to a selection factor, or perhaps SRBD patients used similar coping strategies as the control group used in general.

According to the findings of Folkman and Lazarus, individuals more often use problem-focused coping in controllable versus uncontrollable situations and use emotion-focused coping as the primary strategy in an uncontrollable situation. The diagnosis and treatment of SRBD is the stressor, which, by nature, fits the definition of a controllable situation, as it is controllable through behavioral changes including weight control, continuous positive airway pressure treatment, upper airway surgery, etc. Discussing treatment options with the clinician at the patient's initial evaluation and after confirmation of their diagnosis might have influenced the patients' choices of a greater number of adaptive coping mechanisms (problem-focused), which can slow disease progression and reduce complications. Moreover, patients were predominantly Caucasian (68.2%), who reportedly prefer using problem-focused coping over emotion-focused coping.

Third, 78% of the patients were males, who reportedly use problem-focused coping more than females do.

In our study, the type of coping strategies used was associated positively with daytime sleepiness severity, perceived stress level, and depressive mood level. The more individuals complained of daytime sleepiness, the more they used Self-Controlling, Distancing, Planful Problem-Solving, and Escape-Avoidance strategies. These results suggest the patients complaining of daytime sleepiness use Planful Problem-Solving to eliminate their sleepiness while also mobilizing detached coping, such as Self-Controlling, Distancing, and Escape-Avoidance. Detachment coping associates with higher levels of depressive mood.

The higher the perceived stress level, and the greater the reported depressive mood, the more participants used Escape-Avoidance and Self-Controlling strategies. Furthermore, daytime sleepiness, stress, and depressive mood correlated positively with emotion-focused coping. These findings suggest that the more patients complained of daytime sleepiness, perceived stress, and reported a depressive mood, the more they used emotion-focused coping over problem-focused coping. These findings are consistent with other studies and our expectation. In several cross-sectional studies, emotion-focused coping associates with an increased level of psychological distress in general, although in one study, emotion-focused coping for the purpose of affective regulation correlated with low levels of distress. Problem-focused coping correlates negatively with psychological distress, although stress and depressive mood did not correlate significantly with problem-focused coping in this study. Possibly those who were more sleepy, more highly stressed, or more depressed used more emotion-focused coping because they felt they could do nothing to modify their situations. This attitude may have led to greater stress and depression. However, emotion-focused coping might be the cause, rather than the consequence, of high stress and depression. Those who learned to cope through emotion-focused coping might be more stressed and depressed. Based on our findings, it is tempting to suggest that Self-Controlling and Escape-Avoidance are less adaptive forms of coping. Although little consensus exists regarding which coping strategies deal effectively with stress, some evidence suggest individuals' coping strategies function perfectly well in some situations, while in others they are insufficient. For example, denial of their disease was a psychological strategy of some patients. This could, of course, be classified as a poor strategy. However, in some situations, denial can be adequate and can later lead to more constructive strategies. Therefore, we advocate caution when one interprets a patient's coping.

Although the question of whether emotion-focused coping increases distress or whether higher distress levels lead to emotion-focused coping remains unanswered, we believe the relationship between psychological distress and emotion-focused coping is bidirectional, not unidirectional and static. This study supports this idea, suggesting that the relationship might be circular: emotion-focused coping increases depression, and that increase leads to an increase in the availability and use of emotion-focused coping.

Hooker, et al. point out that psychoeducational and clinical interventions can increase patient use of effective coping skills. The present study suggests practitioners should target patients who complain of excessive daytime sleepiness and experience high levels of stress and depressive mood for such interventions. The present study also suggests practitioners working with SRBD patients need to consider their patients' coping strategies in conjunction with daytime sleepiness, perceived stress, and depression levels. Effective coping contributes to successful adaptation to, and treatment of, SRBD, and an understanding of successful or maladaptive coping establishes a basis for the development of a holistic approach to treating SRBD patients.

Our findings may be limited in several important ways. Due to the cross-sectional nature of the present study, it cannot be determined whether specific coping approaches, such as Escape-Avoidance and Self-Confrontive cause psychological distress or whether those who experience such distress use these coping approaches. Coping styles may also change during the SRBD diagnosis and management trajectory. In addition, this study was conducted.
based on a sample obtained at single site, a university hospital sleep disorders clinic. This limits the findings’ generalizability to other groups of SRBD patients, including those who do not seek professional help. Use of mailed questionnaires might also have induced a bias, and, finally, severely depressed, less knowledgeable, or less expressive persons may not have returned the questionnaires.

Despite its limitations, however, this study reveals some important information about the relationships among daytime sleepiness, stress, depressive mood, and coping strategies in SRBD patients. As we mentioned, those who complained of greater sleepiness, perceived higher stress, and/or reported more depressive mood used greater levels of emotion-focused coping than did their counterparts. Based on these findings, we might conclude that they coped less effectively at the time we acquired these measurements.

Conclusion

This study focused on SRBD’s psychological consequences and the coping mechanisms patients used in responding to it. The coping mechanisms used are important determinants of SRBD progression that researchers and practitioners should understand. Such understanding offers treatment tools against progression of a disease that psychological distress may complicate.

Conflicts of Interest

The authors have no financial conflicts of interest.

REFERENCES
