A prospective diary study of the role of psychological stress and negative mood in the recurrence of herpes simplex virus (HSV1)

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Summary
The aim of this study was to investigate the relationship between psychological stress and negative mood and the recurrence of herpes simplex (HSV1). A range of standard, baseline measures of health and psychological well-being were collected from 20 participants who suffered from HSV1 recurrences (with a history of recent recurrence) and 18 matched controls. Longitudinal data was collected over a 16-week period using weekly diaries. Participants recorded weekly levels of psychological stress, negative mood, negative events and hassles and kept a weekly health record documenting the recurrence of HSV1 and the incidence of other infectious illness. The longitudinal relationship between stress, negative mood and recurrence of HSV was assessed.

Participants who suffered from frequent HSV1 recurrences were significantly higher on standard measures of stress and negative mood than those who only suffered occasional or no recurrences. Furthermore, there was a longitudinal relationship between high levels of perceived stress and the recurrence of HSV1.

It was concluded that those suffering from frequent reactivation of HSV1 may be more vulnerable to the effect of stress on immune function and, in this study, higher levels of psychological stress were associated with the subsequent reactivation of HSV1. Copyright © 2008 John Wiley & Sons, Ltd.

Key Words
psychological stress; negative mood; herpes simplex; infectious illness

Introduction
This study aimed to investigate the relationship between psychological stress and the recurrence of herpes simplex type 1 (HSV1) commonly referred to as cold sores.

A number of studies have found that psychosocial stress may be a risk factor in the development and duration of primary herpes virus infections as well as its recurrence (e.g. Cohen et al., 1999; Kiecolt-Glaser & Glaser, 1987). Evidence regarding the precise role of psychosocial factors in the recurrence of HSV, however, remains unclear, as well as the precise mecha-
nisms by which psychosocial factors are mediated physiologically to influence immune-related illness. Although this study focuses on the relationship between levels of psychological stress and recurrence of infectious illness, a number of recent reviews elaborate the accumulating evidence providing insight into the mechanisms that may underpin the relationship between psychological stress and infectious illness (Elenkov, Webster, Torpy & Chrousos, 1999; Kiecolt Glaser, McGuire, Robbles & Glaser, 2002).

Many previous studies are cross-sectional in design and are therefore unable to distinguish between stress as a cause and stress as a consequence of HSV recurrence. In addition, studies frequently failed to control for the influence of neuroticism or negative affect (NA) on self-report health measures (Watson & Pennebaker, 1989); furthermore, most of the research into HSV recurrence focused on genital herpes. There is a need for longitudinal research that considers whether psychological stress precedes the recurrence of HSV type 1 (facial herpes).

HSV Infection

HSV causes an acute infection at a peripheral site and establishes a latent infection in the local sensory ganglia that innervate the site of the initial infection (Blyth & Hill 1985). HSV has the ability to spontaneously reactivate from its non-infectious latent state and cause a recurrent infection. Factors believed to trigger a reactivation are variable but may include immune suppression, exposure to ultraviolet light, tissue damage and psychological stress. The frequency with which reactivation occurs also varies widely between individuals. Estimates have indicated that one-third of those infected experienced recurrences, and the frequency may range from 4 to 35 recurrences per year with a mean duration of 8 days (Luby & Klinge, 1985). HSV types 1 and 2 are said to be among the most prevalent infectious agents in humans—it has been estimated that up to a third of the world's population suffer from recurrent episodes (Klein 1976). The recurrence of HSV, whether it be facial (type 1) or genital (type 2) is a significant medical problem, and the study of this disease provides an opportunity to develop our understanding of the relationship between psychological factors and infectious illness without the methodological difficulties associated with controlling for exposure to a virus (Cohen, Tyrrell & Smith, 1991).

A brief review of previous longitudinal research

A number of previous longitudinal studies have found evidence for some relationship between stress and/or mood state—for example, Luborsky, Mintz, Brightman and Katcher (1976) suggested that general unhappiness was associated with more frequent cold sores; however, more intense and/or sustained distress may be necessary to influence recurrence. Goldmeier and Johnson (1982) conducted a 28-week longitudinal survey and found that patients with higher scores on the General Health Questionnaire had their first recurrence sooner than those with lower scores; however, in this study, 13 of the 29 participants in the control group were lost at the follow-up stage.

Hoon (1986) followed 122 participants for 6 months using monthly evaluations of major and minor life events and did not find evidence for a relationship with reported recurrence of cold sores and no evidence for an increase in stress ratings in the 2 weeks prior to recurrence. This study, however, relied upon retrospective reporting of life events and did not consider subjective appraisal of stressors.

A subsequent study by Kemeny, Cohen, Zegans and Conant (1989) measured major life events, ongoing daily stress, negative mood, helper inducer (CD4+) and suppressor cytotoxic (CD8+) T cells, health behaviour (sleep, exercise, alcohol and fatigue), presence of other infections and HSV recurrence. Thirty-six participants with recurrent genital herpes were followed for 6 months. A subsample of 19 participants gave blood samples for immune measures. They found that those with high levels of anxiety, depression or hostility had significantly lower CD8+ cells, and these decreased levels of Cd8+ cells both preceded and followed recurrence of HSV. Higher levels of stressors were associated with lower CD4+ cells cross-sectionally. ‘Other infection’ was significantly related to recurrence rate. They suggest that infection may trigger recurrence in some individuals whereas others may have recurrences that are psychologically triggered. When controlling for other infection they found that chronic levels of depressive affect (but not total stressor score and not acute changes in depressive mood) was related to recurrence. They suggested that chronic depressive affect led to decreased levels of CD8+ cells and recurrence of HSV. This was, however, based on average monthly scores.
over the 6-month period and the frequency with which measures are taken may be an important factor. Weekly measures may be more suitable than monthly measures for understanding temporal relationships (Kemeny et al., 1989). In a subsequent study of genital herpes, Cohen et al. (1999) followed 58 females for 6 months and found that persistent stress, but not short-term stress, predicted HSV recurrences. Higher levels of persistent anxiety resulted in an increase in the likelihood of a recurrence but transient mood states and life events did not.

In a meta-analytic review of the relation of stressors and depressive symptoms with the progression of two immunologically moderated diseases [HSV and human immunodeficiency virus (HIV)], it was suggested that both depressive symptoms and stressors were modestly related to HSV recurrence. Zorilla, McKay, Luborsky & Schmidt (1996) reviewed 15 studies (11 studies of genital herpes and three studies of oral herpes) and found that most studies were cross-sectional and relied upon the patients’ self reported recurrence. Prospective studies revealed smaller correlations than cross-sectional designs and provided less support for a relationship between psychological stress and recurrence than for depressive symptoms and recurrence. They concluded that the evidence was not sufficiently robust to predict confidently that future studies would generate similar findings and that more research utilizing prospective designs was required (Zorilla et al., 1996).

A more recent review of research into the relation of stressors and depressive symptoms with the progression of two immunologically moderated diseases (HSV and human immunodeficiency virus [HIV]) is that both depressive symptoms and stressors are modestly related to HSV recurrence. Zorilla, McKay, Luborsky & Schmidt (1996) reviewed 15 studies (11 studies of genital herpes and three studies of oral herpes) and found that most studies were cross-sectional and relied upon the patients’ self reported recurrence. Prospective studies revealed smaller correlations than cross-sectional designs and provided less support for a relationship between psychological stress and recurrence than for depressive symptoms and recurrence. They concluded that the evidence was not sufficiently robust to predict confidently that future studies would generate similar findings and that more research utilizing prospective designs was required (Zorilla et al., 1996).

Most of the evidence for a link between psychological stress and herpes is based upon retrospective reporting following a recurrence (e.g. Schmidt, Zyzanski, Ellner, Kumar & Arno 1985). There is considerable variability between studies in design and methodology. Furthermore, the issue of what constitutes psychological stress is also variable with some using measures of stressors or ‘objective stress’ such as major and minor life events and failing to consider any subjective appraisal of stressors. The rationale for this study was based on Lazarus’s transactional model of stress where the importance of stress appraisal was a critical factor in understanding the potential consequences of such stress. A number of studies measured negative mood although the distinction between transient mood state and more chronic depressive traits have been highlighted.

The present investigation involved a longitudinal diary study of oral herpes taking weekly measures of psychological stress, mood, general health and recurrence of cold sores and other infectious illness over a 4-month period. It was based on a methodology recently used to examine associations between stress and the common cold (Faulkner & Smith, 2008). The study aimed to control for the influence of NA on reporting stress and illness as well as controlling for the influence of current illness.

The diary method allows one to investigate more precisely temporal associations and therefore achieve a clearer understanding of causality. The study also aims to verify the recurrence of herpes. The analyses investigated:
Differences between HSV sufferers and a control group at the start of the study on standardized measures of stressful life events, perceived stress and negative mood.

Differences between HSV sufferers and the control group on weekly diary measures during the 4-month period of assessment (i.e. on measures of weekly stress, mood, negative events and recurrence of infectious illness).

Differences, on the above measures, between those suffering a recurrence of cold sore during the diary period and those HSV sufferers who did not experience a recurrence.

Within the cold-sore group, a longitudinal analysis of whether high levels of stress and/or negative mood directly preceded a cold sore episode, i.e. looking at the temporal relationship between stress and the recurrence of HSV in the following week.

This analysis considered:

- Weekly perceived stress and subsequent cold sore outbreak.
- Weekly mood state and subsequent cold sore outbreak.
- Weekly negative events and subsequent cold sore outbreak.

The relationship between these and the recurrence of other infectious illness during the diary period was also investigated.

METHOD

Design

This was a longitudinal diary study with participants who reported suffering from recurrences of HSV1 (the cold-sore group) and a control group who did not suffer from HSV. Participants completed a brief medical history and a battery of psychosocial measures at baseline (see further discussion). They were then required to complete diary pro-formas each week for 16 weeks that measured the weekly incidence and severity of cold sores as well as other infectious illnesses. If the participant suffered a cold sore recurrence or other illness, further details of the symptoms and severity were recorded. Weekly measures of negative events, perceived stress and negative mood were recorded using five-point Likert-type scales. Diaries were completed and returned weekly. Participants were asked to complete the diaries at the same time each week. When a cold sore recurrence was reported, participants were asked to contact the researcher in order that the incidence could be verified.

Participants

Thirty-eight participants volunteered to take part in the study; 20 in the cold-sore group and 18 matched controls. Two of the cold-sore group participants were males and 18 were females; three of the control group were males and 15 were females. The mean age of the cold-sore group was 27.6 years and the mean age of the control group was 25.3 years. The groups were well-matched on measures of general health and medical history as well as on measures of health behaviours (diet, exercise, smoking and alcohol consumption).

All participants were university students. Cold-sore participants met the criteria of having suffered at least one recurrence of cold sore in the previous 6 months. Participants were paid £10 for completing the study.

Measures

Baseline measures included: a Life Events Scale (Cohen et al., 1991; the Daily Hassles Scale (Kanner, Coyne, Schaeffer & Lazarus, 1981), the Perceived Stress Scale (Cohen, Kamarck & Mermelstein, 1983); the Positive and Negative Mood Scale (Zevon & Tellegen, 1982); and the Trait Anxiety Scale (Spielberger, Gorsuch & Iusbene, 1970).

Participants completed weekly diaries in which they recorded details of any cold-sore recurrence that week (including day of onset, severity and impact) as well as recurrence of other infectious illness. They also recorded levels of stress, negative mood, major and minor events, and general health on five-point Likert-type scales.

Statistical Analysis

Data was analysed using BMDP software (Statistical Solutions, Ireland). Analyses of variance (ANOVAS) were used to compare the groups on baseline measures and analysis of covariance (ANCOVAS) were calculated to control for possible confounding factors such as NA. Where appropriate a post hoc Tukey test was calculated.
to identify significant differences between specific groups and finally, *t*-tests were calculated for analysing stress levels preceding HSV recurrences and stress levels during incidence free periods.

**Results**

**Comparison of the HSV group and the healthy controls on baseline measures of stressful events, perceived stress, negative mood and depression**

The HSV group were divided into those who suffered from few recurrences of cold sores (less than two in the previous 6 months) and those who suffered more frequent recurrences (two or more in the previous 6 months).

Table I shows significant differences between the groups on measures of perceived stress, life events and hassles after controlling for NA and previous illness. The effects were largely caused by the high-frequency HSV group being significantly different from the control group.

**Comparison of HSV and control group on summed weekly diary measures**

It can be seen that the HSV group were significantly higher in stress and negative mood over the diary period than the control group (Table II). They also experienced more negative events and suffered more infectious illness than the control group during this period. These scores remained significant when controlling for NA.

Table I. Differences between high and low incidence cold-sore and control groups on standard psychosocial measures at baseline (perceived stress, life events, minor daily hassles and negative events), controlling for negative affect and previous illness.

<table>
<thead>
<tr>
<th>Measure and significance</th>
<th>No-cold-sore group</th>
<th>Cold sores: low incidence</th>
<th>Cold sores: high incidence</th>
<th>Post hoc differences between the groups (Tukey’s HSD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1, <em>n</em> = 17</td>
<td>Group 2, <em>n</em> = 7</td>
<td>Group 3, <em>n</em> = 13</td>
<td></td>
</tr>
<tr>
<td>Perceived stress***</td>
<td>15.8 (1.4)</td>
<td>19.9 (2.2)</td>
<td>28.2 (1.2)</td>
<td>1 and 3***</td>
</tr>
<tr>
<td>Total life events*</td>
<td>2.5 (0.5)</td>
<td>2.9 (0.8)</td>
<td>4.4 (1.6)</td>
<td>1 and 3*</td>
</tr>
<tr>
<td>Hassles—cumulative severity***</td>
<td>15.2 (9.4)</td>
<td>31.6 (14.3)</td>
<td>63.3 (11.3)</td>
<td>1 and 2*</td>
</tr>
<tr>
<td>Frequency***</td>
<td>10.0 (4.1)</td>
<td>17.9 (6.2)</td>
<td>34.2 (4.9)</td>
<td>1 and 2*</td>
</tr>
<tr>
<td>Negative mood***</td>
<td>10.8 (2.1)</td>
<td>13.2 (3.1)</td>
<td>20.5 (2.5)</td>
<td>1 and 2*</td>
</tr>
</tbody>
</table>

* *p < 0.05; ** *p < 0.01; *** *p < 0.001.
HSD: honestly significant difference; SD: standard deviation.

Table II. A comparison of the summed weekly diary measures (for the whole diary period) for the health control group and the HSV group (high scores = low stress and more positive mood).

<table>
<thead>
<tr>
<th>Variable</th>
<th>HSV [mean (SD)]</th>
<th>Controls [mean (SD)]</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total weekly stress</td>
<td>36.2 (15.4)</td>
<td>52.3 (7.1)</td>
<td>*p &lt; 0.0003</td>
</tr>
<tr>
<td>(possible range = 16–80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total weekly mood</td>
<td>39.9 (15.8)</td>
<td>55.4 (7.5)</td>
<td>*p &lt; 0.0005</td>
</tr>
<tr>
<td>(possible range = 16–80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of other illness</td>
<td>3.6 (2.1)</td>
<td>1.5 (1.2)</td>
<td>*p &lt; 0.0004</td>
</tr>
<tr>
<td>(weekly recurrence; possible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>range = 0–16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative events (weekly)</td>
<td>5.9 (4.1)</td>
<td>0.9 (1.5)</td>
<td>*p &lt; 0.0000</td>
</tr>
<tr>
<td>Weekly hassles</td>
<td>4.9 (4.6)</td>
<td>3.6 (3.1)</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

HSV: herpes simplex virus; SD: standard deviation.
**Weekly stress and mood scores for the HSV Group only, comparing those who had a recurrence of HSV with those who did not have a recurrence during the diary period**

Fourteen participants in the HSV group suffered at least one recurrence of cold sore during the diary period. Six participants in the HSV group did not experience a recurrence during the period. This analysis aimed to investigate whether those who had suffered a cold sore during the diary period were higher on total weekly stress and negative mood than those who did not suffer a cold sore during that period.

Because 85 per cent of HSV recurrences occurred within the first 7 weeks of the diary period, this is when it might be expected that differences in stress and mood would be apparent. Weekly stress and mood scores over the first 7 weeks were calculated for those who had an episode of cold sore compared with those who did not have an episode (i.e. within the HSV group only). ANOVAS were calculated to test the difference in scores and it was found that that those having a cold sore during the diary period had a mean stress score of 16.42 (5.43) compared with a mean stress score for the no episode group of 22.67 (4.63). A low score means higher stress and the difference between the group was significant $F(1,18) = 3.82$, $p < 0.02$. The differences between the groups on total weekly mood was not significant but was in the anticipated direction; mean score for cold sore episode group was 19.00 (5.77) and for the no episode group 23.00 (4.29), $F(1,18) = 2.49$, $p < 0.15$. Again, a lower score means higher negative mood.

**Stress and mood scores in the weeks prior to a recurrence of cold sores**

There were consistent differences between the stress scores in the week prior to an outbreak of HSV; the weekly stress scores in the week prior to a recurrence were consistently higher than the weeks that did not precede a recurrence, and the pattern was similar for negative mood. This initial analysis did not take into consideration the possible confounding effects of having a cold sore in the previous week, i.e. the possible after-effects of having a cold sore. In the subsequent analysis the potential effects of a previous cold sore infection were controlled.

In order to analyse this relationship, stress scores were calculated in the week prior to an outbreak of cold sore to investigate whether they were significantly higher in the weeks prior to a cold sore recurrence than in the weeks when there were no subsequent recurrence. To avoid confounding pre-cold sore stress with post-cold sore stress, scores for those with a cold sore the previous week were excluded from the total stress score that week.

This analysis was a within-subjects design, comparing the stress levels in the weeks prior to a cold sore recurrence with the stress scores in the weeks prior to no recurrence.

The same analysis as above was carried out for the relationship: (a) between weekly mood scores and cold sore recurrence; and (b) between weekly negative events and cold sore recurrence. Mean scores were compared for the week prior to an outbreak of cold sores with scores for the week prior with no outbreak (low score = high negative mood). The following table (Table III) shows the scores for stress, negative mood and negative events.

There was a significant difference in the stress scores in the week prior to an outbreak of cold sore and the week prior to no outbreak of cold sore. This difference was highly significant and remained when controlling for the after-effects of previous illness.

**Discussion**

An initial analysis compared the cold-sore group with the healthy control group on standard measures of stressful events (life events and daily hassles). Initially, the HSV group as a whole was compared with the control group and, as might be anticipated from previous research on stress and illness using these measures (e.g. Cohen & Williamson, 1991), there were significant differences between the two groups. When NA was controlled, however, the differences between the groups did not reach significance (Faulkner, 2005). This suggested that the differences might be because of the tendency of those high on NA to be more likely to report higher scores on self-report measures of health and symptoms of illnesses (Watson & Pennebaker, 1989). As a result of this finding the cold-sore group was divided into those who might be considered severe sufferers, i.e. those who had suffered more frequent recurrences of cold sores in the previous 6 months,
Stress and recurrence of herpes simplex virus

Table III. Temporal relationship between weekly measures and cold sore recurrence showing the mean (SD) scores for stress, negative mood and negative events in weeks ‘pre-cold sore’ compared with their scores ‘pre-no cold sore’ episode (controlling for the after effects of a cold sore; high scores = low stress and more positive mood).

<table>
<thead>
<tr>
<th>HSV group only</th>
<th>Week before no cold sore [mean (SD)]</th>
<th>Week before cold sore outbreak [mean (SD)]</th>
<th>Matched t</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress and cold sore recurrence</td>
<td>2.2.84 (0.54)</td>
<td>1.83 (0.41)</td>
<td>−6.93</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>(high stress = low score)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mood and cold sore recurrence</td>
<td>3.10 (0.52)</td>
<td>2.61 (0.49)</td>
<td>−1.76</td>
<td>p &lt; 0.13, NS</td>
</tr>
<tr>
<td>(negative mood = lower score)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of negative events and</td>
<td>0.57 (0.35)</td>
<td>1.27 (0.60)</td>
<td>−1.24</td>
<td>p = 0.07, NS</td>
</tr>
<tr>
<td>cold sore recurrence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HSV: herpes simplex virus; NS: not significant; SD: standard deviation.

and those who suffered infrequent recurrences. It was the frequent sufferers who were significantly higher in both exposure to stressful events and perceived stress, even when NA was controlled. These results supported the findings of Segerstrom and Miller (2004) who, in her meta-analysis of 300 studies of stress and immune function, concluded that not only does stress effect immunity but that the immune systems of those who were chronically ill were more prone to stress-related changes in the immune function. In this case, it appeared that those who suffered more frequent recurrences of cold sores were scoring significantly higher on standard measures of stress and negative mood. This finding also supports the ‘dose-response’ stress illness hypothesis outlined by Cohen et al. (1991).

The next set of analysis considered the experience of stress and negative mood over the diary period and demonstrated that the HSV group, as a whole, was significantly higher than the healthy controls in measures of stress and negative mood, and weekly measures of negative events as well as the frequency of other infections during the assessment period. These events, however, were concurrent with recurrence of cold sore; it did not necessarily mean that stress and negative mood preceded the outbreak of cold sores.

It could be the case that people experienced high levels of stress and negative mood as a consequence of HSV recurrence. Furthermore, the scores for the HSV group were averaged over the whole group and did not take into account those who suffered a recurrence over the period with those who did not. The next analyses focused on the HSV group only to investigate whether there were within group differences between those having an outbreak of cold sore and those not having an outbreak of cold sore during the period of assessment. It was found that those experiencing a recurrence were significantly higher in reported levels of psychological stress during the period in which they were experiencing these recurrences. There were also differences in mood state; however, these did not reach significance. These findings suggest that HSV sufferers experience higher levels of stress and negative mood overall compared with healthy controls but that this stress and psychological difficulty seems to occur during the period in which they are suffering recurrences of cold sores. Additionally, it appeared that those who suffered more frequent recurrences were subject to higher levels of stress and may be more susceptible to the effect of stress on recurrence. This still did not directly address the question regarding the direction of the relationship between stress and recurrence—were those experiencing higher levels of stress and negative mood more likely to experience a cold sore episode the following week? In order to address this question, levels of weekly stress and negative mood were measured and stress scores in the weeks prior to a recurrence of cold sore were compared with levels of stress and negative mood in the weeks when there were no subsequent recurrences.

There was no significant, longitudinal relationship between negative mood and recurrence of cold sore as measured in this diary study, this was similarly the case for weekly negative events, although the results were in the anticipated direction. This was an interesting finding, given that measures of mood appear to have predicted HSV occurrence in some previous studies (Shah & Button, 1998). However, more transient mood states and objective stress measures are not necessarily the best measures of emotional distress, as
Kemeny et al. (1989) found. They reported that chronic depressive affect resulted in HSV recurrence but not acute changes in depressive mood. They argued that shorter-term mood changes were not sufficient to affect immunosuppression. Similarly, Cohen et al. (1999) concluded that persistent stressors and high levels of anxiety predicted genital herpes recurrence whereas transient mood states, short term stressors and life change events did not. In this study, high levels of perceived stress were a better measure of emotional distress and were associated with significantly higher subsequent recurrence of cold sore than was transient mood state or life events. This finding also supported Lazarus’ model of stress that highlighted the importance of the cognitive appraisal of stressors (Lazarus, 1966). Although there was a trend for negative mood and negative events to be higher prior to an outbreak of cold sores, the only significant associations in this study were for stress and cold sore outbreaks.

The findings from this study demonstrated a significant association between high levels of stress and frequent recurrence of cold sores. The relationship between stress and illness was not significant for those who suffered from only occasional recurrence and this finding was in line with previous research such as Segerstrom and Miller (2004) and provided further evidence that chronic illness may have an immunological cost, rendering sufferers more vulnerable to the effect of psychological stress.

It can be seen from these results that there was a significant longitudinal relationship between high levels of stress and the subsequent recurrence of cold sores in the following week. There was also an ‘after-effect’ of a cold sore episode, and the episode itself may cause stress and negative well-being. In this study, however, participants who were in the aftermath of a previous infection were excluded from the analysis on that week. The findings from this study suggest that high levels of psychological stress may be causally associated with a recurrence of HSV.

It should be noted that the sample in this study consisted mostly of females and it is possible that the findings may only apply to females suffering from HIV1 infection. Further research should further address the issue of possible gender difference and also elaborate any distinction between those who suffer frequent recurrences of HSV1 and those who suffer only occasional episodes.

Conclusion

Those who suffered from frequent recurrences of cold sore episodes scored significantly higher on standard measures of stress and negative mood than those who did not suffer from cold sores and those who suffered from only an occasional recurrence. This research supported findings which indicated that people suffering from more severe infectious illness are more vulnerable to the effect of stress on immune function. Secondly there was a longitudinal relationship between high levels of perceived stress and the likelihood of suffering a recurrence of cold sores suggesting that high levels of psychological stress precedes the reactivation of HSV1 infection.

References


