

Studies on Health and Light

"There is no area of our mental and bodily functioning that the sun does not influence. Our bodies were designed to receive and use it in a wide range of ways. We were not designed to hide from it in houses, offices, factories and schools. Sunshine, reaching us through our eyes and our skin, exercises a subtle control over us from birth to death, from head to tail."

Department of Education, Alberta, Canada, p.4

With and Without Seasonal Affective Disorder

Rats in total darkness without subjecting them to any anxiety stress. Their preference switched to alcohol and water instead of plain water.

In Science, July 30, 1973, Dr. Irving Geller, Chairman of the Department, refers to this as '**darkness-induced drinking phenomenon.**' He relates it to the work reported in 1963 by Nobel Prize winner Dr. Julius Axelrod, who found that the rat pineal gland produced more melatonin during the dark nighttime period than when it was light.

Dr. Geller then gave injections of pineal melatonin to rats kept on a regular light-dark cycle and not subjected to any anxiety. The injections alone turned these rats into alcoholics. Dr. Geller stated that "it is only through such animal studies that one can hope to attain a clearer understanding and perhaps an ultimate treatment or cure, or both, for alcoholism in humans."

An Open Trial of Morning Light Therapy For Treatment of Antepartum Depression

Dark skinned individuals more frequently require light therapy as infants and throughout their lives. Research shows that **African-Americans suffer:**

- 20% more deaths from heart disease ³
- Twice as many strokes
- Four times as many deaths from related diseases
- 20% more deaths from cancer
- Higher rate of infections
- Twice the rate of death from influenza, and pneumonia
- Five times the tuberculosis death rate
- Twice as many deaths from diabetes
- 40% have high blood pressure
- Studies show that darker skin correlates with higher blood pressure, even after accounting for stress. ⁴

Comment: Dermatologists classify us into six different skin types. Darker skinned individuals who are protected from too much sun near the equator become light deprived as they move north and work indoors. Lighter skin and eyes are better adapted to dimmer northern climates, yet all of us are affected by lack of full spectrum light when we are indoors under the normal, yellow-orange light.

Children are affected as well as adults. Health, work and academic progress are affected. They, too, may have more difficulty in the north, in the winter and in school. Researchers are beginning to believe that improper light is a factor in the higher school dropout rate of dark skinned youths.

1 Hess, A.F.: Newer Aspects of the Rickets Problem, JAMA 78:1177, 1922

2 Ente, G.: Relationship of Phototherapy and Skin Color, J Pediat 77:1098, 1970

3 National Center for Health Statistics: Vital Statistics Report, Final Mortality Statistics, 1969, 21(suppl2):4, US Public Health Service; Rockville, MD: 1972

4 Harburg, E., et al: Skin Color, Ethnicity, and Blood Pressure, Amer J Public Health 68:1177, 1978.

Asian Response to Light

Okawa M; Sirakawa S; Uchiyama M; Oguri M; Kohsaka M; Mishima K; Sakamoto K; Inoue H; Kamei K; Takahashi K.

Seasonal variation of mood and behaviour in a healthy middle-aged population in Japan.

Department of Psychophysiology, National Institute of Mental Health,
National Center of Neurology and Psychiatry, Chiba, Japan.
Acta Psychiatr Scand, 1996 Oct, 94:4, 211-6

A population survey of seasonality in six representative cities in Japan was conducted using the Japanese version of the Seasonal Pattern Assessment Questionnaire (SPAQ). The questionnaires were given to 951 parents (male: female ratio 1:1 age range 34-59 years) of high-school students. **Significant regional differences in seasonal variations of mood, length of sleep, and weight were observed; the proportion of individuals reporting high seasonality in the two northern cities was significantly higher than that in the other areas.** These results provide evidence for a northern predominance in the prevalence of seasonal affective disorder in Japan.

Suhail K; Cochrane R.

Seasonal changes in affective state in samples of Asian and white women.

School of Psychology, University of Birmingham, Edgbaston, UK.
Soc Psychiatry Psychiatr Epidemiol, 1997 Apr, 32:3, 149-57.

Seasonality of the affective state has been reported to vary in direct proportion to latitude in temperate regions. The frequency of seasonal affective disorder (SAD) and the severity of the symptoms associated with it have been reported to be greater in higher than in lower latitudes. In addition, recent research has suggested a genetic loading for SAD. Most of the research on the seasonality of affect has been done in high latitude areas, seasonal mood cycles have been infrequently investigated in tropical areas, and no study has so far measured and compared seasonal changes in affect and behaviour in indigenous and populations non-indigenous to high latitudes.

To rule out the biases associated with retrospective designs, a prospective longitudinal study was designed to investigate seasonal mood variations in indigenous white and non-indigenous Asian populations. Since previous research has indicated the excessive vulnerability of women to winter depression, it was decided to measure seasonality of the affective state only in women.

To examine the relative effects of genetic predispositions and physical environment, the Asian group was further divided into "Asian" and "Asian-British". The former group comprised women who were living in England but who had been born and had spent considerably more time in their country of origin, while the latter group consisted of women who were born in England and who had lived there all their lives.

The three groups of 25 women each were matched for age and socio-economic status, and were interviewed every month for 1 year using the Hospital Anxiety and Depression Scale (HAD), a Behavioural Change Inventory (BCI), the Ladder Scale of General Well-being (LSW) and a Monthly

Stress Inventory (MSI). One retrospective scale was administered at the end of the study year to compare the extent of seasonal change in affect with that on the HAD-depression subscale.

RESULTS: Seasonal depression peaked in winter in all three groups, with the incidence of winter depression being highest in the Asian group. Seasonal changes on several dimensions of behaviour were in the direction of winter depression for all three groups. States other than depression (anxiety and general well-being) did not show any seasonal variation. Hours of daylight was found to be the best predictor of seasonal variation in mood among environmental and psychosocial variables. There was no evidence to support a genetic hypothesis for SAD.

Suhail K; Cochrane R.

Seasonal variations in hospital admission for affective disorders by gender and ethnicity.

School of Psychology, University of Birmingham, Edgbaston, UK.

Soc Psychiatry Psychiatr Epidemiol, 1998 May, 33:5, 211-7

Hospital admission statistics for depression and mania have shown significant seasonal patterns. The present investigation was conducted to establish the pervasiveness of the impact of seasons on mood disorder presentation at Birmingham (52 degrees North) by gender and ethnicity. Non-mood disorder admissions were examined as a control to determine the specificity of any seasonal variation to affective illness.

Case notes for 992 admissions, during January-December 1995 inclusive, to an inpatient unit were reviewed retrospectively. Admission data were broken down by gender and into three ethnic groups: Asian, white and black. Seasonality in admissions for depression, bipolar disorder and non-mood disorders was tested by gender and ethnicity.

Admission frequencies for depression showed significant seasonal pattern, with the incidence of depression being highest in winter. Total admissions, bipolar and non-mood disorders did not show any significant seasonal variability. A gender effect was evident on seasonality of admissions for affective illness, with significant winter peak for depression and summer peak for bipolar disorder in women only. **The Asian group was the only ethnic group that showed significant seasonal variation in depression, with a greater number of depressive episodes in winter.** Environmental variables were related significantly to the incidence of mood disorders. Specific seasonal effect for affective illness was evidenced by the non-existence of seasonality in other psychiatric disorders. The reverse seasonal pattern for depression and mania suggests a maladaptive response of vulnerable individuals to specific functions of seasons.

Breast Cancer Risk and Vitamin D from Sunlight

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Hypothesis. Vitamin D is produced when sunlight exposure photolyses 7-dehydrocholesterol in the skin to vitamin D. It can also be obtained from certain foods or dietary supplements. We tested the hypothesis that vitamin D reduces breast cancer risk.

Background. Breast cancer mortality rates are higher in the Northeastern United States than in the South and are inversely correlated with ultraviolet radiation. Regional differences in the prevalence of the known risk factors only partly explain the geographic variation in breast cancer mortality rates.

Experimental studies have demonstrated that 1,25-dihydroxyvitamin D [1,25-(OH)₂D], the hormonally active form of vitamin D, inhibits proliferation and promotes differentiation of a number of cell lines, including breast cancer cells. The action of 1,25(OH)₂D is mediated by intracellular vitamin D receptors which are expressed in many cell types, including breast cancer cells, and regulate the transcription of specific genes involved in cell growth and differentiation.

Few epidemiological studies to date have assessed the role of vitamin D in the etiology of breast cancer. We analyzed interview data from a large prospective cohort study conducted by the National Center for Health Statistics to assess whether sunlight exposure and dietary intake of vitamin D are associated with reduced breast cancer risk.

Study population. We based the analysis on interview data obtained from a cohort of women aged 25-74 years who participated in the first National Health and Nutrition Examination Survey (HNANES 1) from 1971 and were followed prospectively until 1987. We derived several vitamin D-related exposure measures from the interview, 24-hour dietary recall, and dermatological examination conducted at baseline and at the first follow-up interview conducted in 1982-84. Women diagnosed with breast cancer between the baseline interview and the 1987 follow-up survey were identified through self-report hospital records, and death certificates. We based the analysis on 4,881 white women, including 133 women who developed breast cancer during the first follow-up period.

Statistical analysis. We performed Cox proportional hazards regression analyses to estimate age-adjusted relative risks (RR) and 95% confidence intervals (CI), as well as relative risks adjusted for age, education, income, age at menarche, age at first birth, body mass index, family history of breast cancer, alcohol consumption, and physical activity. Age-adjusted relative risks are presented below.

Results. Breast cancer risk was significantly reduced among women who lived in the South at baseline (age-adjusted RR= 0.59, CI=0.35-0.98), compared to women who lived in the North. Compared to women from areas with low solar radiation, we also found significant reductions in risk among women who were born in regions with high solar radiation (RR=0.53, CI=0.32-0.87) or whose longest residence was in regions with high solar radiation (RR=0.58, CI=0.36-0.95). **The risk reduction was similar for women who lived for at least 20 years (RR=0.54, CI=0.28-1.02) or more than half their lifetime (RR=0.57) in areas of high solar radiation.** Compared to women with little sunlight exposure as assessed by the examining physician, **risk was reduced among those with considerable sunlight exposure (RR=0.60, CI=0.33-1.09).** Similarly, compared to women with no rare sunlight exposure, **those with both frequent recreational and frequent occupational sunlight exposure had a reduced risk (RR=0.54, CI=0.28-1.02).**

Considering the presence of actinic (sunlight-induced) skin damage as an indirect measure of sunlight exposure, we found no risk reduction among women with moderate or severe actinic skin damage.

With regard to dietary sources of vitamin D, the reduction in risk was highest for women with the highest intake of vitamin D, although there was no trend of decreasing risk with increasing vitamin D intake. Daily intake of 200 IU or more was associated with a relative risk of 0.63 (CI=0.38-1.03), compared to a daily intake of less than 50 IU. Regular use of multivitamins did not affect breast cancer risk.

Adjustment for potentially confounding variables with slightly changed the relative risk estimates, but resulted in a loss of statistical significance for several exposure variables.

Discussion. This is the first analytic epidemiological study to assess the relation between **sunlight exposure and breast cancer. We found consistent risk reductions for 30-40%** for several measures of sunlight exposure and dietary intake of vitamin D. We could not, however, address the question of how much sunlight exposure per day might potentially reduce breast cancer risk. Because the data were obtained prospectively, the results are unlikely to be due to recall bias. They are based, however, on a relatively small number of breast cancer cases and need to be confirmed by other larger studies.

Conclusion. The findings of this cohort analysis **support the hypothesis that vitamin D, a potentially modifiable lifestyle factor, reduces breast cancer risk.** Future epidemiological studies that include larger numbers of breast cancer cases and use improved methods to assess sunlight exposure and dietary vitamin D intake are clearly warranted.

Note: Vitamin D3 is made with UV-B.

Calcium Absorption

W. E. Hathaway, J. A. Hargreaves, G. W. Thompson, and D. Novitsky,
"A Study Into the Effects of Light on Children of Elementary School Age -
A Case of Daylight Robbery," (Edmonton, Alberta, Canada: Alberta Education, 1992).

The Department of Education of Alberta, Canada, conducted a two-year study involving four different kinds of light. Physicians, educators, social workers, nutritionists and dentists conducted the study. The null hypothesis stated that the type of light had no differential effects on students' scholastic achievement, growth and development, attendance, and dental histories. The study found that students under full spectrum light with trace ultraviolet:

- Learned faster
- Tested higher
- Grew faster
- Had 1/3 fewer absences due to illness
- Had 2/3rds fewer cavities than expected

Ott, John N, Health and Light, New York: Pocket Book edition by Simon and Schuster, 1977, p. 98.

One study by John Ott, PhD, dramatizes the importance of full spectrum light. It placed 2000 mice under four different types of light. In an otherwise identical, controlled environment, the C3H strain of mice developed spontaneous tumors. Mice died at:

- 7.5 months under pink fluorescent light
- 8.2 months under cool white (standard office) fluorescents
- **15.6 months under full spectrum fluorescents**
- 16.1 months under natural sunlight

Swedo, S E; Allen, A J; Glod, C A; Clark, C H; Teicher, M H; Richter D;
Hoffman C; Hamburger, S D; Dow, S; Brown, C; Rosenthal, N E.

A controlled trial of light therapy for the treatment of pediatric
seasonal affective disorder. Department of Psychiatry, McLean Hospital, Belmont MA. USA
Journal of the American Academy of Child and Adolescent Psychiatry, 1997 Jun, 36:6, B16-21.

OBJECTIVE: To evaluate the efficacy of light therapy for the treatment of pediatric seasonal affective disorder (SAD).

METHOD: 28 children (aged 7 to 17 years) at two geographically distinct sites were enrolled in a double-blind, placebo-controlled, crossover trial of bright-light treatment. Subjects initially entered a week-long baseline period during which they wore dark glasses for an hour a day. They were then randomly assigned to receive either active treatment (1 hour of bright-light therapy plus 2 hours of dawn simulation) or placebo (1 hour of clear goggles plus 5 minutes of low-intensity dawn simulation) for 1 week. The treatment phase was followed by a second dark-glasses phase lasting 1 to 2 weeks. After this phase, the children received the alternate treatment. Response was measured using the parent and child versions of the Structured Interview Guide for the Hamilton Depression Rating Scale, Seasonal Affective Disorders version (SIGH-SAD).

RESULTS: Data were analyzed as change from baseline. SIGH-SAD-P **total depression scores were significantly decreased from baseline during light therapy** compared with placebo (one-way analysis of variance, $\rho = .009$), and no differences were found between the placebo and control phases. Subscores of atypical and typical depression were also significantly decreased during the active treatment ($\rho = .004$ and $.028$, respectively). A similar trend was noted with the SIGH-SAD-C, but this did not reach significance. At the end of the study, 78% of the parents questioned and 80% of the children questioned rated light therapy as the phase during which the child "felt best."

CONCLUSION: Light therapy appears to be an effective treatment for pediatric SAD.

Physical Fitness

(Urbana, IL: October 1945): pp. 641-44.

An early study on the effect of ultraviolet radiation on physical fitness was done at the University of Illinois. The ten-week controlled study compared men on a five item muscular endurance test and on the Schneider cardiovascular fitness index. The twenty-two subjects were from the lower third of basic physical fitness classes.

- The experimental group **gained 19.2%** on the Schneider cardiovascular index compared to 1.5% for the control group.
- The experimental group **gained 15.4%** in motor fitness compared to the 11.8% for the control group.
- The experimental group **had ten colds compared to twenty** for the control group.

PMS Linked to Light

A prominent PMS researcher, Barbara Parry, M.D., of the University of California, San Diego, recently established that PMS is related to light and that phototherapy (light therapy) can alleviate PMS symptoms. Dr. Parry identified a woman in southern California who only has PMS during the winter months. Parry used specially designed lights to regulate the woman's serotonin levels during the day and sleep cycles at night. The woman's PMS symptoms were substantially reduced. (Phototherapy is best known for treating SAD, Seasonal Affective Disorder.)

Why did the phototherapy work? When people are exposed to bright light, they produce serotonin, a neuropeptide (a chemical that carries messages between nerves) that helps us feel calm, alert and happy during the day. At night, when it is dark, the brain produces less serotonin and more melatonin, a neuropeptide that helps us sleep deeply.

Researchers at UCLA (Rapkin et al., 1987) have shown that serotonin levels drop just before ovulation in all women. Rapkin shows that this drop correlates with the onset of PMS symptoms, and that serotonin levels rebound with the onset of menstruation - when PMS symptoms decrease. This and other recent research suggests that PMS occurs in women with low base levels of serotonin; when serotonin levels drop further at ovulation, these levels fall low enough in PMS sufferers for symptoms to appear.

Using phototherapy, women with PMS can keep their serotonin/melatonin levels high enough to prevent their PMS symptoms from appearing. (Parry, Berga et al, 1991; Parry, Rosenthal et al, 1987) Using light, PMS women frequently report less depression, less moodiness, better sleep, better concentration, etc.

Researchers used to believe that PMS, which is obviously linked to the menstrual cycle, must be caused by a hormonal imbalance. **We are now learning that PMS seems to be caused by cyclical irregularities in brain neurotransmitters, particularly serotonin, rather than by hormones.** A study reported in the New England Journal of Medicine (Schmidt et al., 1991) suggest that although **PMS is usually synchronized with a woman's menstrual cycle, it does not seem to be caused by the hormonal fluctuations that trigger that cycle.**

The lack of quality light and resulting low serotonin affects many people, both female and male. This is especially true in January, February and March even though the days are getting longer. Our brains function like solar-powered batteries which run down when there is not enough light. When the sunlight increases, it takes a while to recharge our batteries. Scientists have discovered that our brains have a built-in "light-meter" in the brain's pineal body that measures the amount of light our bodies receive. It also acts as a biological clock that times the length of

exposure. The type of light (visible color balance and presence or absence of beneficial ultraviolet A and ultraviolet B) is also registered by the body. Surprisingly, many people remain deprived of the benefits of full spectrum light in the summer because we spend much of our time indoors, where we are deprived of ultraviolet light. (Ultraviolet light is blocked by glass and most plastics.)

Light deprivation is particularly common in the northern tier of the country, where light is less intense year-round and where it is frequently colder, keeping people indoors, and in areas such as the Pacific Northwest that have frequent cloud cover.

Shiftworkers

Stewart KT; Hayes BC; Eastman CI.
Light treatment for NASA shiftworkers.
Department of Psychology and Social Sciences,
Rush-Presbyterian-St. Luke's Medical Center, Chicago, Illinois, USA.
Chronobiol Int, 1995 Apr, 12:2, 141-51

Intense artificial light can phase-shift circadian rhythms and improve performance, sleep, and well-being during shiftwork simulations. In real shiftworkers, however, exposure to sunlight and other time cues may decrease the efficacy of light treatment, and occupational and family responsibilities may make it impractical. With these considerations in mind, we designed and tested light-treatment protocols for NASA personnel who worked on shifted schedules during two Space Shuttle missions.

During the prelaunch week, treatment subjects self-administered light of approximately 10 000 lux at times of day that phase-delay circadian rhythms. Treatment continued during the missions and for several days afterward. No treatment was administered to subjects in the control group.

Treatment subjects reported better sleep, performance, and physical and emotional well-being than control subjects and rated the treatment as highly effective for promoting adjustment to their work schedules. Light treatment is both feasible and beneficial for NASA personnel who must work on shifted schedules during Space Shuttle mission.

Sleep Studies

Cooke KM; Kreydatus MA; Atherton A; Thoman EB.
The effects of evening light exposure on the sleep
of elderly women expressing sleep complaints.
Biobehavioral Sciences Graduate Degree Program, University of Connecticut, Storrs 06269, USA
J Behav Med, 1998 Feb, 21:1, 103-14

In order to address the typical phase advanced, disturbed sleep of the elderly, additional evening light was provided to elderly women by means of a "visor" which provides 2 000 lux to each eye. The subjects wore the light visor for 30 minutes in the evening.

The subjects were 10 community-residing women over the age of 65 (mean = 79.4 years; range 67-87 years). Sleep was recorded in the home for 28 successive 24-hr periods: 7 days pretreatment, 14 days while using the light visor, and 7 days post-treatment. Thus, each subject served as her own control. Sleep was recorded using the Home Monitoring System (HMS), a non-intrusive procedure which does not require instrumentation of the subject.

The subjects showed significant changes during and even after the intervention: there was a significant decrease in sleep latency over weeks, and a significant increase in sleep time and sleep efficiency. The subjects also reported less fatigue during treatment. The results suggest that additional light, provided for as little as 0.5 hours in the evening and at only 2 000 lux, increases the amount of nighttime sleep and improve the quality of sleep in older women.

Eastman CI; Boulos Z; Terman M; Campbell SS; Dijk DJ; Lewy AJ
Light treatment for sleep disorders: consensus report. VI. Shift work.
Biological Rhythms Research Laboratory,
Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL 60612, USA
J Biol Rhythms, 1995 Jun, 10:2, 157-64

The unhealthy symptoms and many deleterious consequences of shift work can be explained by a mismatch between the work-sleep schedule and the circadian rhythms. This mismatch occurs because the 24-h zeitgebers, such as the natural light-dark cycle, keep the circadian rhythms from phase shifting to align with the night-work, day-sleep schedule. This is a review of studies in which the sleep schedule is shifted several hours, as in shift work, and bright light is used to try to phase shift circadian rhythms. Phase shifts can be produced in laboratory studies, when subjects are kept indoors, and faster phase shifting occurs with appropriately timed bright light than with ordinary indoor (dim) light. Bright light field studies, in which subject live at home, show that the use of artificial nocturnal bright light combined with enforced daytime dark (sleep) periods can phase shift circadian rhythms despite exposure to the conflicting 24-h zeitgebers. So far, the only studies on the use of bright light for real shift workers have been conducted at National Aeronautics and Space Administration (NASA). In general, the bright light studies support the idea that **the control of light and dark can be used to overcome many of the problems of shift work**. However, despite ongoing practical application (such as at NASA), much basic research is still needed.

Schmitz M; Frey R; Pichler P; R"pke H; Anderer P; Saletu B; Rudas S.
Sleep quality during alcohol withdrawal with bright light therapy.
Department of Quality Assurance,
Kuratorium fAur Psychosoziale Dienste, Vienna, Austria.
Prog Neuropsychopharmacol Biol Psychiatry, 1997 Aug, 21:6, 965-77

1. Alcohol withdrawal is a complex syndrome that ranges from anxiety, insomnia to delirium tremens. Common treatment is the application of sedative medication. Exposure to bright light in the daytime should advance the normal sleep/wake cycle and moreover it should improve the availability of man's adaptive behavior during alcohol withdrawal.
2. This pilot study describes bright light therapy (BL) during alcohol withdrawal in ten alcohol dependent patients (DSM-III-R: 291.80) without any sedative medication. BL (3 000 lux) was administered on day 3 of abstinence between 7.00-9.00 a.m. and 5.00-9.00 p.m. Total-sleep-polysomnography (recordings between 10.30 p.m. - 6.00 a.m.) and self-rating scale were performed to compare intraindividual changes during three nights. After one adaptation night (immediately after alcohol withdrawal), one baseline night and one "BL-night" and one "post-BL night" were analyzed.
3. At baseline, total sleep time efficiency were severely deteriorated, but tended to improve in the following nights after BL. Sleep onset latency showed a significant decline after BL. Stages 3 and 4 were reduced at baseline. Latencies to slow wave sleep were significantly shortened after BL. REM increased in the nights after BL. Subjective sleep quality improved after BL. Although the present results, bright light having a possible stabilizing effect on sleep maintenance and sleep architecture during acute alcohol withdrawal, the authors could only derive hypotheses for further ongoing controlled investigations using placebo light, to receive final verification.

Substance Abuse and Latitude

Paschane. D. "Variability of substance abuse. Global variability of substance abuse: is latitude a unique etiological factor?"
University of Alaska, Anchorage, USA.
International Journal of Circumpolar Health,
1998 Oct, 54:4, 228-38.

Worldwide substance abuse consequences are a major problem challenging health planners and providers. To mediate these problems effectively, further information on the variability of substance abuse prevalence and associated causes is needed. There is some evidence suggesting that latitude may present unique etiology for substance abuse because of northerly conditions such as extreme light and dark cycles and longer periods of cold harsh environment. This hypothesis is investigated by reviewing the known literature and applying methods for evaluating latitude as a geophysical grouping characteristic on archival substance abuse data. Conclusions are based on previous findings and examples of alcohol-attributable mortality for populations from six northern areas and the United States.

Winter and Summer Outdoor Light Exposure in Women With and Without Seasonal Affective Disorder

Graw P; Recher S; Sand L; Kräuchi K; Wirz Justice A.
Winter and summer outdoor light exposure in women with and without seasonal affective disorder.
Chronobiology and Sleep Laboratory,
Psychiatric University Clinic, Basel, Switzerland.
J Affect Disord, 1999 Dec, 56:2-3, 163-9

BACKGROUND: The annual decrease of daylight duration initiates a depressive phase in patients with seasonal affective disorder (SAD), and light therapy treats it. How much bright light exposure in winter and summer these patients actually receive may help understand the pathogenetic factors initiating SAD.

METHODS: During a week in winter and summer, women with and without SAD kept daily logs of the time spent outdoors, subjective sleep, and self-ratings of mood and alertness.

RESULTS: Compared with the winter depressive state, mood, alertness, and sleep of SAD patients improved in summer to control values, but did not correlate with the amount of light exposure. In summer, patients with SAD spent more time outdoors than controls.

LIMITATION: Light logs--in comparison with light monitor measurements--may overestimate light exposure outdoors.

CONCLUSION: Women with SAD do not spend less time outdoors in winter than controls, but spend more time outdoors in summer.

CLINICAL RELEVANCE: Patients with SAD show a high amplitude seasonal difference in outdoor light exposure. **The susceptibility to winter depression may arise not from behaviourally-related lack of sufficient light exposure, but an increased vulnerability to the amount of light received. They may require more light than controls to remain euthymic** (higher light exposure in summer, light therapy in winter).

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