

On the application of light therapy in German-speaking countries

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Abstract Many studies have investigated seasonal affective disorder (SAD; fall-winter-depression) and its treatment with light therapy (LT). However, to the best of our knowledge, no other study has investigated the usage of LT in Europe since 1994. Thus, we performed a survey in hospitals with adult psychiatric departments in German-speaking countries by questionnaire. First, a questionnaire was constructed, considering also recent developments in LT. This questionnaire was sent to all hospitals with adult psychiatric departments listed in the “Deutsches Krankenhaus Adressbuch,” which contains hospitals from all German-speaking countries (Germany, Switzerland, and Austria). Non-responders were asked to answer the questionnaire by mail and by phone. We achieved a completion rate of 58%. Data show almost no relevant, non-artificial differences between countries as well as between type of hospital. LT is more frequently used in university and state hospitals than in other types of treatment facilities. Compared to 1994, the major findings are (1) a substantial increase in the use of LT from 13.0 to 69.8% with no differences between Germany, Austria, and Switzerland, (2) this increase is mostly due to treatment for various forms of depression and further possible applications are less often considered, (3) there is a shift in the usage of LT from monotherapy to combination of pharmacotherapy with LT as an adjunctive treatment, and (4) a north–south comparison showed no substantial differences. Considerably higher rates of usage of LT have been found compared to the last survey in German-speaking countries taking

place in 1994. Usage almost tripled; however, possible indications for LT other than SAD and non-seasonal depression are not applied to full extent. Further efforts on the propagation of LT should therefore be undertaken, with the same rigorous studies as for pharmacotherapy.

Keywords Bright light therapy · Seasonal affective disorder · SAD · Depression · Hospitals

Introduction

As early as 1982, Lewy et al. [18] published an article concerning the treatment for a bipolar patient with bright light therapy (LT). LT is the treatment with bright white (full spectrum) visible light without the ultraviolet and infrared spectrum. The breakthrough arised with an article from Rosenthal et al. in 1984 [29], who first described “seasonal affective disorder” (SAD) and established bright LT as treatment of choice for this syndrome. Soon afterward, a subsyndromal form of SAD was described [12]. In the years to come, numerous publications on SAD and LT were published [23, 32, 35].

The most important clinical application of LT is the treatment for SAD. Nonetheless, further possible indications were described, such as non-seasonal major depression [16, 22], premenstrual dysphoric disorder [5, 24, 27], shift work [3], jet-lag syndrome [4], alcohol withdrawal [7], or “negative symptoms” in schizophrenia [11] as well as Alzheimer’s disease [10, 37].

Current research focuses on the use of LT in combination with pharmacotherapy [17, 25, 26, 35], underlying mechanisms of the effect of LT [28, 34, 36], or the relationship between personality and SAD [8, 19]. The use of new technologies is as well a topic of research [9]. Another

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hot spot in medical research is formed by neuroendocrinological [20] and neurobiological effects of LT [30, 31, 33]. Furthermore, other fields besides SAD are investigated, e.g., non-seasonal major depression [21] or premenstrual dysphoric disorder [5, 15, 27]. Additionally, the application of LT is influenced by general considerations on the treatment for depression [1, 2, 14].

In 1994, Kasper et al. [13] published a survey on the use of LT in Germany. Since then, to the best of our knowledge, no other survey on this topic has been performed. The purpose of this survey was to investigate the actual use of LT, to discover possible developments and to explore the use and acceptance of applications and treatments for LT.

Methods

First, a questionnaire for the survey was constructed. For comparability, as many items as possible were used from the questionnaire of Kasper et al. [13]. ICD-10 codes were used in this new version, and further items were included, regarding recent developments in LT. Actually, we asked the following questions: (1) is LT used in the hospital, (2) since when is LT used in the hospital, (3) is LT used for inpatients, outpatients, or both, (4) is LT prescribed on a daily basis or in another frequency, (5) for how long is LT prescribed within a treatment period (1, 2 weeks, or longer), (6) what type of LT is employed, (7) for which treatment indications is LT considered to be successful, and (8) is LT successfully used as mono- or combination therapy. We asked, if LT was used for these diagnostic categories (ICD-10 codes in brackets): (1) depressive episode (F32), (2) recurrent depressive disorder (F33), (3) seasonal affective disorder (F33/F31), (4) negative symptoms in schizophrenia (ICD-10: F20), (5) neurotic, stress-related, and somatoform disorders (F4), (6) premenstrual dysphoric disorder (N94.3), (7) nonorganic sleep disorders (F51), (8) jet-lag syndrome (F51.2), and (9) other.

All hospitals with adult psychiatric departments ($N = 601$) listed in the Deutsches Krankenhaus Adressbuch, 2007 [6], a directory containing all hospitals in the German-speaking countries (Germany, Switzerland, and Austria), received a short letter containing the purpose of the survey and a request for participation as well as the questionnaire. Due to various reasons, e.g., refusal of participation, separately listed hospitals forming a functional unit, shut-down, the total number of adult psychiatric departments was reduced to 554. Non-responders were asked to answer the questionnaire by mail and by phone. In total, we received 324 questionnaires, 280 (86.4%) from Germany, 19 (5.9%) from Austria, and 27 (7.7% from Switzerland), which equals a completion rate of 58.4% (no significant difference in completion rate by country).

Statistical analysis was performed with SPSS 14.0, and the level of significance was set at 0.05 for all tests. Depending on the scale of measurement, we used the Chi-square test for nominal or dichotomous variables and one-way analysis of variance (ANOVA) for normally distributed variables on a continuous scale. The Kruskal–Wallis test was used in case of a violation of the sphericity assumption. All statistical tests were two-tailed.

Results

LT is used by 69.8% of all adult psychiatric departments (Table 1), increasingly since about 10 years (Fig. 1). 35.5% of institutions use it for inpatients, 4.3% for outpatients, and 29.6% for both. LT is applied daily by 62.7%,

Table 1 Types of hospitals using light therapy (LT)

Type	Number ^a	Using LT Number (%)
University hospitals	34	29 (85.3)
Teaching hospitals ^b	80	61 (76.3)
State hospitals ^c	23	20 (87.0)
Specialized hospitals ^d	100	69 (69.0)
Psych departments in general hospitals ^e	51	34 (66.7)
Other ^f	36	13 (36.1)
All hospitals	324	226 (69.8)

^a Total number of different types of hospitals in Germany, Austria, and Switzerland

^b Lehrkrankenhäuser

^c Bezirks/Landeskrankenhäuser

^d Fachkliniken

^e Psychiatrische Abteilungen an Allgemeinkrankenhäusern

^f Rehabilitation hospitals, psychiatric departments of the military service, sanatoria, combined psychosomatic, and psychiatric hospitals

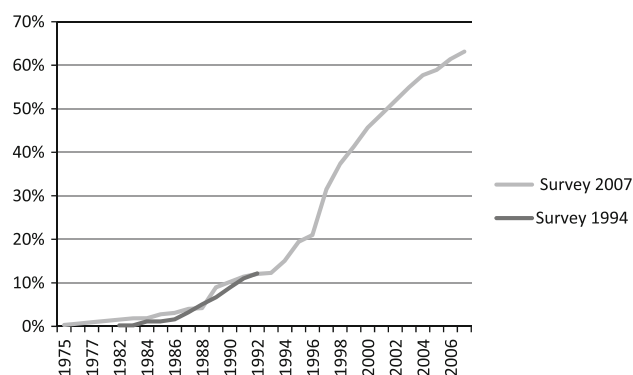


Fig. 1 Cumulative percentage of new hospitals introducing LT. Shown is the cumulative percentage of psychiatric hospitals in German-speaking countries using LT according to the surveys in 1994 [12] ($N = 436$) and 2007 ($N = 324$)

by 6.1% in longer intervals, and 31.2% did not answer the question. It is applied for 2 (34.3%) or 4 (15.7%) weeks or longer (11.1%), 38.9% did not answer. Most common applications of LT are SAD (64.8%), single depressive episodes (58.3%), and non-seasonal recurrent depressive disorder (58.0%), while it is hardly used for other indications (Table 2). LT is scarcely used in monotherapy, mostly in combination with antidepressants or other psychopharmacologic drugs (Table 2). The percentage of combination therapy varies from 5 to 100% between institutions, showing an irregular use.

We also asked whether the application of LT was considered as useful (Table 3). Data are widely consistent with the application. Depressive episode (63.9%), recurrent depressive disorder (64.5%), and seasonal affective disorder (78.7%) were considered the most useful applications.

No differences between countries as well as between type of hospital were found, with 2 exceptions: LT is more frequently used ($\chi^2 = 28.288$, $df = 5$, $P < 0.001$) in university and state hospitals than in other types of hospitals (Table 1). There is also a statistically significant difference concerning jet-lag syndrome. For jet-lag syndrome, LT is more frequently considered as inefficient ($\chi^2 = 6.685$,

$df = 2$, $P = 0.035$) in Germany (70.1%; Austria 50% and Switzerland 50%).

Finally, we computed a north–south comparison, with Austria, Switzerland, Bavaria, and Baden-Württemberg forming the south, while the other German federal states were considered as the northern part. The use of LT is not statistically significantly different between north and south ($\chi^2 = 2.305$, $df = 1$, $P = 0.129$). However, LT is more frequently employed for inpatients in the north (54.3%) than in the south (43.0%; $\chi^2 = 6.676$, $df = 2$, $P = 0.036$). Furthermore, LT is considered as inefficient for jet-lag syndrome by 71.2% in the north and only by 57.7% of all departments in the south ($\chi^2 = 4.463$, $df = 1$, $P = 0.035$), and LT is less frequently (8.4%) used for other diseases in the north ($\chi^2 = 5.910$, $df = 1$, $P = 0.015$) than in the south (22.7%).

Discussion

A comparison between our results and the data obtained by Kasper et al. [13] resulted in a substantial increase in the use of LT within the last 11 years (Fig. 1). In our study,

Table 2 Usage of LT as mono- or combination therapy according to different diagnostic groups

Diagnosis (ICD-10)	Monotherapy ^a Number ^b (%) ^c	Combination therapy ^a Number ^b (%) ^c
Depressive episode F32	1 (0.3)	188 (58.0)
Recurrent depressive disorder F33	1 (0.3)	187 (57.7)
Seasonal affective disorder (SAD) F33	16 (4.9)	195 (59.9)
Negative symptoms in schizophrenia F20	0	13 (4.0)
Neurotic, stress-related, and somatoform disorders F40–F48	0	30 (9.3)
Premenstrual dysphoric disorder N94.3	10 (3.1)	17 (5.2)
Nonorganic sleep disorders F51	13 (4.0)	70 (21.6)
Nonorganic disorders in the sleep–wake schedule F51.2	32 (9.9)	7 (2.2)
Other	20 (6.2), not specified	

Percentage refers to sample size, difference to 100% are non-responders

^a Related to the number of hospitals, which use LT for individual diagnostic treatment indication

^b Number of institutions

^c Percentage of institutions performing mono- or combination therapy, if they use LT for the individual diagnostic indication

Table 3 Applications for which LT is considered as useful

Diagnosis (ICD-10)	Useful yes Number (%) ^a	Useful no Number (%) ^a
Seasonal affective disorder (SAD) F33	255 (78.7)	1 (0.3)
Recurrent depressive disorder F33	209 (64.5)	47 (14.5)
Depressive episode F32	207 (63.9)	50 (15.4)
Nonorganic sleep disorders F51	110 (34.0)	146 (45.1)
Nonorganic disorders in the sleep–wake schedule F51.2	84 (25.9)	171 (52.8)
Premenstrual dysphoric disorder N94.3	45 (13.9)	211 (65.1)
Neurotic, stress-related, and somatoform disorders F40–F48	34 (10.5)	222 (68.5)
Negative symptoms in schizophrenia F20	20 (6.2)	237 (73.1)
Other	29 (9.0)	227 (70.1)

Percentage refers to sample size, difference to 100% are non-responders

^a Number and percentage (in brackets) of institutions considering LT a useful/non-useful application for the corresponding diagnosis

69.8% of all hospitals use LT, compared to 13% in 1994. On a closer look, this increase is widely due to the increased usage of LT in depression. Among all hospitals which apply LT, the percentage of usage for SAD rose from 86 to 92.9%, for depressive episode from 49 to 83.6%, and for recurrent depression from 57 to 83%. There is a substantial increase in usage for sleep disturbances as well, from 7 to 37%, whereas the usage for other applications decreased, for schizophrenia from 11 to 7% and for neurotic disorders from 18 to 13.3%. The usage for premenstrual dysphoric disorder increased slightly from 7 to 11.9%, while the usage for other applications remained stable (9 to 8.8%).

Concerning the full range of possible applications, our data suggest a lack of information. Generally, LT is widely accepted with no major differences in German-speaking countries. Yet, the works on jet-lag syndrome [4], schizophrenia [11], or premenstrual dysphoric disorder [5, 24, 27] have hardly been receipted, and thus, other possible applications have been neglected until now. This may be due to the fact that most publications concerning light therapy deal with seasonal affective disorder and depression, thus creating a certain amount of awareness among prescribing doctors. On the other side, there are few publications for other possible applications, more likely perceived by those few specialized in LT.

It is also remarkable that LT is mostly used in combination with pharmacotherapy. The reason for this phenomenon cannot be deducted from our data and should be investigated separately. A possible factor might be general changes in the treatment for depressions [1, 14]. However, studies in SAD [25] have shown that LT as monotherapy might not be sufficient for a substantial percentage of patients. Thus, it appears that combination therapy is used for reasons of efficacy. Unfortunately, our question for the type of combination therapy was answered in terms of “antidepressants” or “psychopharmacological drugs.” Some participants mentioned SSRIs, but no one named a specific drug. Also, the question for the type of light has not been answered specifically by respondents. Therefore, we are not able to determine whether new developments, like blue narrow-band light-emitting diodes (LEDs) [9] are utilized.

The fact that there are almost no differences between countries as well as differences between north and south is a mayor finding. Actually, we expected differences between countries and between types of hospital. This might indicate a generally widespread reception of LT as well as a homogenous knowledge of the use of LT within German-speaking countries. However, this finding might also be due to a statistical bias because the major part of all returned questionnaires was from Germany (86.4%), corresponding to country size and population. More recent

studies have examined the successful use of LT in dementia [10, 37], and thus, dementia was most frequently mentioned as a further application of LT.

Considerably higher rates of usage of LT have been found after the last survey in German-speaking countries taking place in 1994. Usage almost tripled; however, it is evident that compared to pharmacotherapy, there is still a lack of controlled studies for LT in other indications than depressive disorders. Further efforts on the spread of LT should therefore be undertaken, and controlled trials for LT in other indications are necessitated to provide high-quality scientific evidence for its usage.

Conflict of interest None.

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