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ORIGINAL PAPER

G. Hajak on behalf of the SINE Study Group*

Epidemiology of severe insomnia and its consequences in Germany

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Abstract This is the first nation-wide face-to-face survey on the prevalence of well-defined severe insomnia and its impact on quality of life in the general population of Germany. The survey was part of an international epidemiological study, which was also conducted in Belgium, Great Britain, Ireland and Sweden. A representative sample of 1913 adults aged 18 years and over were interviewed in all parts of Germany according to the quota method. Subjects with symptomatic insomnia were identified using an algorithm compatible with the principal criteria for severe insomnia defined in the fourth revision of the Diagnostic and Statistical Manual of Mental Diseases (DSM-IV). Subjects provided data on quality of life using the Short Form 36 Health Survey (SF-36) questionnaire and on health care consumption.

Prevalence of severe insomnia in Germany was found to be 4 %, which was lower than in other European countries (6–22 %). Severe insomnia was more prevalent among women, the unemployed, those living alone after divorce or separation, and those in large cities, but not more frequently in the elderly (aged 65 years and over). The majority of subjects had chronic complaints, with 74 % of them suffering from severe sleep problems for over a year's duration (average 56 ± 23 months). Consultations with general physicians, medication usage, medical tests and hospitalisation were greater among severe insomniacs compared to subjects who had no sleep complaints. The question regarding overall appreciation of quality of life was rated as bad in 22 % and good in 28 % of severe insomniacs compared to 3 % (bad) and 68 % (good) in subjects with no sleep complaints. Despite this, only 55 % of severe insomniacs had ever discussed their sleep problem with a doctor and the proportion who consulted their doctor specifically regarding sleep problems in the previous 12 months was even lower (36 %). The vast majority (73 %) was not taking hypnotic or sedative medications.

In conclusion, insomnia, even when severe, is a common and a chronic complaint in Germany. This trial suggests that while, on the one hand, sleep disorders have a significant impact on patient's quality of life and consumption of health care, it is, on the other hand, a condition that is poorly recognised and for which patients are, for unknown reasons, reluctant to seek treatment.

Key words Sleep disorder · Insomnia · Epidemiology · Prevalence · Quality of life · Health care consumption · Germany

Professor Dr. med. Göran Hajak (✉)
Department of Psychiatry and Psychotherapy
University of Regensburg
Universitätsstrasse 84
93051 Regensburg, Germany
e-mail: goeran.hajak@bkr.regensburg.de

* **Study of Insomnia in Europe [SINE] Study Group**
in alphabetical order of members:
M Bianchi, Socioeconomics Department, Rhône-Poulenc Rorer SA, Antony, France; D Boichut, Taylor Nelson SOFRES, Montrouge France; C Crowe, Sleep Disorders Unit, Dublin, Ireland; G Hajak, Department of Psychiatry, Sleep Disorder Center, University of Göttingen, Germany; J Hetta, Sleep Disorders Unit, Department of Psychiatry, Uppsala, Sweden; G Hoffmann, Unité de Sommeil Adultes, Hôpital Universitaire Brugmann, Brussels, Belgium; C Jenkinson, Health Services Research Unit, University of Oxford, Institute of Health Sciences, Oxford, UK; D Léger, Unité de Sommeil, Service d'Exploration Fonctionnel, Hotel Dieu, Paris, France; DJ Nutt, Psychopharmacology Unit, School of Medical Sciences, Bristol, UK; S Wilson, Psychopharmacology Unit, Department of Clinical Medicine, University of Bristol, Bristol, UK

Introduction

It is well established that poor sleep quality or insufficient sleep is a common complaint in the general population. However, the true extent and impact of insomnia amongst the general population in western industrial countries remains unclear. Reported prevalence rates have varied from 10 % to nearly 50 % (e. g. Mellinger et al. 1985, Ford et al. 1989, Quera-Salva et al. 1991, Gallup 1995, Ohayon 1996, Ohayon et al. 1997, Hatoum et

al. 1998). The differences are mainly due to the use of differing definitions, methods, diagnostic criteria and classification systems of insomnia in previous epidemiological surveys of different populations from various countries. Within Germany the picture in the general population is not much clearer as the available epidemiological studies were performed with restricted populations. Either studies were restricted to certain regions of the country: Upper Bavaria or West Germany as it was (Weyerer and Dilling 1991, Simen et. al. 1995, 1996), or they only included patients consulting a general practitioner (Hohagen et al. 1993, Weyerer 1996), or they selected patients from selected demographic groups such as elderly patients in Berlin (Englert and Linden 1998). Moreover, little is known about the impact of insomnia on the quality of life and health care consumption amongst Germany's population. Insomnia is thought to have a major impact on human health, socio-economic performance (Johnson 1983, Roth 1995, 1996, Schulenburg 1995, Kuppermann et al. 1995, Idzikowski 1996) and quantity of general health care services consumed (Weyerer and Dilling 1991, Hohagen et al. 1993, Üstün et al. 1996). The direct economic cost to the individual and society is considerable (Walsh et al. 1995, Chilcott and Shapiro 1996).

This survey took as an underlying assumption the notion that insomnia will cause significant and relevant impairment if it is severe. Insomnia is classified clinically as severe when it occurs frequently and in particular when it affects daytime functioning (American Psychiatric Association 1987, 1994; World Health Organization 1991). Surveys in Germany have estimated that the prevalence of severe or chronic insomnia is approximately 7–25 % (Weyerer and Dilling 1991, Hohagen et al. 1993, Simen et al. 1995, 1996, Weyerer 1996, Englert and Linden 1998). As yet, however, too little is known about the consequences of severe insomnia on quality of life and the health care consumption. Further, no previous study has ever studied insomnia and its consequences in unified Germany using face-to-face interviews. Therefore, this survey was targeted to provide information about the nationwide prevalence, the impact on quality of life and the consumption of health care services amongst subjects in the general population who report, in particular, severe insomnia.

Methods

Survey techniques

This epidemiological survey of severe insomnia was conducted in five European countries (Belgium, Germany, Great Britain, Ireland and Sweden) in March and April 1997. The results of the international comparison will be presented elsewhere (Nutt et al. in progress). The current article reports on the national results for Germany.

The first step involved the screening of national samples to measure the prevalence of severe insomnia. The samples were weighted in order to match national census data for age, sex and region. This was followed by the second step which was an extensive and focused survey of people who were diagnosed as having severe sleep disturbance using the same diagnostic criteria that had been used in the first step. Data were collected on specific features of sleep disorders, quality of life and health care consumption. In a third step subjects with no sleep complaints in the first step and those with mild and moderate sleep disturbance were surveyed. Comparisons with the group who had mild to moderate insomnia will be reported elsewhere.

Screening of prevalence in the general population

A large sample of the population aged 18 years or older was interviewed after a selection process that used proven random route sampling techniques commonly employed in opinion polls and market research. Screening questions were asked during a face-to-face interview conducted by trained interviewers in the subject's home and were part of an omnibus survey that addressed several different topics in the same interview. This method is thought to provide greater motivation for people to answer and to ensure more neutral responses to sensitive medical questions. No remuneration or rewards were offered. The demographic criteria used to categorise the patients were sex, six age categories and regional stratification based on the 13 German regions ("Bundesländer"). Some of the regions are sparsely populated rural areas with high unemployment and a recent history of political, social and economic upheaval, while others are highly industrialised and are characterised by densely populated conurbations. The number of subjects selected from each demographic group (gender and age) and regional category mirrors the percentages provided in the official census data for Germany (Statistisches Bundesamt 1995) as closely as possible. Weighting was employed if imbalances compared to the census data had to be corrected.

Detailed survey of subjects with severe insomnia

Data for this step were gathered in interviews and from questionnaires. The questionnaires were completed in a second interview in subjects who were identified as having severe insomnia during the first step of the survey. Pre-existing data suggested that a sample size of between 1600 to 2000 interviewed subjects would yield a minimum of 150 subjects reporting severe sleep disturbance per country in the study. Since prevalence rates were lower the number of surveyed subjects was enlarged for a detailed analysis of accompanying features of insomnia. Methods and diagnostic criteria used to identify respondents were the same as for the study of prevalence. The pool of respondents was randomly selected; no matching was attempted and no weighting process was applied to the results.

Survey of control group

The pool of subjects with no sleep complaints, gained in the last step, were used to provide a comparison group to the subjects with severe complaints. This was done by randomly surveying a group of subjects with no sleep complaints identified in the first phase. A weighting process based on gender, age and geographical distribution was applied to the results of the control group to ensure comparability with the group of subjects with severe insomnia.

Diagnostic instruments used during screening in the general population

Subjects with severe insomnia were identified using a specific screening algorithm which consisted of four questions adapted from DSM-III-R (American Psychiatric Association 1987) and DSM-IV (American Psychiatric Association 1994). This provided a measure of the prevalence of severe insomnia. The algorithm specified that during the previous month, the subject must have experienced at least two of the following symptoms at least three times per week every week: difficulty falling asleep; spontaneous waking up at night and an insufficient number of hours of sleep per night. In addition, the subject must have experienced detrimental effects during the day related to sleep deficit, examples given were tiredness or irritability. The algorithm differs from DSM criteria in that DSM-III-R and DSM-IV only require one of the three symptoms to be present, and not two.

Rating instruments used for the survey of subjects with severe insomnia

Data on these subjects concerning details of sleep disturbance, quality of life and consumption of health care services were gathered using self-completed questionnaires.

The questions on sleep disturbance covered duration and causes of sleep disturbance, treatments, frequency of visits to doctors concerning sleep problems and the presence of symptoms of depression and anxiety.

Diagnosis of associated symptoms of depression and/or anxiety was also achieved through simple questions adapted from the DSM. For anxiety, one of the two following symptoms had to have been present during the previous 6 months and was still present: anxious or worried most of the time and feeling of apprehension in everyday life. For depression, at least two of the following symptoms must have been present recently and for at least two weeks: feeling downhearted and low most of the time during the day and nearly every day; loss of interest in most things and feeling tired all the time.

Consumption of health care services in general included a variety of measures of overall health care consumption including medical consultations, medication, absence from work, hospitalisation and medical tests.

Quality of life was assessed using the short form 36 Health Survey (SF–36) questionnaire (Ware and Sherbourne 1992). This questionnaire has been designed and validated for use in general population surveys and in various languages (Jenkinson et al. 1993, 1996). The SF-36 is a simple self-completed form composed of 36 items which are grouped into the following eight clusters: physical functioning, energy/vitality, role limitations due to physical problems, social functioning, bodily pain, role limitations due to emotional problems, general health perception and mental health. A single item of change in health over the past year is also determined. Each item is scored on a scale ranging from 0 (worst possible health) to 100 (best possible health). The German translation was obtained employing the forward and backward method, which entails translating the scale back into the original language by an independent translator after initial translation into the new language. An expert group resolved discrepancies between the original and the backward translated version. Pilot testing was performed to assess the ordinality of the terms and the equidistance of response choices. Psychometric evaluation of the translation includes reliability and validity and responsiveness testing and the power of the translation to distinguish populations with differing medical conditions (Bullinger 1995).

In addition to the SF-36, subjects were asked a global question concerning overall quality of life in terms of good, quite good, neither good nor bad, quite bad, and very bad.

Data analysis

Most of the data will be presented in a descriptive manner. Intergroup comparisons were performed with the chi-square test or the Z-test. $P<0.05$ was considered statistically significant.

Results

Prevalence of severe insomnia in Germany

In all, 1913 subjects were screened in Germany; 55 % reported no sleep complaints during the last month, 41 % were classified as having mild to moderate sleep disturbance, while 4 % (n=81) fulfilled the criteria of interest here, severe insomnia. The breakdown of the screening algorithm is provided in Fig. 1. As could be expected from knowledge of the literature, prevalence of this most serious form of insomnia was higher in women, those who are non-working and subjects who

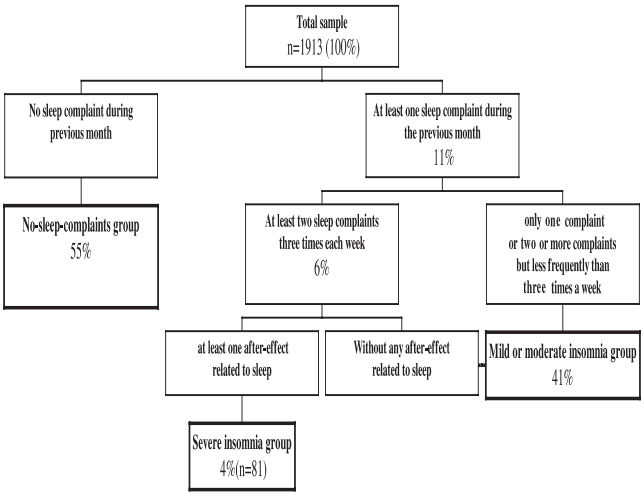


Fig. 1 Screening algorithm

are separated or divorced, but not widowed. There was a steady rise in the number of subjects with insomnia as size of town increased. The number of persons living in the household, the number of children under 15 and the type of employment had no impact. Rather surprisingly it was found that as far as severe insomnia is concerned there does not appear to be a correlation with ageing. On the contrary the highest prevalence was found in the age group of those who would be just approaching retirement or newly retired, in older subjects it then drops back to rates comparable with other adults. The lack of clear correlation with rising age was found in all the countries taking part and was not unique to Germany (Nutt et al. in progress). The prevalence of severe insomnia in relation to various socio-demographic characteristics is summarised in Table 1. The finding that city living is associated with insomnia was also reflected in the breakdown by regions. In the geographically tiny city state of Berlin, 13 % of the subjects reported severe insomnia compared to 3 % in Bavaria and only 1 % in Thüringen and Baden-Württemberg (Table 2).

An unexpected result was the finding that in international comparison, Germany showed, with 4 %, the very lowest prevalence of severe insomnia compared with the rates in the other countries (6–12 %) (Fig. 2).

Survey of subjects reporting severe insomnia

The second part of the study was a random survey which identified 206 subjects who fulfilled diagnostic criteria of severe insomnia. In the third step 162 subjects who had no sleep complaints, matched to the 206 severe insomnia subjects for age, sex and region, were surveyed.

The average duration of insomnia reported here was 56 ± 23 months with 74 % of the subjects reporting duration of over 1 year and 15 % of over 10 years. Subjects with severe insomnia stated that their sleeping problems had started in most cases in relation to personal health

Tab. 1 Socio-demographic structure of the German population in general, in the sample before weighting and the prevalence of severe insomnia according to socio-demographic group. NS = not significant

	Structure of the population in Germany over 18	Structure of the total sample before weighting	Percentage of total sample with severe insomnia
Total prevalence		100 %=1913	4 % (100 %=1913)
Sex			
Male	47 %	49 %	3 % (100 %=897)
Female	53 %	51 %	5 % (100 %=1016)
Significance (Z-test)			P=0.04
Age (years)			
18–24	10 %	13 %	1 % (100 %=203)
25–34	18 %	23 %	3 % (100 %=347)
35–44	18 %	20 %	4 % (100 %=336)
45–54	17 %	18 %	5 % (100 %=317)
55–64	17 %	14 %	7 % (100 %=328)
> 65	20 %	12 %	4 % (100 %=381)
Significance (χ^2-test)			NS
Working status			
Working	Not available	46 %	4 % (100 %=886)
Non-working		54 %	5 % (100 %=1027)
Significance (Z-test)			NS
Marital status			
Single	Not available	25 %	3 % (100 %=472)
Married/cohabiting		60 %	4 % (100 %=1149)
Separated/divorced		5 %	12 % (100 %=105)
Widowed		10 %	6 % (100 %=187)
Significance (χ^2-test)			P < 0.01
Size of town			
Less 5000	Not available	14 %	1 % (100 %=267)
5000–19 999		15 %	3 % (100 %=288)
20 000–99 999		15 %	4 % (100 %=277)
100 000 and over		56 %	5 % (100 %=1080)

concerns such as stress, anxiety, accident, hospitalisation, etc. (48 %), problems at work (28 %), problems with family or relatives (24 %) or death of relatives (12 %), while other causes were found in less than 5 % of cases. 74 % of patients also reported symptoms of depression and/or anxiety. In spite of these facts, the number of subjects taking medication specifically for the condition was found to be only 27 %. Twenty-three mentions were made of 16 different classic psychotropic compounds and 32 mentions were made of various plant-based compounds (multiple responses per patient were possible). This apparent lack of medical attention to insomnia was also mirrored in the number of consultations with doctors. In spite of the severity only 55 % had ever mentioned their condition to a doctor and only in 36 % of cases had the consultation been sought specifically for insomnia.

Quality of life

Severe insomnia is clearly associated with a significantly impaired subjective sense of the quality of life. The

Tab. 2 Prevalence of severe insomnia in the German regions ("Bundesländer")

	% of total German population living in region	Sample size in region (=100 %)	% in region with severe insomnia
Schleswig-Holstein	6	111	2
Niedersachsen	10	194	6
Nordrhein-Westfalen	22	412	5
Hessen	7	138	4
Rheinland-Pfalz/Saarland	7	121	2
Baden-Württemberg	12	234	1
Bayern	14	272	3
Berlin	4	82	13
Brandenburg	3	63	4
Mecklenburg-Vorpommern	2	40	3
Sachsen-Anhalt	4	69	4
Sachsen	6	115	8
Thüringen	3	62	1
	100 %	=1913	

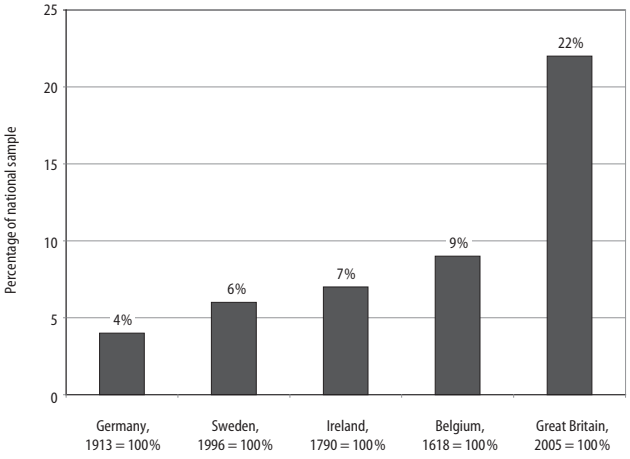


Fig. 2 Comparative prevalence of severe insomnia in Germany and the other countries included in the study

largest differences in the SF-36 scores between severe insomnia subjects and those with no sleep complaints were found in the four subscales which can be subsummed under the terms Energy and Activity. These include the subscales: vitality, (amount of) social functioning, mental health and, most severely impaired of all, limitations to daily living due to emotional problems. Questions in the last subscale are: as a result of emotional problems I accomplish less, do not work, etc. as carefully as usual, have cut down the amount of time spent working, etc. The pattern of responses from severe insomniacs was similar in all the countries taking part in the study with the interesting exception of Sweden where quality of life was consistently rated higher in all subscales compared to the other countries (Nutt et al. in progress). Severe insomnia leads to impairment of quality of life that is somewhat greater than that recorded for patients with long standing illnesses (Fig. 3). The no-sleep-complaints subjects achieved scores that were slightly better than the norm data gathered on the general population (Jenkinson 1993). The global question on overall quality of life revealed very clear differences between the two groups: severe insomnia and no sleep complaints. Of the severe insomniacs 22 % rated their quality of life as generally bad compared to only 3 % of the no-complaints group. Conversely, 68 % of the no-complaints subjects rated generally good quality of life compared to only 28 % of the insomniacs (Fig. 4).

Consumption of health care services

In almost all categories of general health care consumption the severe insomnia subjects were more frequent users than the no-complaints subjects. This was so for any consultations with a doctor, any regular medication use, number of medical tests performed and number of hospitalisations. The only exception to the pattern was periods of sick leave prescribed by the doctor. Here 24 % of severe insomnia subjects had been off work at least once in the past 12 months compared to 29 % of the no-complaints subjects (Table 3).

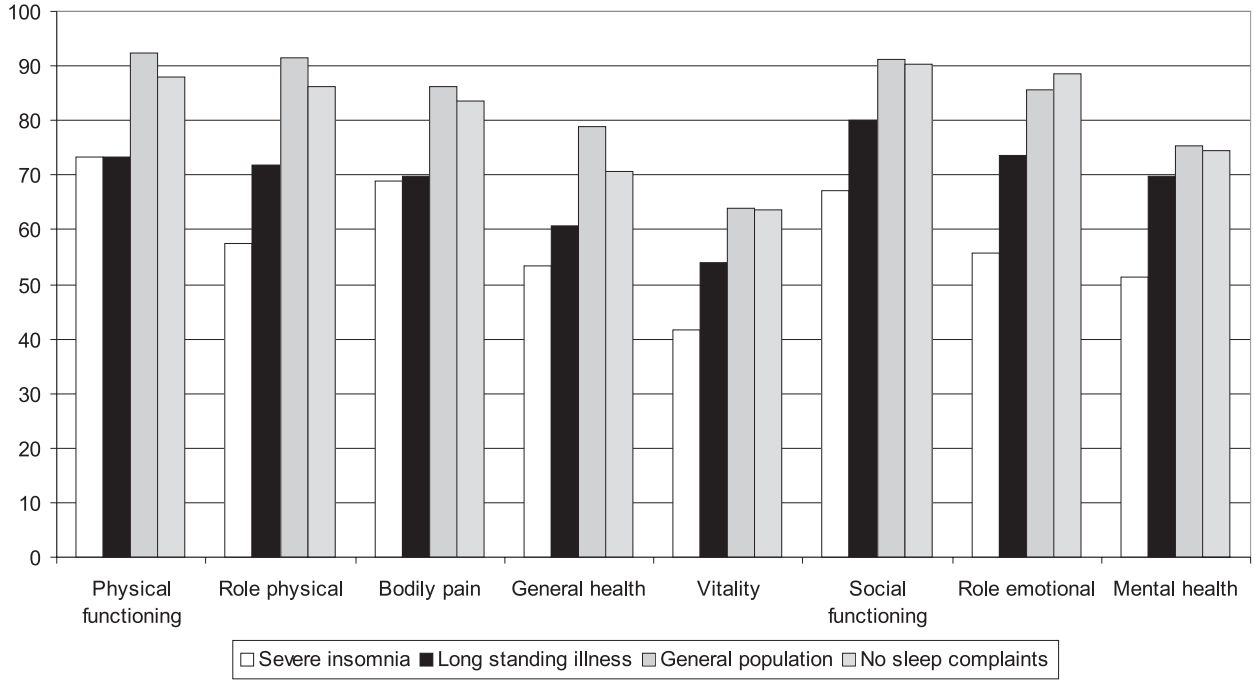
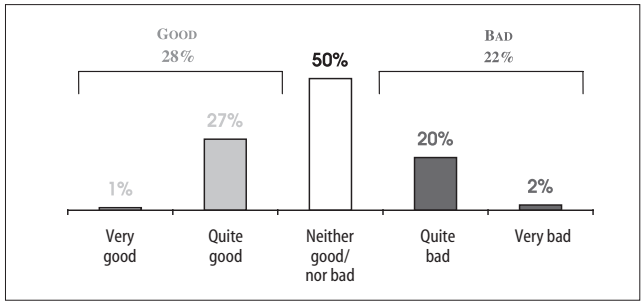


Fig. 3 Quality of life (SF 36 scores) for subjects with severe insomnia and no sleep complaints compared with patients with somatic "long standing" illnesses such as cardial problems, pulmonary diseases, pain syndromes etc., and the general population, both taken from the literature (*)
(*) = Jenkinson et al. (1993)

Severe insomnia subjects



No sleep complaints subjects

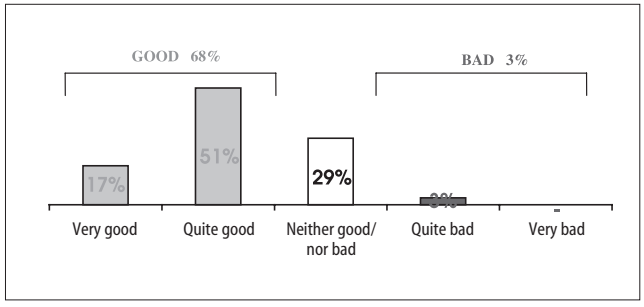


Fig. 4 Comparison of global quality of life evaluations
4a. severe insomnia subjects
4b. no sleep complaints subjects
Question: Would you say that, at the moment, your quality of life is very good, quite good, neither good nor bad, quite bad, very bad …

Discussion

In all, across countries the study found a somewhat lower prevalence rate of significant insomnia than in other studies. For example, a trial in the USA in about 2000 primary care patients found a prevalence of 'major current insomnia' of 10 % (Simon and VonKorff 1997), Ohayon (1996) in his seminal study of a general population found a prevalence of 20 % and the WHO collaborative study (Üstün et al. 1996) found overall prevalence (regardless of severity) in primary care settings to be as high as 26.8 %. The lower rate found here is presumably due firstly to the fact that the diagnostic criteria in this study were set intentionally high in order to capture a group of insomniacs who undoubtedly require treatment. The requirement of two symptoms for example, goes beyond the DSM-III-R and DSM-IV definition. However, this hinders the comparison of the present study with other epidemiological studies using DSM criteria. Secondly, the leading questions used in the screening for the general population failed to identify subjects who at the time of the survey may have been asymptomatic because they were being successfully treated for insomnia. The study by Ohayon (1996) revealed that as many as 8.2 % of his large sample were currently taking medication for sleeping difficulties and were currently satisfied with their sleep. The omission of the question here probably leads to a lower apparent prevalence rate than would have been the case if the screening questions had also picked up subjects on active treatment. Finally, the finding of a 4 % prevalence rate of severe insomnia in the general population of Germany is close to other surveys performed in the general population. Simen et al. (1995) reported 7 % prevalence for 'frequent or constant insomnia' in a representative group of West Germans. Further, Zulley and Ohayon (1998) reported from a telephone survey that using the American Psychiatric Association's (1994) DSM-IV criteria, 6 % of a sample of over 4000 people in the general population in Germany were classified as having insomnia. Obviously, prevalence rates found in primary care are higher than those found in the general population. However, Germany does consistently appear to have a somewhat lower prevalence than other countries, in particular compared to Great Britain.

A tentative explanation for the extraordinarily high rates of severe insomnia found in Britain (and conversely, the low rate in Germany) is perhaps to be found in another fact that the present study revealed. Although medication for insomnia is widely available, severe insomnia appears to remain largely untreated in Britain. In Germany on the other hand, 27 % of individuals with severe insomnia reported taking medication for their sleeping problems, and hypnotic/sedative drugs were taken by 19 %. This finding broadly agrees with surveys conducted in other countries. A study in the USA of just less than 2000 patients in a primary care setting found that of the 10 % qualifying for major current insomnia 28 % reported intake of psychotropics; 14 % used benzodiazepines and 19 % antidepressants (Simon et al. 1997). A study in France found that almost 10 % of the general population (n=5622) were taking medication for sleep problems (Ohayon 1996). In an Australian survey (n=550) of the 30 % who reported sleep problems 25 % had taken prescription medication for the condition (Olson 1996). The present study found that in Britain only 15 % of those with severe insomnia were taking medications for their sleep problems, and only 6 % were taking hypnotics or sedatives. It is reasonable to assume that those higher treatment rates – consisting

Tab. 3 Health care consumption in subjects with severe insomnia and subjects with no sleep complaints in Germany

	Severe insomnia (n=206)	No sleep complaints (n=162)
Consultations for any reason in last 2 months	82 %	78 %
Any regular medication taken	42 %	31 %
Medical test in last 6 months	58 %	47 %
Hospitalisations in last 12 months	13 %	10 %
Sick leave at doctor's suggestion	24 %	29 %

not only of prescription of sedative or hypnotic agents – effectively reduce the number of subjects in the general population suffering from severe insomnia. It is also clear that the medical/media climate in other countries is more amenable to the effective treatment of sleep disturbance and that, in Britain, media coverage of the abuse of hypnotics has made it very difficult to treat this disorder in a rational manner.

Having said this, even though the acceptability of treatment may be higher in Germany, the present survey is not alone in exposing the extent of under diagnosis of sleep disorders in the country. While insomnia represents a considerable problem for individuals and society, its alleviation is complicated by two facts. Firstly, only a minority of insomniacs are thought to seek medical help for sleep problems. In 1995 Simen et al. found that only 49 % of subjects from the West German population who reported insomnia of over 2 years duration had ever consulted a doctor concerning the problem. Secondly, general practitioners insufficiently identify patients with sleep disorders in their outpatient practice (Haldemann et al. 1996, Hohagen et al. 1993; Schramm et al. 1995). Weyerer, for example, found in his 1996 study that, while general practitioners were very good at recognising schizophrenia, affective disorders and dementia, they were less successful at spotting sleep disorders and neurotic/psychosomatic disorders. This finding, however, is by no means limited to Germany. Studies in other countries have also come to the conclusion that insomnia is underdiagnosed and that patients are tardy at seeking treatment (Mellinger et al. 1985, Gallup 1995, Üstün 1995, Ohayon et al. 1997, Hatoum et al. 1998).

Failure to alleviate insomnia can have important implications. It has long been recognised that insomnia can adversely affect overall well-being and, therefore, quality of life. The SF-36 scores and the global rating obtained in this study indicate that severe insomnia causes considerable impairment of quality of life when compared with norm groups. Moreover, subjects with severe insomnia had worse scores than patients with long standing illnesses (Jenkinson 1993). In summary, the SF-36 scores revealed that the greatest impairment suffered by insomniacs was to be found in the areas of vitality, energy and amount of activity, including in the work place, and that the impairment was comparable to that of patients with chronic pain conditions.

It is also well recognised that insomnia is associated with increased morbidity and mortality (Stoller 1994, 1997). People with insomnia have an increased risk of heart disease, elevated blood pressure, diabetes, stroke, anxiety and clinical depression (Stoller 1997). It has been suggested that effective treatment of insomnia may prevent the development of major depression (Ford et al. 1989). Insomnia also results in impaired performance leading to absenteeism from work, reduced productivity and a higher rate of accidents (Stoller 1994, 1997). The subjects with severe insomnia in this study were required to experience daytime effects such as tiredness and irritability. Such effects are often underrated and can have serious consequences (Sharpley 1996). For example, daytime sleepiness has been associated with accidents, particularly motor vehicle accidents, which are a major cause of mortality (Stoller 1997). Moreover, the rate of general accidents is about four times higher among chronic insomniacs than the general population (Balter and Uhlenhuth 1991). These are some of the reasons why insomnia is thought to cause a considerable social and economic burden.

In the present study the findings described above were confirmed for Germany. There was greater overall health care consumption among groups with severe insomnia than those with no sleep complaint. This is only partially explained by the fact that people with severe insomnia tend to have multiple co-morbidities in particular symptoms of depression (Mellinger et al. 1985; Hatoum et al. 1998). Although there have been no objective measures of impaired function among subjects with severe insomnia, a recent study in the primary care setting reported that insomnia was indeed associated with functional impairment, lost productivity and greater use of health care services (Simon et al. 1997). In particular, the prevalence of moderate or severe occupational role disability in subjects with insomnia was found to be 24 %, similar to that seen in patients with psychiatric and general medical disorders. Moreover, total health care costs were much greater in the insomnia group versus the no-insomnia group (Simon et al. 1997).

The associations of severe insomnia with the demographic categories: female, non-working, separated/divorced and urban area, conform to common assumptions on the prevalence of this disorder. Somewhat unexpected was the fact that severe insomnia did not increase in prevalence along with age. Although most studies find a positive correlation there are exceptions to be found in the literature. Both Lack and Olson (1988 and 1996, respectively), in two small Australian general population studies, failed to find an increase with age. Ohayon (1997) found an increase with age of DSM-IV-diagnosed insomnia related to general medical conditions. However, for 'primary insomnia' (insomnia related neither to medical nor mental conditions) he found comparable prevalence in both younger and older subjects. There are several possible explanations for the result. Maybe elderly subjects do not have an increased prevalence of the severe insomnia that was required in the present study if insomnia related to general medical conditions tends to be mild or moderate. Secondly, it is conceivable that elderly subjects do not report negative daytime sequela to insomnia to the same extent as younger subjects, as they can doze and nap during the day and do not have exacting family or work place demands upon them.

In conclusion, this study has shown for Germany that while, on the one hand, sleep disorders have a significant impact on patient's quality of life and consumption of health care, it is, on the other hand, a condition that is poorly recognised and for which patients are, for unknown reasons, reluctant to seek treatment. This indi-

cates that public awareness of the negative impact of disturbed sleep and the relative ease with which it is normally treatable appears to be low both in the general population and the medical profession. In view of the significant daytime impairment and high utilisation of health care services that this condition entails, immense public health and educational efforts are still required to increase the number of individuals who presently seek medical attention or receive treatment in Germany.

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