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The Zurich Study

VII. Insomnia: Symptoms, Classification and Prevalence

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Summary. This study describes sleep behaviour and insomnia in a representative cohort of a Swiss population. Interviews were carried out prospectively from age 20–21 to 27–28 years, starting with 292 males and 299 females. Females usually go to bed earlier and sleep 30 min longer than males. Taking into account length and periodicity of insomnia we can distinguish occasional insomnia (OI), repeated brief insomnia (RBI), and continued insomnia (CI), defined by operational criteria. The prevalence of sleep problems is stable from age 21–28, at 36%–40%. CI (prevalence 8%–10%) and RBI (13%–19%) are both medical problems in terms of treatment by professionals (10%–17%) or self-medication (7%–12%). The majority of insomniacs cope with sleep problems in various other ways. Frequency and patterns of symptoms of insomnia are described.

Key words: Insomnia – Epidemiology – Prospective study – Classification – Prevalence – Symptoms

Introduction

Insomnia is one of the most *frequent symptoms* in the general population and a major reason for the abuse of hypnotics and alcohol. An American national survey by Mellinger et al. (1985) of a representative sample of the population aged 18–79 years found that 35% of all adults are afflicted during the course of 1 year and that 17% of the population considered insomnia to be a serious problem. In 1979, 2.1% of the men and 3.0% of the women had been using prescription hypnotics for the past year.

The problem of insomnia has received growing attention in the past decade and great efforts have been made to establish a widely acknowledged *classification system* for sleep problems (ASDC et al. 1979a). Most epidemiological studies have focused on certain age groups: elderly people (Berry et al. 1984; Cohen et al. 1983; Gerard et al. 1978; Strauch and Wollschläger 1973); middle-aged people (Gislason and Almqvist 1987; Hetta et al. 1985; Partinen et al. 1984; Abe and Moritsuka 1986); and adolescents (Morrison et al. 1985; Strauch et al. 1973, 1985). As far as the group of young adults is concerned, they are represented in the field, mainly if they are students and easily available for research purposes. A few studies deal with the age group 20–30 (Borbély 1984; Mellinger et al. 1985). On the whole, the studies agree that insomnia is more prevalent among females and increases with age.

All these studies were cross-sectional except for the study of Strauch et al. (1985), which followed adolescents from age 10 to 14 over 2 years. The majority of the subjects experienced difficulties in falling asleep at some time during adolescence and had a high fluctuation of insomnia over the years. We do not know of any longitudinal studies of insomnia in adults. Our "Zurich Study", following a cohort of young adults from the Canton of Zurich between age 20 and 30, can provide us with both cross-sectional and longitudinal information on sleep behaviour and insomnia in a cohort of the normal population, as well as the association of insomnia with functional psychiatric symptoms and syndromes.

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The present paper, the first of two in this journal, deals with the cross-sectional information about sleep behaviour and insomnia at age 28. It describes normal sleep behaviour of males, females, and short sleepers; gives a classification of subtypes of insomnia, illness behaviour of insomniacs, prevalence rates at three different ages; and examines SCL-90 profiles and family history of probands with insomnia. The second paper is about the association of insomnia with neurotic and functional syndromes and symptoms, with the course of insomnia and its longitudinal association with depression.

Design and Methodology

The Zurich Study was started with a sample of young adults aged 19–20 years in 1978. They were selected as a representative cohort of the normal population of the Canton of Zurich in Switzerland (2201 males, 2346 females) using the Symptom-Check-List-90-R (Derogatis 1977) as a screening instrument. The sample for the prospective study, consisting of 591 probands in 1979, was composed of two-thirds probands with high scores in the SCL-90 and one-third probands with low scores. The design and methodology were described by Angst et al. (1984). Up to now, this cohort has been interviewed three times with the semi-structured psychiatric interview SPIKE, in the years 1979, 1981, and 1986 (Fig. 1). A fourth interview has been performed in the course of 1988/89, with the cohort at age 29–30. Questionnaires were given in the years 1978 (screening) and 1980. Several reports on the results of the interviews in 1979 and 1981 were published herein. In 1986, at the third interview, the cohort was aged 27–28 and consisted of 225 males and 232 females. The overall drop-out rate after the interview in 1986 and 7 years after the first interview has been only 23%. At the same time sex ratios and ratios of high vs low scorers, according to the pre-selection with the SCL-90, remained stable between 1978 and 1986.

The assessments include a semi-structured interview, the SPIKE, which has been revised several times during the study, and the SCL-90-R. The SCL-90-R was given at each contact, i.e. five times between 1978 and 1986. The interview SPIKE V, carried out in 1986, comprised 35 neurotic and psychosomatic syndromes, including consumption habits. It did not only cover the usual range of psychiatric syndromes such as depression, anxiety, panic, phobia, hypomania, suicidal behaviour, obsessive-compulsive or hypochondriacal syndromes, but also somatic and psychosomatic complaints such as back, stomach, intestinal tract, respiration, heart, circulation, sleep, headache, allergy, sexual behaviour, menstrual problems, etc.

With respect to normal sleep behaviour, time of going to bed and rising, sleep latency, and quality of sleep were checked prior to the investigation of various symptoms of insomnia. If symptoms of insomnia are present, length, frequency, and recency of sleep complaints are assessed. The subjective suffering were measured by an analogue scale from 0 to 100, and data on illness behaviour, including self-medication, were collected. Further questions aimed at subjective impairment at work, at recreational activities, and relationships with partner and friends. Finally, the previous history was checked to assess age at onset, the course over the past 5 years, seasonal variations, and family history of parents and siblings.

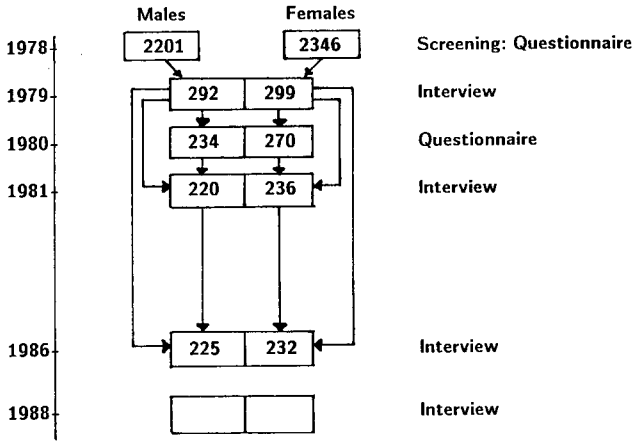

Fig. 1. Design of the Zurich Study

Normal Sleep Behaviour

Firstly we describe the normal sleep behaviour of the cohort at age 27–28. Data on *time of going to bed,* rising and sleep latency by sex are given in Table 1.

Table 1. Sleep behaviour by sex (1986)

	Total ($n = 449$)	Male ($n = 219$)	Female ($n = 230$)
Time of going to bed (hours)			
Mean	23.14	23.28	23.00***
Median 50%	23.00	23.30	23.00
Third quartile 75%	24.00	24.00	23.30
Standard deviation (min)	60	61	55
Minimum	20.30	21.00	20.30
Maximum	3.30	3.30	3.00
Time of rising (hours)			
Mean	6.52	6.49	6.56
Median	6.45	6.30	7.00
Third quartile	7.30	7.15	7.30
Standard deviation (min)	62	68	55
Minimum	2.00	2.00	4.30
Maximum	12.00	12.00	10.00
Duration of sleep (h)			
Mean	7.38	7.20	7.55***
Median	7.30	7.30	8.00
Third quartile 75%	8.11	8.00	8.30
Standard deviation (min)	60	58	57
Minimum	4.00	4.00	5.00
Maximum	11.00	11.00	11.00

*** $P < 0.001$, t-test

Although there was a wide variation of bedtimes, the majority of probands went to bed within the same time span and the plot of the distribution shows a curve with a wide, flat base and two high peaks at 11.00 p.m. and 12.00 p.m. Three-quarters of our sample went to bed, at the latest, at 12.00 p.m. The earliest sleeper in our cohort went to bed at 8.30 p.m., the latest at 3.30 a.m. A comparison of "bedtimes" by sex indicates that women go to bed 30 min earlier than men (mean of males = 11.28 p.m., of females = 11.00 p.m.; $P < 0.001$, t test).

The time of rising had even less variation than the time of going to bed, and showed an extremely high and narrow curve with two peaks at 6.00 a.m. and 7.00 a.m. The mean *time of rising* was 6.49 a.m. Most of the probands in our sample got up between 6.00 a.m. and 7.00 a.m., with three-quarters of them rising by 7.30 a.m. and 90% of them getting up no later than 8 o'clock. There are no significant sex differences, with women rising 7 min later than men on the average.

Sleep latency varied between 0 and 150 min: 15% of our probands usually fell asleep at once, half of them after no more than 8 min; three-quarters of them had a sleep latency of not more than 15 min. There were no sex differences with respect to sleep latency.

The average *duration of sleep* is defined as the difference between the time of going to bed and the time of rising, taking into account sleep latency. On the average, our probands slept for 7 h and 38 min with a range of 4–11 h. A quarter of our sample slept up to 7 h, three-quarters up to 8 h. There was a clear *sex difference* in length of sleep, with females sleeping nearly 30 min longer than males (mean of males = 7.20, of females 7.55) ($P < 0.001$, t-test). This difference is attributable to the earlier time at which females go to bed; it is not related to sleep latency or the time of rising in the morning.

The sex difference remains stable after controlling with analysis of variance for the effects of full-time or part-time work or having children.

In our sample 5.6% were short sleepers, sleeping 6 h or less. If the sleepers with 6 h sleep are excluded, the rate decreased to 2.5%. Eight per cent of the males, but only 3% of the females were short-sleepers ($P < 0.05$, chi-square). Short sleepers had lower sleep quality: 16% of the short sleepers rate their sleep as bad compared with 4% of the "normal" sleepers ($P <$ 0.5 chi-square). Short sleepers went to sleep rather late: three-quarters of them went to bed by 1.00 a.m. and rose by 6.30 a.m., thus going to bed nearly 2 h later than the others. Their sleep latency amounted to nearly 15 min and was comparable with the sleep of the controls. There is no overall association between insomnia and short sleeping. Among the subtypes of insomnia, short sleepers prevailed in the group of CI, but the figures are too small to be statistically tested.

The quality of sleep was generally considered to be good. Eighty percent of our sample rated their sleep as good, 15% as moderate, and only 5% as poor in quality. There was no sex difference in this respect.

Insomnia

Typology and Description of Insomnia

In this study we try to classify insomnia not only by symptoms but also by occurrence and course over 1 year. We take into account length and frequency of periods of insomnia over the past 12 months and the patterns they form.

Earlier unpublished analyses of the data collected at the first two interviews in 1979 and 1981 suggested the definition of three subtypes of insomnia: occasional insomnia (OI), repeated brief insomnia (RBI), and continued insomnia (CI).

A "continued insomnia" is defined by symptoms of insomnia persisting at least for 2 weeks; these periods can occur once or several times over the previous years. Insomnia with briefer spells (less than 2 weeks- duration), occurring at least monthly over the previous 12 months, is called "repeated brief insomnia". The remaining group with spells of insomnia not meeting these criteria is called "occasional insomnia".

These criteria pick up very mild as well as more severe cases of insomnia. Figure 2 illustrates the patterns of insomnia characteristic for the three subtypes described in this section.

Both RBI and CI can be characterized in more detail by frequency and length of complaints. At age 28, 43% of the insomniacs with RBI not only suffered

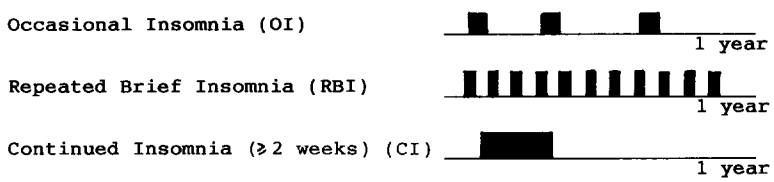

Fig. 2. Subtypes of insomnia

from monthly, but from weekly insomnia. And 61% of the subjects with CI not only suffered from insomnia over a minimum of 2 weeks but over more than 3 months (Table 2). In fact only 12 of 59 (20%) subjects with CI suffered from insomnia of only 2 weeks' duration.

In order to examine whether the two subgroups of CI (broken down by the 3-month criterion) differ in severity, they were compared as to sleep latency, subjective suffering from insomnia, insomnia induced impairment at work and leisure activity, and finally treatment rates. Because none of these indicators showed a significant difference between insomniacs with CI lasting longer than 3 months and insomniacs with CI lasting shorter than 3 months, a further subdivision of CI seems to be unnecessary. For further analyses we maintain the subdivision of insomnia into OI, RBI and CI.

Table 2. Continued insomnia (1986): length of episodes (n = 59)

	n	%
Minimal length		
Two weeks	12	20
One month	11	19
Three months	36	61

Table 3. Sleep latency by subtype of insomnia (1986)

	Sleep latency (min)			
	Mean	S	Median	Maximum
OI (n = 84)	12.5	11.85	10	60
RBI (n = 69)	20.6	19.09	15	75
CI (n = 59)	22.1	32.15	10	150
Controls (n = 245)	8.6	8.65	5	45

Overall difference $P < 0.0001$ (Kruskal-Wallis ANOVA)

The age at onset of insomnia was assessed by a specific question in the 1986 interview. The median age of onset was 25 years for OI, 17 for RBI, and 22 years for CI. The difference between RBI and CI is statistically significant. This finding raises the question whether insomnia manifests itself first as OI and RBI and later as CI.

There was a considerable difference in subjective sleep quality of the three subgroups of insomnia. All subjects had to rate their overall sleep quality as good, moderate, or poor; 93% of the controls slept well, and, this was also true for 78% of occasional insomniacs, but only for 51% of insomniacs with RBI and 59% with CI ($P < 0.0001$ chi-square).

Furthermore, the three groups of insomniacs also differed in sleep latency (as shown in Table 3). The controls took 9 min, the occasional insomniacs 12 min, and subjects with RBI and CI more than 20 min to fall asleep. The longest sleep latency (150 min) was found among insomniacs with CI, whereas the maximum sleep latency among probands with OI or RBI did not exceed 75 min.

Symptoms of Insomnia

In 1986, ten symptoms of insomnia were assessed systematically in all probands who responded positively to the initial probe questions. In addition, the subjects were free to give other symptoms, but only very few of them made use of this possibility. The ten symptoms are listed in Table 4.

The most prevalent symptoms of insomnia were "difficulty falling asleep" (early insomnia) in 76%, "awakening at night" (middle insomnia) in 64%–68%,

Table 4. Symptoms of insomnia (1986)

Symptoms	Subtypes of insomnia			
	OI n = 84 (%)	RBI n = 69 (%)	CI n = 59 (%)	Total n = 212 (%)
1 Difficulty falling asleep	71	84	73	76
2 Awakening at night	65	62	64	64
3 Awakening early in the morning	35	39	34	36
4 Making an effort to fall asleep	29	30	36	31
5 Panic at night	7	23	20	17
6 Awakening from a nightmare with intense fear	18	29	34	26
7 Difficulty getting up, not feeling rested in the morning	61	67	59	62
8 Worrying during the day whether you can sleep at night	14	14	15	15
9 Falling asleep unintentionally (e.g. watching TV, listening to the radio, listening to a talk)	10	16	15	13
10 Exaggerated need for sleep during daytime	26	32	24	27

and "awakening early in the morning" (late insomnia) in 36% of the cases. The majority of insomniacs also complained of "difficulties getting up" or "not feeling rested in the morning" (62%). Fifteen per cent of insomniacs worried during the day about their ability to sleep at night, with 27% feeling an exaggerated need for sleep during daytime, and 31% making a special effort to fall asleep at night. The three subtypes of insomnia were very similar in symptom frequencies. Also, a breakdown of symptoms by *sex* does not result in significant differences; therefore, we will not present the data.

From a therapeutic point of view, clinicians frequently distinguish between early, middle, and late insomnia. We know little about their occurrence and prevalence in a normal population.

Table 5 shows all the possible *patterns of early, middle, and late insomnia* together, and broken down by the three subtypes OI, RBI, and CI. Seventy-six per cent of the subjects showed early insomnia alone or in combination: 25% suffered from early insomnia only, another 23% from combined early and middle insomnia, and 23% from all three symptoms. Middle insomnia alone was observed in 12%. Late insomnia alone was rare (1%); usually late insomnia was associated with early and/or middle insomnia (7% and 23%). Again, the three subtypes of insomnia did not differ in the patterns of insomnia.

Table 5. Symptom patterns in subtypes of insomnia (1986)

Symptom patterns			Subtypes of insomnia			
Insomnia			OI	RBI	CI	Total
Early	Middle	Late	$n = 84$ (%)	$n = 69$ (%)	$n = 59$ (%)	$n = 212$ (%)
+	0	0	19	30	27	25
0	+	0	14	4	17	12
0	0	+	1	1	0	1
+	+	0	25	23	19	23
+	0	+	7	3	5	5
0	+	+	6	7	7	7
+	+	+	20	28	22	23
0	0	0	8	4	3	4

Unweighted Frequency and 1-Year Prevalence Rates of Insomnia at Age 21, 23, 28

The unweighted relative frequencies of insomnia by sex at age 21, 23, and 28 are given in Table 6. There were no significant *sex differences* in frequency of subtypes of insomnia at any of the three interviews.

Table 7 shows the weighted 1-year *prevalence rates* of the normal population for OI, RBI and CI. The prevalence rates varied only to a minor extent over the three different time points across a period of 7 years (Table 7). Approximately 60%–65% of the probands did not complain about any insomnia at any of the three interviews (21, 23, and 28). The rate of OI and RBI decreases a little with age, whereas CI was found more frequently at age 28.

Illness Behaviour and Impairment in Social Areas

Owing to the construction of the SPIKE, data on treatment and subjective impairment are available for insomniacs with RBI and CI, but only partly for insomniacs with OI. *Professional treatment* was sought by 10% of RBI and 17% of CI, a ratio that seems fairly low (Table 8). Up to 9% of insomniacs with CI or RBI took non-prescription drugs to promote sleep. Half of the insomniacs tried to cope with the problem in various other ways: by changing their diet, taking natural remedies, trying diverse methods of relaxation, seeking distraction, or by applying other problem-focused practical coping modes.

Subjective suffering from insomnia and *subjective impairment* in areas of work, recreation, social contacts, and in the relationship with their partner were assessed by visual analogue scales (0–100). The three groups of insomniacs did not differ in these variables to a significant degree. Therefore, we only mention values for all three groups taken together. The mean subjective suffering was 40.2 ± 29.6 (median 35).

Table 6. Unweighted frequencies of insomnia by sex in 1979 (age 21), 1981 (age 23), 1986 (age 28)

	1979		*1981*		*1986*	
	Males $n = 292$ (%)	Females $n = 299$ (%)	Males $n = 220$ (%)	Females $n = 236$ (%)	Males $n = 225$ (%)	Females $n = 232$ (%)
No insomnia	53	49	64	54	55	52
OI	17	20	10	17	18	19
RBI	22	19	16	16	17	13
CI	8	12	11	13	10	16

OI = Occasional insomnia; RBI = repeated brief insomnia; CI = continued insomnia

Table 7. Weighted 1-year prevalence rates of insomnia in 1979, 1981 and 1986

	1979	1981	1986
No insomnia	59.5	63.5	62.3
Occasional insomnia	15.4	13.2	18.2
Repeated brief insomnia	15.8	14.8	7.8
Continued insomnia	9.3	8.4	11.6

Table 8. Treatment rates (1986)

	RBI $n = 69$ (%)	CI $n = 59$ (%)	Total $n = 128$ (%)
Professional treatment	10	17	13
Non-prescription drugs	12	7	9
Total	22	24	22

Subjective impairment at work and during leisure time are equally low (12.8 ± 19.6 and 14.2 ± 24.7). Fifty-three per cent of the insomniacs did not feel impaired at work and 60% did not feel impaired during leisure time.

Subtypes of Insomnia and Symptom-Checklist-90 Profiles

After the interview with the SPIKE, the subjects also completed the Symptom-Checklist-90-R of Derogatis (1977), which assesses various complaints over the past 4 weeks. This self-assessment was independent of the interview and the subjects were not aware of any intended correlation analysis between insomnia and SCL-90. Three SCL items (nos. 44, 64, 66) refer to sleep problems. Of 196 subjects with an interview diagnosis of insomnia, 149 (76%) gave a positive answer to one or more of the three questions of the SCL items. A complete overlap cannot be expected, of course, because insomnia assessed by the SPIKE interview refers to the past 12 months, whereas the SCL-90 questionnaire only refers to the past 4 weeks.

We find three distinct profiles which differ significantly from each other: the profile of the controls, the profile of insomniacs with OI, and the profile of insomniacs with either RBI or CI. Figure 3 shows the profiles of the 9 SCL-90 scales and the total score for the three groups. Probands with OI had higher scores than controls on the scales anxiety, depression, interpersonal sensitivity, obsessive compulsive disorder, somatization, and on the total score. Probands with RBI or CI show a profile which is exactly of the same shape as that of insomniacs with OI, but with even higher scores in all scales and a remarkable peak on the depression scale. The differences between the profiles of the unified RBI and CI and the controls are remarkable and for all scales statistically significant Kruskal-Wallis ANOVA. Furthermore, the profile of the controls is flatter than the profiles of the two insomnia groups. With respect to the SCL-90, OI seems to occupy a middle position between controls and insomniacs with either RBI or CI.

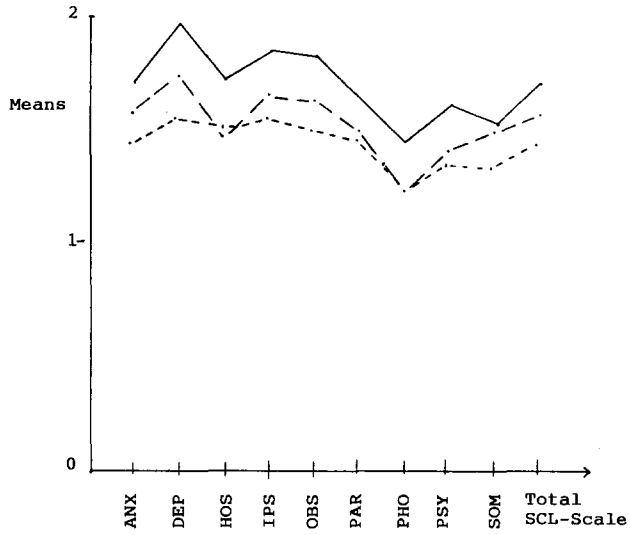

Fig. 3. SCL-90-Scale profiles of insomniacs (RBI + CI) vs OI vs controls in 1986. *CI,* Continued insomnia; *OI,* occasional insomnia; *RBI,* repeated brief insomnia. —— RBI + CI; —·— OI; – – · – controls

Table 9. History of insomnia among parents of subjects with diagnoses of subtypes of insomnia (OI, RBI, CI) in 1986

Positive family history (any insomnia)	Subtypes of insomnia				$P <$
	OI $n = 84$ (%)	RBI $n = 69$ (%)	CI $n = 59$ (%)	Controls $n = 245$ (%)	
Father	18	21	12	12	NS
Mother	46	49	25	33	0.02
Father and mother	57	58	32	40	0.01

Positive Family History

The data on a positive family history rely completely on the reports of the probands. They were asked in detail about treated and untreated insomnia of parents and siblings. Table 9 gives some findings. The insomniacs differ from the 245 controls in an unsystematic way. It is difficult to understand why the group with CI, which seems, at first glance, to be the most severe one, has a rather low positive family history, whereas the other two groups show higher

rates of insomnia among parents than the controls. It is remarkable that a positive history of insomnia is much more frequently given for mothers than for fathers. The same is true for treatment rates. The fact that 40% of controls have a positive family history of insomnia among parents agrees well with prevalence rates in the normal population of about 30% for males and females. Father and mother together give a slightly higher rate.

Discussion

Our data on normal sleep behaviour at age 28 show a rather small amount of variance with regard to time of going to bed, sleep latency, and especially time of rising in the morning. Most of these young adults went to bed between 11 and 12 p.m., rose between 6 a.m. and 7 a.m. and needed only about 8 min to fall asleep. Compared with the results of Borbély (1984), which refer to a representative sample of 1000 persons of the normal Swiss population, our young cohort goes to bed at least 1 h later. Irregular sleeping times due to night shift work are irrelevant in our sample in view of the scarcity of this activity in Switzerland.

Most surprising is the finding that young women go to bed earlier than young men and therefore sleep nearly 30 min longer. This sex difference in sleep behaviour is not explained by different social factors; it remains stable after controlling for being partly or fully employed or being a housewife with or without children. These findings confirm another epidemiological interview study about sleeping habits and insomnia of different age groups in Switzerland (Borbély 1984), but are at variance with a large epidemiological questionnaire study of a middle-aged (45–64 years) Swedish population (Hetta et al. 1985). Short sleepers (definded as sleeping 6 h or less per night) account for 5.6% in our sample, which is close to the 7% found by Borbély.

The classification of a clinical syndrome is always to a certain extent arbitrary. This is especially true of insomnia. A proposal was made by the ASDC et al. (1979b). We did not follow this scheme because we assessed sleep behaviour in the same way as many other psychiatric syndromes. Therefore, we do not have, for instance, a cut-off for the length of 3 weeks as proposed for the diagnosis of persistent insomnia. We have the cut-off at 2 and 4 weeks because these are criteria also used for the diagnosis of depression.

We wanted to attempt a new descriptive typology of insomnia, based on data from the normal population, and based on different patterns of length and frequency of abnormal sleep. Taking into account insomnia across a period of 12 months, three different patterns could be distinguished: OI, lasting less than 2 weeks and occurring less than monthly; CI, persisting every night for at least 2 weeks, but mostly more than 3 months; and RBI, lasting less than 2 weeks, but occurring at least monthly. Price et al. (1978) distinguished in a similar way occasional from chronic poor sleepers. He found among adolescents aged 15–18 years, 12.6% chronic poor sleepers and 37.6% occasional poor sleepers. In face of the longitudinal instability of insomnia we should certainly take into account longitudinal aspects of the phenomena. Strauch et al. (1985) found in their longitudinal studies a decrease in 18.6% and an increase in 9.3% of sleep difficulties, whereas in 30.9% no systematic trends could be observed. Disorders of excessive somnolence (DOES; ASDC et al. 1979c) were of no relevance in this sample.

If we compare this classification with the conventional diagnostic scheme, OI is partly similar to "transient situational insomnia", triggered by an emotional shock or other stressful life events and lasting less than 3 weeks. CI resembles the subclass of persistent (conditioned) insomnia, lasting at least for 3 weeks (ASDC et al. 1979b). Eighty percent of our CI group lasted at least for 4 weeks. RBI is a new category of insomnia not described previously.

The most prevalent symptom of insomnia in all three subgroups (OI, RBI, CI) is the difficulty in falling asleep, followed by awakening at night. Awakening early in the morning is rather rare in this young group. Hetta et al. (1985) found awakening at night to be most prevalent in a middle-aged group and elderly people, who often complained of waking up too early in the morning. Therefore, our finding may be age specific.

The secondary symptom of "not feeling rested in the morning" is the most frequent complaint linked with sleeplessness. Strauch et al. (1973) found in their group of adolescents aged 13–18 years the symptom "tired in the morning" in 50% of the subjects with sleep problems. In our sample it was 62%.

In many rating scales of psychopathology early, middle and late insomnia are mentioned separately and these symptoms are also used for diagnostic purposes, for instance for the definition of disorders of initiating and maintaining sleep (DIMS). We do not know of an epidemiological study which has looked for the patterning of early, middle and late insomnia frequencies, nor do we know of data about the temporal sequence of these symptoms. The distinction between early, middle and late insomnia is artificial. Only 38% of the subjects with insomnia have a pure form (25% early, 12% middle, 1% late). A combination is the rule. Usually, early insomnia is combined

with middle insomnia (23%), or with both middle and late insomnia (another 23%). This finding suggests the hypothesis that early insomnia is usually the first stage prior to the development of middle or late insomnia.

Our distinction of OI, RBI and CI has up to now not been shown to be clinically relevant. The single symptoms are the same in all three groups, as also are the patterns of early, middle and late insomnia. On the other hand, OI does not seem to be of great clinical relevance. If we consider the self-assessment of complaints by the Symptom-Checklist-90 broken down by the three subtypes of insomnia in comparison with the controls, three different profiles can be distinguished: OI, RBI together with CI, and controls. Insomniacs with OI score higher than controls on five subscales and the total score of the SCL-90. The profiles of RBI and CI are very similar and were therefore unified. Insomniacs with RBI or CI score remarkably higher than the controls in all scales of the SCL-90. Their scores are also higher than those of insomniacs with OI. Overall, the profiles of the three groups are very similar, but insomniacs with RBI or CI score especially high on the depression scale.

CI embraces complaints of insomnia over 2 weeks and longer. Only a small proportion (20%) of these insomniacs meet the minimum criteria of 2 weeks of insomnia; 61% of the CI group exhibit chronic forms of insomnia lasting for 3 months and more.

Treatment rates were not assessed for subjects with OI. The treatment rates found in subjects with RBI and CI were rather low if compared with treatment rates of other psychiatric groups, such as depression or panic disorder (Angst et al. 1989). Only 8%–17% of insomniacs sought professional treatment during the previous 12 months. Also fairly low is the use of hypnotics. Only 9% of the insomniacs (RBI and CI) were taking non-prescription hypnotics. About half of all the insomniacs tried to improve their sleep in different ways, by diet, natural remedies, walking, relaxation, changing their sleeping habits etc. These active attempts to cope show that insomnia is often not considered to be a reason for medical treatment.

To our surprise no sex difference could be found for insomnia at age 21, 23 or 28. This contradicts studies describing higher prevalence rates of insomnia and poorer quality of sleep in females (Borbély 1984; Hetta et al. 1985; Mellinger et al. 1985). The 1 year weighted prevalence rates of insomnia were relatively stable across the years, namely 36%–40%. They are quite in line with the rates given by other studies (30%–35%) (Mellinger et al. 1985; Hetta et al. 1985).

Mellinger et al. (1985) mentioned that by excluding all persons with sleep problems, the group which never had a sleep problem of any kind is left, and that this may be a simple, useful indicator of good health. This would be the case in 31% of our sample (33% males, 29% females, unweighted frequencies).

This paper leaves many questions unanswered; for instance, the longitudinal course of insomnia, and especially the association of insomnia with other psychiatric symptoms and syndromes. A second paper will deal with these issues.

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