

Longitudinal trends in late-life insomnia: implications for prescribing

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Abstract

Objective: to assess trends in insomnia and hypnotic drug use in a representative sample of elderly general practice patients.

Design: longitudinal study with three interview waves—1985, 1989 and 1993.

Setting: urban and suburban Nottingham.

Participants: 1042 patients originally aged 65 and over randomly sampled from general practitioner lists.

Main outcome measures: point prevalence estimates, status (case/non-case/died) at 4-year follow-up, episode incidence and survival functions.

Results: at baseline (1985) 221 respondents met the survey criteria for insomnia. Of these, 36.1% continued to report severely disrupted sleep in 1989. Within this period 84 new cases of insomnia were identified (an incidence rate of 3.1% per person-year at risk). Controlling for age and sex, insomnia was unrelated to survival among prevalent cases, but significantly related to survival among incident cases (odds ratio = 1.7; 95% confidence interval = 1.1–2.5). Of 166 respondents using prescription hypnotics in 1985, 31.7% continued to report usage in 1989. Similarly, out of 41 new hypnotic drug users identified in 1989, 29.3% continued to report usage in 1993.

Conclusions: important clinical differences in the natural history of insomnia are evident when incident and prevalent cases are compared. Nevertheless, outcomes at 4-year follow-up suggest that, for the majority of surviving cases identified in a prevalence screen and for a substantial minority of incident cases, late-life insomnia shows a level of chronicity incompatible with hypnotic drug therapy as currently recommended.

Keywords: ageing, epidemiology, hypnotics, incidence, insomnia

Introduction

Insomnia affects between 5 and 10% of the adult population [1] and is both widely reported and commonly treated in general practice [2, 3]. While many effective treatment options have been developed in recent years, hypnotic drugs remain the treatment of choice in primary care settings [4]. In England, for example, the total volume of general practice prescriptions for hypnotics shows only a modest decline from 13.6 million in 1980 to 12 million in 1992 (the last year for which published data are available). During the same period, prescriptions for sedatives and tranquillizers fell from 18.9 million to 8.6 million [5]. Similar trends have been reported in Scotland [6], Wales [7] and elsewhere in Europe [8]. Yet, despite this sustained commitment to the management of disturbed sleep, the epidemiology of insomnia remains poorly developed.

For the past 30 years most epidemiological data on insomnia have been derived from cross-sectional studies [1]. Although consistent in identifying elderly people as the group most likely to report disturbed sleep and hypnotic drug use [9], these have provided few insights into the incidence of, or outcomes associated with, insomnia in later life. As a result, while the need to target prescribing and avoid long-term hypnotic drug use continues to be emphasized [10, 11], particularly in relation to elderly patients, there is at present little information to enable clinicians to predict outcomes, need or likely future expenditure arising from insomnia in older general practice populations. This dearth of information on the natural history of sleep disorders in later life was emphasized recently by a US National Institutes of Health consensus statement, which drew particular attention to the need for longitudinal studies to inform policy and practice in this area [12].

In the analyses reported here we use data from an 8-year study of representative elderly general practice patients to examine longitudinal issues in late-life insomnia. Developing earlier cross-sectional work [12,13], these analyses specifically address (i) outcomes among prevalent cases of insomnia, (ii) the incidence of insomnia, (iii) outcomes among incident cases of insomnia and (iv) temporal trends in hypnotic drug use among elderly patients.

Methods

Sample

Data were derived from the three waves (1985, 1989, 1993) of the Nottingham Longitudinal Study of Activity and Ageing. The original sample was constructed by first combining three areas of greater Nottingham to provide a study population whose demographic composition reflected the average national pattern for England and Wales [15]. These areas included 48 733 individuals served by 25 general practitioners. With the consent of these general practitioners, Nottinghamshire Family Practitioner Committee age-sex lists were used to identify all non-institutionalized individuals aged 65 years and over living within the survey catchment. Of 8409 elderly people identified, 1299 eligible individuals (those alive and still living at the address provided) were randomly selected for interview. Those aged 75 years or older were intentionally over-sampled in order to admit sufficient numbers for subsequent longitudinal analyses.

The baseline survey was conducted between May and September 1985 [13, 14]. All surviving and locally resident respondents were invited to participate in the 4-year follow-ups which commenced in May 1989 and May 1993. Information on mortality within the baseline sample was provided by the National Health Service Central Register.

Interview questionnaire

The structured questionnaire covered aspects of health, well-being and lifestyle and was administered by a trained interviewer. Quality of sleep was assessed using the item "Do you ever have problems sleeping?", with five response categories (never, seldom, sometimes, often, all the time). If appropriate, respondents were then asked whether they had experienced this problem in the preceding week. Respondents also provided estimates of average sleep latency and total average night-time sleep and information on prescription hypnotic drug use. Reported drug use was verified by the interviewer, who examined tangible evidence of prescribed medication (bottles, cartons, scripts, etc.).

In the present analyses insomnia was considered to be present if respondents reported a sleep problem 'often' or 'all the time' (severity criteria) and if that

problem had been experienced in the previous week (recency criterion).

Analysis of data

Calculations of incidence rates for the period 1985-89 were based upon person-years at risk. For each respondent at risk the exact period between survey interviews (or the exact period between interview and subsequent death) was calculated for the waves 1985-89. The point of onset for incident cases of insomnia was considered to lie at the mid-point between survey interviews. Since the over-75 age group was over-sampled, estimates of incidence for the whole sample were appropriately weighted. To compare overall incidence for men and women while controlling for age, rates were combined in a logistic regression model with age as the dependent variable. Average sleep latencies and total sleep times for insomnia and non-insomnia groups were compared using analysis of variance with age and sex as covariants. Cox regression models were used to analyse survival. All data were analysed using SPSS for Windows version 6.0 [16].

Results

Response and attrition rates are shown in Table 1. In the interests of clarity, all age groupings in the tables are expressed in terms of 1985 (baseline) ages.

Table 1. Nottingham Longitudinal Study of Activity and Ageing: attrition, 1985-93

1985	
Original sample (Family Practitioner Committee lists)	1299
No. of respondents interviewed	1042
Response rate	80%
1989	
No. of losses (1985-89)	
Died	261
Refused interview	63
Untraceable	25
Emigrated	3
No. of survivors	781
Interviews with survivors	690
Re-interview rate	88%
1993	
No. of losses (1989-93)	
Died	217
Refused interview	50
Untraceable	11
Emigrated	2
No. of survivors	564
Interviews with survivors	410
Re-interview rate	72%

Outcomes among prevalent cases

From the 1985 survey, information on sleep quality was available for 1023 respondents. Of these, 221 met the severity and recency criteria for insomnia, giving an overall weighted prevalence of 21.2% [95% confidence interval (CI) = 17.6–25.8]. Only a small minority of respondents ($n = 14$) reported symptoms at least 'often', but failed to meet the survey criterion for recency (i.e. had not experienced their symptoms in the preceding week). Compared with other respondents, those with prevalent insomnia showed significantly longer mean estimated sleep latencies (52.9 min *versus* 18.5 min; $F = 160.6$, $P < 0.001$) and significantly shorter mean estimated sleep times (387.9 min *versus* 436.7 min; $F = 38.3$, $P < 0.001$).

Four-year outcomes among these prevalent cases are shown in Table 2. Of the original 221, 55 (24.6%) no longer met the survey criteria for insomnia, while 80 (36.1%) continued to report severely disrupted sleep. The probability of insomnia being reported in both 1985 and 1989 showed a clear relationship with gender, with apparently continuous complaints being most likely among women. Survival analysis controlling for age and sex showed no significant relationship between survey ratings of insomnia in 1985 and 1985–89 mortality (residual $\chi^2 = 0.01$, $d.f. = 1$, $P = 0.93$) or 1989 interview refusals (residual $\chi^2 = 0.1$, $d.f. = 1$, $P = 0.75$).

Incidence of insomnia

From the baseline (1985) survey, 802 (78.8%) individuals did not meet the present criteria for insomnia and

were therefore judged to be at risk. Within this group 84 new cases were identified at the first follow-up in 1989, giving an overall (weighted) incidence rate per person-year at risk of 3.1% (95% CI = 2.7–3.5; Table 3). Overall incidence increased with age up to 79 years (see Table 3). When the sexes are considered separately, it is clear that this age gradient is influenced principally by increasing incidence among ageing men, although the rates for women remained higher for all age bands. Compared with the remaining at-risk respondents, incident cases of insomnia showed significantly longer mean estimated sleep latencies (45.9 min *versus* 17.9 min; $F = 30.2$, $P < 0.001$) and significantly shorter mean estimated sleep times (370.4 min *versus* 434.6 min; $F = 30.0$, $P < 0.001$).

Outcomes among incident cases

Four-year outcomes (1989–93) among the 84 incident cases identified in 1989 are shown in Table 4. Overall, only 13.1% continued to meet the study criteria for insomnia, while 31.9% no longer reported significant sleep problems. Survival analysis for the same period showed that, after controlling for age and sex, incident insomnia was associated with a significantly increased likelihood of mortality (odds ratio = 1.7; 95% CI = 1.1–2.5, $P = 0.01$).

Hypnotic drug use

At the baseline interview in 1985, 166 (weighted prevalence = 15%) respondents reported the use of prescription hypnotics. Four-year outcomes (1985–89)

Table 2. Four-year outcomes (1985–1989) among prevalent cases of insomnia

Age group (1985)	<i>n</i>	No. (and percentage) of cases		
		Without insomnia	With insomnia	Dead
All				
65–69	39	15 (38.5%)	17 (43.6%)	3 (7.7%)
70–74	61	14 (22.6%)	26 (42.6%)	12 (19.7%)
75–79	59	17 (29.7%)	20 (32.4%)	16 (27%)
80+	62	9 (13.2%)	17 (28.9%)	29 (47.4%)
Men				
65–69	14	7 (50%)	6 (33.2%)	0
70–74	13	4 (30.6%)	5 (39.4%)	3 (21.8%)
75–79	18	8 (43.8%)	2 (11.2%)	6 (37.6%)
80+	13	1 (9.2%)	2 (17.6%)	8 (67.2%)
Women				
65–69	25	8 (32.7%)	11 (44.1%)	3 (11.9%)
70–74	48	10 (21.5%)	21 (44.4%)	9 (19.2%)
75–79	41	9 (21.6%)	18 (43.8%)	10 (24.1%)
80+	49	8 (15.3%)	15 (30.8%)	21 (43.1%)
Overall	221	55 (24.6%)	80 (36.1%)	60 (23.5%)

Rows may not total 100% owing to attrition.

Table 3. Incidence of insomnia (1985-1989)

Age group (1985)	No. of cases		Person-years at risk	Rate per person-year ^a	95% CI
	Total	New			
All					
65-69	176	18	649.5	2.8	2.4-3.5
70-74	228	26	804	3.2	2.7-4.0
75-79	214	24	703.6	3.5	2.9-4.2
80+	187	16	563	2.9	2.4-3.7
Men					
65-69	86	4	315.9	1.3	1.2-1.4
70-74	105	8	364.6	2.2	1.9-2.6
75-79	92	10	299.9	3.5	2.9-4.3
80+	61	3	154	2.4	1.9-3.4
Women					
65-69	90	14	333.6	4.2	3.5-5.2
70-74	123	18	439.4	4.1	3.4-5.1
75-79	122	14	403.7	3.4	2.9-4.2
80+	126	13	408.9	3.3	2.9-4.0
Overall		84	2720.1	3.1	2.7-3.5

^aAge-weighted.

95% CI, 95% confidence interval.

among the 166 hypnotic users are shown in Table 5. Overall, 50 (31.7%) respondents reported prescription hypnotic drug use on both occasions, with 48 (30.2%) reporting discontinuation.

The 1989 survey identified a total of 41 new hypnotic users. Using the same person-years approach and defining the population at risk as those who, in 1985, reported no hypnotic drug use, the overall incidence of new hypnotic drug use was estimated as 1.5% (95% CI = 1.3-1.6). Four-year follow-up (1989-93) of these incident hypnotic drug users showed the following distribution of outcomes: continued usage, 29.3%; discontinued usage, 21.9%; and died, 36.6%.

Discussion

These results show a pattern of sleep complaints closely related to individual perceptions of sleep

latency and total sleep and are consistent with earlier cross-sectional prevalence studies in which insomnia has been conservatively defined [1]. Given also the representativeness of the baseline sample and the high re-interview rates obtained, we feel that the present data offer valid and generalizable insights into the natural history of late-life insomnia in general practice populations.

Extrapolated to primary care, the present findings indicate that, for a typically age-structured general practice list containing 300 registered patients aged 65 and over [17], approximately 53-77 of these patients will suffer from insomnia, with a further 8-11 new cases arising each year (although these predictions take no account of selection bias in a given list). Two factors suggest that incidence here is under-estimated: (i) the baseline sample excluded those in residential and nursing-home care, who may have had a higher risk of

Table 4. Four-year outcomes (1989-93) among incident cases of insomnia

Age group (1985)	n	No. (and percentage of cases)		
		Without insomnia	With insomnia	Dead
65-69	18	5 (27.8%)	5 (27.8%)	5 (27.8%)
70-74	26	8 (30.8%)	2 (7.7%)	13 (50%)
75-79	24	9 (40%)	2 (8.3%)	10 (40%)
80+	16	6 (40%)	1 (10%)	4 (30%)
Overall	84	28 (31.9%)	10 (13.1%)	32 (39.1%)

Rows may not total 100% owing to attrition.

Table 5. Hypnotic drug use: prevalence and 4-year outcomes

Age group (1985)	Hypnotic users ^a	Non-users ^b	Continued use ^b	Dead
All				
65-69	24 (11.2%)	10 (41.7%)	8 (33.3%)	3 (12.5%)
70-74	38 (13.3%)	11 (28.9%)	15 (39.5%)	9 (23.7%)
75-79	52 (19.2%)	17 (34.4%)	18 (34.4%)	13 (25%)
80+	52 (20.9%)	10 (21.9%)	9 (18.8%)	25 (50%)
Men				
65-69	7 (16.7%)	4 (57.1%)	3 (42.8%)	0
70-74	13 (31.0%)	5 (38.5%)	3 (23.1%)	5 (38.5%)
75-79	11 (26.2%)	4 (36.4%)	2 (18.2%)	5 (45.4%)
80+	11 (26.2%)	2 (18.2%)	1 (9.1%)	7 (63.6%)
Women				
65-69	17 (13.7%)	6 (35.3%)	5 (29.4%)	3 (17.6%)
70-74	25 (20.2%)	6 (24%)	12 (48%)	4 (16%)
75-79	41 (33.1%)	13 (31.7%)	16 (39%)	8 (19.5%)
80+	41 (33.1%)	8 (19.5%)	8 (19.5%)	18 (43.9%)
Overall	166 (16.3%)	48 (30.2%)	50 (31.7%)	50 (31.7%)

^a1985 (column %).

^b1989 (row %).

Rows may not total 100% owing to attrition.

becoming cases and (ii) an unknown number of the incident cases may have died between the 4-year waves. Certainly, the overall incidence rate found here (3.1%) is substantially lower than that reported for the same age group (7.3%) in the Epidemiologic Catchment Area study of sleep and psychiatric disorders [18]— although the Epidemiologic Catchment Area study reported 1-year cumulative incidence rates for survivors only and possibly over-estimated incidence among elderly people.

Differing outcomes between prevalent and incident cases emphasize the heterogeneity of insomnia in this age group and may reflect important clinical differences between those who develop sleep problems in later life and those who 'graduate' into old age with pre-existing chronic sleep problems. Since prevalent cases include many individuals who will have developed their sleep problems in mid-life or before [19], it is unlikely that the course and outcome of insomnia within this group will be determined mainly by the illnesses and disabilities characteristic of old age. Incident insomnia, on the other hand, originates in later life and is more likely to arise from and reflect the course of old age morbidity. Such a view appears to be supported both by the excess mortality (indicating high levels of morbidity) and by the relatively high recovery rate (consistent with acute illness episodes) among the incident cases.

Longitudinal trends in hypnotic drug use show a remarkably similar pattern over the periods 1985-89 and 1989-93, with 31.7% of prevalent users and 29.3%

of incident users reporting use 4 years later. These findings provide little support for a conclusion that protracted hypnotic drug consumption among elderly people is becoming substantially less common. Rather, the evidence here suggests that hypnotic drug use which commenced after 1985 was almost as likely to continue for the next 4 years as that which had commenced before.

As in other longitudinal studies, the continuity of events between survey waves (here, the symptoms of insomnia and hypnotic drug use) is assumed and caution in interpreting these data is therefore appropriate. To some extent these assumptions can be supported. For insomnia, given the frequency of complaints reported on both occasions (as occurring 'often' or 'all the time') and in the light of retrospective cross-sectional data suggesting similarly high levels of symptom continuity among elderly people with severe sleep problems [20], it is likely that most respondents who met the survey criteria for insomnia in both 1985 and 1989 experienced symptoms throughout the intervening period. Similarly, given that in 1985 84% of hypnotic users reported consumption 'often' or 'all the time' [14], while 76% of the 'continued use' group (Table 5) reported similar frequencies of use, assumptions of continuity, at least among the majority, appear reasonable.

Overall then, symptom persistence is a highly probable feature of late-life insomnia, with prevalent cases showing relatively higher levels of symptom chronicity than incident cases. While recommendations vary, it is

now widely accepted that hypnotic drug therapy beyond 4–6 weeks duration is undesirable. Thus, for most cases it is reasonable to conclude that since the duration of symptoms is likely to exceed by some magnitude the recommended duration of drug therapy, hypnotics appear to be an unsuitable response to insomnia in later life. However, given the much lower levels of symptom chronicity shown among incident cases, late-life onset insomnias may present the most appropriate target for hypnotic drug therapy.

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Key points

- Compared with the attention paid to hypnotic drug use in general practice, relatively little research has focused on the natural history of the underlying disorder for which these drugs are prescribed—insomnia.
- Most epidemiological studies of insomnia have described prevalence only, using cross-sectional data.
- Information on typical longitudinal outcomes among those reporting disturbed sleep is essential if hypnotic drugs and psychological treatment are to be appropriately targeted and insomnia management improved.
- This longitudinal study found high levels of chronic insomnia among elderly patients, but with important differences emerging between incident and prevalent cases.

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