

# Does sleep disturbance predict depression in elderly people? A study in inner London

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**SUMMARY.** *Insomnia in elderly people has traditionally been regarded as inevitable and trivial. A longitudinal study was undertaken to examine the prevalence of sleep disturbance among elderly people in an inner London community and its association with demographic variables, depression, dementia and disability. Those aged 65 years and over living at home were interviewed using a validated and reliable semi-structured interview schedule. A total of 705 people were interviewed in 1987–88 and 524 were re-interviewed in 1990. Subjective sleep disturbance was found to be common (33% and 43%, respectively). Sleep disturbance was associated with being a woman, being unmarried, living alone, disability, and current and future depression, but not with dementia or older age. The best predictor of future depression in elderly people who were not depressed was current sleep disturbance. In the presence of current sleep disturbance, the traditional predictors of depression — being a woman, having a disability, being unmarried, living alone and being older — did not contribute further.*

*This study has shown that sleep disorder is associated with pathology. Insomnia in elderly people requires assessment and this must be accompanied by the treatment of underlying disorders and monitoring of future health.*

**Keywords:** *insomnia; sleep disorders; psychiatric disorders; mental health; morbidity; elderly.*

## Introduction

'Old age is always wakeful, as if the longer linked with life, the less man has to do with aught that looks like death.'

Herman Melville, *Moby Dick*, 1851 :29

**D**ESPITE the lack of data for older age groups, insomnia has traditionally been regarded as inevitable rather than as evidence of psychiatric illness, in both medical practice<sup>1</sup> and in literature.<sup>2</sup>

It is known that sleep disturbance is common in elderly people; an overview of estimates of its prevalence in community surveys shows them ranging from 10% to 52% with most around 30%.<sup>3</sup> The commonest medical response to psychological illness is the prescription of a drug to promote sleep, usually a benzodiazepine, suggesting that sleep disorder is commonly presented to doctors.<sup>4</sup> In particular, this is so among those aged 65 years and over, to the extent that age has been found to be the most important variable determining prescription of hypnotics.<sup>5</sup> The high

prescription rate in elderly people is partly because of chronicity of use, for example, in one study 60% of those aged 65 years and over on benzodiazepines continued taking them for over three years.<sup>6</sup>

Despite this almost standard management of sleep disturbance, insomnia is not always in itself a primary diagnosis: it may be a cause, a symptom or an epiphenomenon of illness. Insomnia has been reported in association with many psychiatric disorders including depression,<sup>7</sup> anxiety,<sup>8,9</sup> dementia,<sup>4</sup> anorexia nervosa<sup>10</sup> and post-traumatic stress disorder.<sup>7</sup> In psychiatry, insomnia is usually regarded as a secondary disorder, caused by an affective disorder. Indeed, the *International classification of diseases* stipulates that the category of sleep disorder 'should only be used when a more precise medical or psychiatric diagnosis cannot be made'.<sup>11</sup>

There are as yet no published studies of sleep disorder and psychiatric illness among elderly people in the general population. Most reports have originated from hospital or clinic populations. The one study of the relationship between insomnia and various psychiatric disorders in a community sample, using standardized criteria, did not specify data concerning elderly people.<sup>3</sup> The study reported that 40% of those with insomnia of more than two weeks' duration had a psychiatric diagnosis ranging from an affective disorder to alcohol or drug abuse. In addition, the risk of developing a new major depression in the year following interview was significantly raised in those with persistent insomnia (that is, reported at both initial and follow-up interviews).

A study was undertaken of elderly people in order to examine the prevalence of sleep disturbance in the community; the association of sleep disorder with demographic variables, depression, dementia and disability; and the relationship between current sleep disturbance and future depression.

## Method

People aged 65 years and over and living at home, in an inner London electoral ward (Gospel Oak), were interviewed in 1987–88 and again in 1990 using the shortened version of the comprehensive assessment and referral evaluation schedule,<sup>12</sup> an instrument developed from the full schedule.<sup>13</sup> Potential interviewees were identified by knocking on the doors of every home in the electoral ward. Letters were sent to potential interviewees, inviting them to take part in the study and an interview time was then arranged. The interviews were carried out by experienced clinicians.

The shortened schedule is a valid and reliable semi-structured interview containing homogeneous scales which assess organic brain syndrome, depression, subjective memory impairment, somatic symptoms, activity limitation and sleep disturbance. All the scales have been developed to eliminate redundancy so that no two scales are measuring the same syndrome. The sleep disturbance scale has eight items, a score of two or more indicating caseness. The items comprise difficulty falling asleep, taking or being dependent on medication to help one sleep, sleep interrupted during the night, difficulty sleeping (falling/staying asleep) owing to moods or tension, difficulty sleeping owing to pain or itching, inability to return to sleep after waking at night, waking early or feeling tired and sleeping more than two hours during the day. This scale has been shown to have construct validity.<sup>14</sup> Sleep disorder has been shown to have predictive validity, in that

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individuals with sleep disorder were significantly more likely to manifest the disorder one year later than were persons not so classified.<sup>15</sup>

In addition to the homogeneous scales, there are two diagnostic scales to detect probable cases of dementia and depression. The scales are designed to be operational diagnoses which refer to syndromes of cognitive impairment or depressed mood which are severe enough for clinical intervention.<sup>16</sup>

In the present survey, additional questions were asked about use of health and social services. The detailed methodology is reported elsewhere.<sup>17</sup> Data were analysed using *SPSS.PC*. Chi square tests were used for univariate comparisons, and the relationships within variables were further explored using logistic regress analysis and causal path analysis.

## Results

In 1987–88, 705 people (87.2%) aged 65 years and over living in their own homes were interviewed (referred to as the 1988 interview). In 1990, 524 of the 705 (74.3%) were re-interviewed: of those not re-interviewed 90 had died, 11 had been admitted to residential homes and 80 had moved or refused a second interview. In the 1988 survey, 447 women and 258 men were interviewed and in the 1990 survey 346 women and 178 men were re-interviewed. In the 1988 survey 192 people were in the 65–69 years age group (27.2%), 355 were aged 70–79 years (50.4%) and 158 were aged 80 years or older (22.4%). In the 1990 survey 150 people were in the 65–69 years age group (28.6%), 275 were aged 70–79 years (52.5%) and 99 were aged 80 years or older (18.9%).

In 1988, 235 people (33.3%) reported sleep disturbance while in 1990 the figure was 226 (43.1%). A total of 336 individuals reported sleep disturbance in either or both surveys. In 1988, the mean age of those reporting sleep disturbance was 74.7 years, and of those not reporting any disturbance 74.6 years. In 1990, the mean ages of the two groups were 76.1 years and 76.0 years, respectively. These differences were non-significant. Factors significantly associated with sleep disturbance are shown in Table 1.

Of those who were interviewed twice, 121 reported sleep disturbance both in 1988 and in 1990 (51.4% of those originally reporting sleep disturbance) (Table 2). Women, those currently unmarried or living alone, those who were depressed, and those taking psychotropic medication were significantly more likely to have disturbed sleep. Sleep disturbance was also significantly associated with limitation in activities of daily living and with receipt of any non-general practitioner service. Any contact with the general practitioner was not significantly associated with

**Table 1.** Sex, marital status and social circumstances, and reported depression and activity limitation of those reporting and not reporting sleep disturbance in 1988 and 1990.

	% of people with characteristic			
	1988		1990	
	Sleep disturbance (n = 235)	No sleep disturbance (n = 470)	Sleep disturbance (n = 226)	No sleep disturbance (n = 298)
Women	74.0	58.1 ***	73.0	60.4 **
Not married	69.8	53.6 ***	67.7	54.7 **
Living alone	57.8	44.0 ***	57.1	42.0 **
Depressed	35.7	8.1 ***	30.1	4.4 ***
Limited in ADL	51.1	24.3 ***	46.0	24.2 ***

n = number of people in group. ADL = activities of daily living.  $\chi^2$  test: \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

**Table 2.** Factors associated with reporting sleep disturbance in 1988, 1990, or in both years.

Characteristic	% of people with characteristic			
	Sleep disturbance reported in			Sleep disturbance never reported (n = 248)
	1988 and 1990 (n = 121)	1988 only (n = 50)	1990 only (n = 105)	
Women	79.3	76.0	65.7	57.3 ***
Not married	74.4	70.0	61.9	52.0 ***
Living alone	59.5	56.0	52.4	38.7 ***
Depressed in 1990	38.0	12.0	21.0	2.8 ***
Taking psychotropic medication	47.1	26.0	17.1	4.4 ***
Limited in ADL	54.6	30.0	36.2	23.0 ***
Receiving any non-GP service	54.6	40.0	41.9	31.5 ***

n = number of people in group. ADL = activities of daily living.  $\chi^2$  test: \*\*\* $P < 0.001$ .

sleep disturbance. Prevalence did not increase with age. Of those interviewed in both surveys, the mean age of the 50 reporting sleep disturbance in 1988 only was 76.3 years, and the mean age of the 105 people reporting sleep disturbance in 1990 only was 76.1 years (mean age of those never reporting sleep disturbance was 76.0 years).

Of the total population in 1988 and 1990 respectively, 24.7% and 26.9% were classified as having subjective memory impairment, 25.1% and 29.0% as having somatic symptoms, 33.2% and 33.6% as being limited in activities of daily living, 4.4% and 6.1% as having dementia and 17.3% and 15.5% as being depressed.

Associations between either sleep disturbance or depression, and prescription of either benzodiazepines or antidepressants were examined using a log-linear model (Table 3). In both 1988 and 1990 the description of sleep disturbance explained benzodiazepine prescriptions. Depression status did not add to the prediction of use of benzodiazepines. Antidepressant prescription was predicted by the diagnosis of depression in 1988, but in contrast, in 1990 antidepressant prescription was predicted by sleep disturbance. However the numbers of people prescribed antidepressants were small in both surveys.

Sleep disturbance was not associated with a diagnosis of dementia in either survey.

As reported earlier, of all respondents with a sleep disorder, 35.7% in 1988, and 30.1% in 1990 were depressed; sleep disorder was significantly associated with current depression in both surveys. Sleep disturbance remained a significant predictor of current depression in a logistic regression analysis incorporating demographic and services variables (sex, mental states, social circumstances and use of health and social services). Those who reported sleep disturbance on both occasions were significantly more likely to be depressed in 1990 than those who did not report sleep disturbance on either occasion or who reported sleep disturbance on only one occasion.

Sleep disorder in 1988 predicted depression in the 1990 survey ( $\chi^2 = 43.42$ , 1 degree of freedom,  $P < 0.001$ ; odds ratio = 3.22, 95% confidence interval 1.53 to 6.78). Depression in 1988 predicted future depression (odds ratio 10.66). Caseness on the depression homogeneous scale but not on the depression diagnostic scale in the 1988 survey was not, following logistic regression, a significant predictor of depression in 1990. Further

**Table 3.** Use of benzodiazepines and antidepressant medication, and sleep disturbance and depression.

Medication	No. of people taking medication who are			
	Depressed		Not depressed	
	Have sleep disturbance	Have no sleep disturbance	Have sleep disturbance	Have no sleep disturbance
<b>1988</b>				
Benzodiazepines				
Yes	27	4	44	11
No	57	34	107	421
Antidepressants				
Yes	11	4	9	7
No	73	34	142	425
<b>1990</b>				
Benzodiazepines				
Yes	14	1	35	7
No	54	12	123	278
Antidepressants				
Yes	5	0	9	5
No	63	13	149	280

analysis employed causal path analysis based on the square root transformed scale scores for the sleep disturbance and the depression scales on both occasions. The most parsimonious models showed causal pathways from sleep disturbance to depression, but not from depression to sleep disturbance. This finding was true whether the results were looked at cross-sectionally or prospectively.

In logistic regression analysis the significant predictors of depression in the second survey were first, depression, and then sleep disturbance in the first survey. In their presence other possible predictors of depression (being a woman, having a disability, being unmarried, living alone and being older) did not contribute further.

## Discussion

This is the first report of a community survey of the relationship between sleep disorder and psychopathology among elderly people. There were a number of important and interesting findings: subjective sleep disturbance in elderly people was found to be common; it was associated with being a woman, with current depression, future depression, disability, being unmarried and living alone but not with dementia or older age. Approximately half of those reporting sleep disturbance at the initial survey were still suffering sleep disturbance two years later. The best predictors of future depression were current depression and sleep disturbance; for those who were not depressed, the best predictor of future depression was sleep disturbance. In this population the causal path was from sleep disturbance to depression. Benzodiazepines were prescribed for insomnia and therefore were received by many people who had sleep disturbance and who were depressed.

The study was of a total community sample of elderly people. Although the numbers were not large, enough people were interviewed to be statistically meaningful. It contained slightly more of the very old but is of similar sex distribution to England and Wales as a whole.<sup>18</sup> As increasing age did not appear to be significantly associated with subjective sleep problems in this survey, this non-representativeness should not alter the findings.

Psychiatric diagnoses were made according to a standardized algorithm, which has been shown to be valid and reliable.<sup>12-14</sup> As

insomnia is a symptom of depression, the diagnosis of depression would be expected to be associated with current sleep disorder, but insomnia might not be expected to predict future depression in the absence of current depression. Were those people with new depression and previous sleep disorder sub-threshold cases of depression, that is, early cases, in the first survey? In order to examine this possibility the depression homogeneous scale can be used to distinguish people who, although not cases on the diagnostic scale, represent sub-cases as they cross the threshold on the depression homogeneous scale. However, when this putative risk factor was added to the logistic regression equation it did not emerge as a significant predictor of future depression in the non-depressed population. Therefore the finding that sleep disorder predicted depression appears not to be a result of sleep disorder being an independent predictor of future depression.

Of the original sample, 26% were lost to follow up. As this group included proportionately more men, who as a group complained less of sleep disturbance, this alone may explain the increased prevalence in the second survey. It is possible that those who refused follow up were also less likely to be depressed and to have disturbed sleep. This is possible given previous results from Gospel Oak, showing that those who were depressed were more likely to respond to the invitation for interview than those who were not depressed.<sup>17</sup>

One finding of this survey is the lack of relationship between dementia and sleep disturbance. However, it is a new finding that sleep disturbance was the best predictor of new depression in elderly people and that sleep disturbance seemed to lead to depression. In its presence, the traditional predictors of depression: being a woman, having a disability, being unmarried, living alone and being older did not contribute further. This requires replication, but implies that general practitioners screening elderly people, especially in inner city areas, should perhaps note subjective sleep disturbance as an indication for careful monitoring for future depression. This study has shown that sleep disorder is associated with pathology. Doctors' belief that sleep disturbance is 'trivial and fleeting'<sup>19</sup> is belied by the finding that half of those with disturbed sleep were still suffering disturbed sleep two years later. Insomnia in elderly people requires assessment, and this must be accompanied by the treatment of underlying disorders and monitoring of future health.

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