

Medical student education in sleep and its disorders

ABSTRACT – *Objective:* To investigate the pattern of medical student teaching about sleep and its disorders in the UK.

■ *Design:* A questionnaire was sent to organisers of preclinical and clinical courses in which aspects of sleep and its disorders might appropriately be included.

■ *Setting:* All UK medical schools.

■ *Results:* There was an overall 71% response rate, with all medical schools represented. A wide variation (80-6%) was seen between departments in the provision of such teaching. The median total time given to sleep and its disorders in undergraduate teaching as a whole was five minutes, for preclinical teaching 15 minutes, and zero in clinical teaching. Teaching was particularly limited on the various types of sleep disorder common in clinical practice, and also on non-medication treatments. Little consistency was evident in teaching format, recommended reading, use of other instructional material and student assessment. Awareness of local sleep research or clinics was reported by very few.

■ *Conclusions:* As in other countries, undergraduate medical teaching is inadequate as a basis for the development of competence in diagnosing and treating sleep disorders, which are common and cause difficulties in all sections of the population. There is a need to correct this deficiency in ways compatible with recent recommended changes in medical education.

In recent years, the US government and professional organisations have had their attention drawn to the frequent occurrence of sleep disorders and to the ways in which such disorders often cause personal distress, with serious social and occupational damage to individuals and considerable economic consequences to the nation^{1,2}. The comprehensive review by Partinen³ shows the same high rates for the many types of sleep disorder in different countries. Epidemiological studies of sleep disorders in the UK are limited, but there is no reason to expect their pattern to differ from that in the US, other parts of Europe or elsewhere. Sleep disorders in the general population include:

- current, frequent complaints of insomnia: 30% (one-third chronic)⁴
- excessive sleepiness: about 5%⁵
- obstructive sleep apnoea with symptoms: at least 2% of middle-aged adults⁶
- frequent settling or night waking problems in toddlers: 20–25%⁷.

In addition, significant sleep disturbance complicates many physical and psychiatric disorders at all ages, and

sleeping pills remain one of the most commonly prescribed treatments in medicine. Despite these high rates of seriously disturbed sleep and its consequences, surveys show that this topic receives little or no attention in undergraduate medical education.

In 1993, a national survey of US medical schools, sponsored by the National Commission on Sleep Disorders Research⁸, concluded that there was little evidence of improvement since an earlier American Sleep Disorders Association survey in 1978⁹. This deficiency has not been corrected by later postgraduate training (eg in family practice, psychiatry, neurology or paediatrics), for which there is also evidence of serious inadequacies^{10,11}. Some years ago the European Sleep Research Society sent a questionnaire about education and sleep disorders to each of its national members and several European universities. A summary of the findings, and the results of a workshop on the same topic, were published in 1990¹². The conclusions echoed those of the American surveys: that is, minimal or no teaching at all levels of medical education, with little or no coordination of the various preclinical and clinical courses in which sleep might be mentioned.

As part of a programme to raise awareness of the need for improvements in medical education in the UK, the British Sleep Society (BSS) commissioned the present survey. It was designed to provide systematic information about pre-clinical and clinical undergraduate teaching concerning sleep and its disorders on which to base recommendations to medical schools on how the undergraduate courses might be modified to meet the needs of modern clinical practice.

Method

Study design and procedure

A questionnaire, similar to that developed for the 1993 US study⁸, was sent to all UK medical schools. It covered pre-clinical and clinical teaching, and asked about the time allocated to basic sleep processes and different sleep disorders, including specific topics. Enquiries were also made about teaching emphasis and format, recommended reading, other instructional materials used and forms of student assessment. Informants were asked if they considered that there was enough time in their courses (and, if not, why not), and what additional teaching resources they would value. Finally, course organisers were asked to describe briefly any research in their department connected with sleep or its disorders, and any clinical sleep disorders services in their area.

The questionnaire was sent to the organisers of all courses in which it was considered that aspects of sleep and its disorders might be appropriately included, namely,

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behavioural science, general medicine, general practice, geriatric medicine, neurology, neuroscience, paediatrics, pharmacology, physiology, psychiatry and respiratory medicine. Initially, the dean's office of each medical school was asked to identify the course organisers. If no reply was received for a particular course, a second enquiry was sent to the head of department with a request to forward it to the person concerned. Where the preclinical/clinical course distinction did not apply, the questionnaire was sent to the nearest approximation to a traditional course organiser. Course organisers usually knew what other courses might include teaching about sleep, and were helpful in directing enquiries to them.

Between November 1994 and February 1995, 260 questionnaires were despatched. A second mailing was conducted in April 1995, and a third in July 1995. Replies were received up to May 1996.

Results

Response rate and sample characteristics

Nine of the 260 questionnaires were returned as undeliverable because no separate course of the type in question was provided by those particular medical schools. Thus, the 179 replies eventually received represented an adjusted response rate of 71%. All medical schools were represented in the results.

The response rates for individual courses as a percentage of the number of departments of each type contacted are shown in Table 1.

Teaching content

For each type of course for which replies were received, the percentage in which any teaching about sleep and its disorders was provided is given in Table 1. From the replies received, it appeared that only one medical school provided

Table 1. The response rates for individual courses.

Course	% of departments of each type	% of departments with any teaching about sleep and its disorders
Behavioural science	57	67
General medicine	58	33
General practice	76	6
Geriatric medicine	52	42
Neurology	65	29
Neuroscience	53	80
Paediatrics	77	60
Pharmacology	69	78
Physiology	87	80
Psychiatry	88	78
Respiratory medicine	70	50

Table 2. Time allocated to teaching about sleep or its disorders in preclinical and clinical courses.

Course	Range (hours)	Semi-interquartile range (min)	Median (min)	Replies	
				No.	%
Preclinical					
Behavioural science	0-2	29.4	30	12	57
Neuroscience	0-2	59	5	10	53
Physiology	0-4	27.5	22.5	20	87
Clinical					
General medicine	0-6	30	0	15	58
General practice	0-5	0	0	16	76
Geriatric medicine	0-2	5.6	0	12	52
Neurology	0-2	30	0	17	65
Paediatrics	0-2	7.5	5	20	77
Pharmacology	0-2	30	30	18	69
Psychiatry	0-8	29.4	5	23	88
Respiratory medicine	0-2	26.3	2.5	16	70

no teaching about sleep and its disorders in any of its preclinical and clinical courses.

The total time given to such teaching in the overall undergraduate courses varied from 0-8 hours. The distribution of time allocation was markedly positively skewed, with a median of five minutes and a semi-interquartile (S-I) range of 30 minutes. Table 2 shows the time allocated to teaching about sleep and its disorders in individual courses, both preclinical and clinical.

The median time allocation in preclinical teaching was 15 minutes (S-I range, 28 min) and in clinical teaching, zero (S-I range, 30 min). The median number of minutes per individual course is shown in Table 2. Taking into account only those courses that taught about sleep, the median number of minutes in preclinical teaching was 30 minutes (S-I range, 43 min), while that for clinical teaching was 60 minutes (S-I range, 23 min).

Statistical analysis of the time devoted to individual topics under the headings 'basic sleep processes' and 'sleep disorders' was frustrated by omissions or imprecise statements (especially 'some') in response to the request for information on time devoted to these topics. Table 3 indicates the frequency with which any teaching was reported for each topic.

Teaching characteristics (preclinical and clinical courses combined)

The response rate was less than 50% for the following sections of the questionnaire:

- The overall orientation of the material presented on sleep, whatever the course, was said to be mainly clinical (61% of those who replied) rather than biological or behavioural.

Table 3. The frequency with which any teaching was reported on specific topics in preclinical or clinical courses.

Teaching topic	% of no. of replies
Basic sleep processes	
Sleep physiology & basic mechanisms	24
Sleep description & measurement	17
Neuroanatomical substrates	13
Chronobiology of sleep & wakefulness (biological clocks, sleep-wake rhythms)	14
Pharmacology of sleep & wakefulness	21
Functions of sleep	13
Determinants of daytime sleepiness	7
Phylogenetic aspects	4
Developmental aspects	7
Sleep & ageing	14
Sleep & dreaming	17
Sleep disorders	
Epidemiology &/or consequences of sleep disorders	11
Insomnias	15
Excessive sleepiness	9
Parasomnias (episodic disturbances at night, eg sleepwalking, nightmares)	8
Sleep-related breathing disorders	16
Sleep-wake cycle disorders	7
Sleep problems in medical illness	4
Sleep in psychiatric disorders	12
Paediatric sleep disorders	12
Sleep disorders in old age	6
Investigation (eg sleep recordings)	12
Drug treatment	17
Other treatments (eg behavioural)	9

- In 90% of replies the main format used for teaching about sleep and its disorders was lectures to large groups (over 50 students) rather than seminars, small group lectures, tutorials or self teaching. Different formats were often combined.
- Recommended reading was rarely specified, merely mentioning standard textbooks, chapters and books of various levels and orientation.
- The specified instructional materials were mainly slides and videos.
- Student assessment took the form of multiple choice questions (71% of courses for which a response was obtained), essays or short questions in an examination (49%), and essays or short questions as part of course work assessment (17%).

Of the 49% of course organisers who answered the question 'Do you feel that sufficient time is allocated for teaching in the area of sleep and sleep disorders?', 55% said 'no', the rest said 'yes'. Dissatisfaction with the time available in each course, expressed as a percentage of course

Table 4. Dissatisfaction by course organisers with the time available in each course for teaching about sleep disorders.

Course	% of course organisers dissatisfied
Behavioural science	71
General medicine	60
General practice	66
Geriatric medicine	60
Neurology	83
Neuroscience	50
Paediatrics	42
Pharmacology	31
Physiology	25
Psychiatry	82
Respiratory medicine	67

organisers who responded to this item, varied as shown in Table 4. Their reasons why more time was not allocated were: lack of available time in an already crowded curriculum (29%), sleep not considered a core subject (8%), and insufficient teaching expertise (6%).

One-third of those who responded said they would welcome additional resources or reading materials to improve or complement their current teaching about sleep and its disorders. Their specific requests were for:

- videos or films: 77% of requests
- recommended reading: 58%
- slides: 52%
- computer teaching packages: 52%
- visiting speakers: 16%
- attachments or links with sleep practice or research elsewhere: 15%.

Local research activities or sleep disorders services

Only 17% of respondents reported research in their department concerning sleep or its disorders. This cannot be taken as a measure of current sleep research in medical schools as the figure included both past and present activities. Only 11% were aware of sleep disorders services within their area.

Discussion

This survey is the first attempt to compile a systematic picture of the extent of planned teaching about sleep and its disorders at undergraduate level in UK medical schools – and possibly also the first review of its type in Europe. Detailed comparisons were not possible because of differences in presentation of the results. However, the present findings are generally in agreement with the earlier US surveys. The 1993 US survey found that, on average, less than two hours of total teaching time was allocated to

sleep and its disorders, and 37 of the 126 accredited schools reported *no* structured teaching time. Fewer than 5% of medical schools offered four or more hours of didactic teaching on sleep, mainly in fourth year elective periods⁸. Information in the European survey¹² was not collected in such a systematic way as in either the US study or the present study, and was inevitably incomplete. The findings were expressed in general terms and varied widely, depending mainly, it seems, on the presence of an enthusiastic teacher. The overall conclusion from all these surveys is that in all the countries studied, in spite of increasing awareness that sleep problems are common and a significant source of personal, social, health and economic concern, sleep and its disorders are poorly represented in undergraduate medical education.

The overall response rate of 71% achieved in the present study can be considered reasonable compared with the 82.6% rate in the 1993 US survey, in view of the generally greater awareness of sleep disorders medicine in North America. The attitudes and activities of the persistent non-responders remain uncertain. If it can be assumed that they generally had little or nothing to report about their teaching activities on this topic, the overall picture concerning the amount of teaching is even *less* satisfactory than that based on information provided by those who did reply.

The findings indicate where emphasis in the various courses should be placed to promote greater awareness of this aspect of medical science and clinical practice. Overall, the teaching about sleep and its disorders is most unsatisfactory in the clinical years, in which fewer than half the courses provide sleep teaching, with an overall median time of zero minutes, compared to 76% of the preclinical courses offering an overall median time of 15 minutes. The most serious deficiencies are in general medicine, general practice, geriatric medicine, neurology and paediatrics. However, the total time devoted to sleep and its disorders in the entire undergraduate course amounts to an estimated median of only five minutes.

Apart from the need for a general increase in awareness about basic sleep processes and the different sleep disorders and their treatment, there appears to be a particular need to give medical students a better knowledge of excessive sleepiness and the parasomnias, sleep-wake cycle disorders, sleep disorders in old age and those associated with medical illness, and non-drug treatments. All these topics are relevant to large sections of the population, so it is unfortunate that some course organisers in general medicine, general practice, geriatric medicine and paediatrics did not consider insufficient the small amount of time, if any, devoted to sleep or its disorders.

The main format was reported to be lectures. This pattern is changing, with increasing emphasis on small group, problem-orientated, self-directed learning wherever possible¹³, which would be particularly appropriate for an integrated preclinical/clinical account of sleep and its disorders. Recommended reading was inconsistent and limited (or unknown by the informants, judging by the low

response rate to this enquiry). This also seemed to be true of the other instructional material used. Similarly, types of student assessment varied, but these will change in the UK as teaching methods are revised in line with General Medical Council (GMC) recommendations¹³.

Although the picture achieved by this survey is incomplete, it seems clear that, as in the US and elsewhere in Europe, teaching about sleep and its disorders for UK medical students falls well short of that likely to provide a basis for their later acquisition of adequate knowledge and skills in sleep disorders medicine. The overall picture is one of inconsistency, fragmentation and (to a large extent) neglect, especially of clinical aspects of sleep. This is in spite of the wealth of evidence that in all types of clinical practice (in some much more than others) many patients will be encountered who have serious sleep problems requiring informed attention. It is noteworthy that, despite pressure of time in the undergraduate course, some medical schools have achieved a much more appropriate coverage of sleep and its disorders than most have done.

Major allocation of time for any one topic is neither possible nor desirable in the modern undergraduate courses. However, the inclusion of at least a brief, balanced and integrated course on sleep and its disorders seems justified as part of the core curriculum in all undergraduate medical teaching, and would be a good example of general themes in medical education as recommended by the GMC. For those in whom this stimulates a particular interest, a special study module should be available.

General themes of a curriculum on sleep for medical students

Outlined below are possible general themes for a curriculum for medical students:

- 1 The personal, social, educational, occupational and economic impact of sleep disorders
- 2 The integration of basic medical science and clinical issues exemplified by the field of sleep disorders medicine
- 3 The interspecialty and interdisciplinary nature of accurate diagnosis and effective management
- 4 Developmental aspects of the nature, presentation, management and prognosis of sleep disorders from infancy to old age.

The areas in which elementary knowledge would be required include:

- 1 Sleep physiology, including basic mechanisms and circadian rhythms
- 2 Clinical and laboratory assessment of sleep and its disorders
- 3 Insomnias, and sleeplessness in children
- 4 Excessive sleepiness
- 5 Parasomnias
- 6 Circadian rhythm disorders
- 7 Behavioural and other treatments.

Many of these topics lend themselves well to innovative and engaging forms of teaching, such as problem-based cases or clinical vignettes presented for live discussion or by means of videotape or computer. With evaluation of such methods, progress might well be made in correcting the unsatisfactory situation concerning education about sleep and its disorders revealed by the present survey.

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