

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/15966073>

Ellis B W, Johns M W, Lancaster R et al The St. Mary's Hospital Sleep Questionnaire: A study of reliability. *Sleep* 4: 93-97

Article in *Sleep* · February 1981

Source: PubMed

CITATIONS

158

READS

1,265

6 authors, including:



Murray Johns

Optalert Ltd

81 PUBLICATIONS 11,897 CITATIONS

SEE PROFILE



Nikiforos V Angelopoulos

University of Thessaly

170 PUBLICATIONS 980 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Identification with the aggressor defence mechanism [View project](#)

Short Report

The St. Mary's Hospital Sleep Questionnaire: A Study of Reliability

Brian W. Ellis, Murray W. Johns, Richard Lancaster,
Polikarpos Raptopoulos, Nikiforos Angelopoulos, Robert G. Priest

St. Mary's Hospital, London, England

Summary: A systematic sleep questionnaire has been devised for assessing the previous night's sleep of a subject. It has been designed for repeated use. It is completed by the subject and is framed with the needs of the hospital patient in mind. In the present study it was given to 93 subjects in four different groups: 16 surgical inpatients, 21 medical inpatients, 32 psychiatric inpatients (in a general hospital unit), and 24 normal volunteers. Test retest reliability correlations have been derived using a nonparametric correlation coefficient (Kendall's tau). Each of the items achieved statistically significant reliability ($p < 0.0001$) in all four groups, with the value for tau on the total sample varying from 0.70 to 0.96. The St. Mary's (or SMH) Sleep Questionnaire is put forward as an instrument that is a systematic inquiry into the subject's experience of sleep and that is composed of items of demonstrable reliability. **Key Words:** Sleep questionnaire—Reliability.

There are several ways that sleep can be investigated, including continuous electroencephalogram (EEG) and electromyogram recordings, visual observation, interviews, questionnaires, sleep logs, and diaries (Johns, 1971, 1975). All of them have inherent advantages and disadvantages. For example, EEG recordings are invaluable in assessing the effects of drugs on the phases of sleep (Oswald and Priest, 1965; Priest, 1978) and in avoiding the deliberate or unconscious distortion that can occur with subjective reports. However, EEGs are expensive to perform and do not lend themselves to large surveys.

In at least some populations, subjective reports correlate significantly with objective assessments (Lewis, 1969; Johns, 1977; Johns and Dore, 1978) and the estimates change in the same direction as the objective measures. The methods

Accepted for publication August 1980.

Dr. Johns' present address is Victoria, Australia.

Dr. Angelopoulos' present address is Athens, Greece.

Address correspondence and reprint requests to Dr. Priest at Academic Department of Psychiatry, St. Mary's Hospital Medical School, Harrow Road, London W9 3RL, England.

used in eliciting these subjective reports need to be standardized so that results reported by different workers can be compared and contrasted.

In view of the success of an earlier sleep questionnaire in psychiatric inpatients (Priest and Rizvi, 1976), the present version was formulated for the various patient groups to be found in a general hospital.

METHOD

A total of 93 subjects completed the St. Mary's Hospital (SMH) Sleep Questionnaire twice on the same day, answering questions about their previous night's sleep. The first occasion was soon (1–2 hr) after waking in the morning, and these questionnaires were collected as soon as they were completed. Blank identical questionnaires were presented again, without warning, approximately 4 hr later the same morning. Comparisons were made between the two sets of answers as a measure of the reliability of particular questions.

The subjects were in four groups: (a) 32 psychiatric patients, (b) 16 surgical patients, (c) 21 medical patients, and (d) 24 normal volunteers. The sample of patients was made up of all those inpatients on certain wards of St. Mary's Hospital who were able to cooperate for the duration of the study. The wards included the medical and surgical beds under the clinical care of two of the authors (BWE and RL) and all the psychiatric beds.

For much of the data, the nonparametric rank-order correlation coefficient, Kendall's tau (Kendall, 1962; Siegel, 1956) was used. The case for using this with psychometric survey data has been argued before (Priest, 1971, 1976). Tau (*b*) was calculated for paired data using the Statistical Package for the Social Sciences (SPSS) (Nie et al., 1975). The χ^2 (corrected for continuity) or exact-probability tests were used for data in nominal form (Siegel, 1956).

TABLE 1. *Sleep questionnaire: descriptive data*

Questionnaire item	<i>n</i>	Range of answers	Mean \pm SE
Age	94	15–80 yr	43 \pm 1.8 yr
Q1	92	20.00–01.25 hr	2281 \pm 0.11 hr
Q2	90	21.00–07.75 hr	2383 \pm 0.15 hr
Q3	91	01.50–09.50 hr	0644 \pm 0.14 hr
Q4	87	04.43–10.00 hr	0723 \pm 0.13 hr
Q5	94	1–8	4.35 \pm 0.18
Q6	93	0–7	1.89 \pm 0.19
Q7	93	0.05–10 hr	6.67 \pm 0.18 hr
Q8	92	0–6.75 hr	0.62 \pm 0.12 hr
Q9	93	1–6	4.22 \pm 0.12
Q10	94	1–6	3.47 \pm 0.12
Q11	94	1–5	3.69 \pm 0.11
Q12	92	1–2	1.22 \pm 0.04
Q13	94	1–4	1.57 \pm 0.08
Q14	87	0–4 hr	0.71 \pm 0.09 hr

Note: Sex ratio (F/M), 25/69. Figures after decimal points represent fractions of hours (not minutes).

TABLE 2. Test retest correlations

Question no.	Psychiatric inpatients (n = 32)	Volunteers (n = 24)	Medical inpatients (n = 21)	Surgical inpatients (n = 16)	Total (n = 93)
1	0.80	1.00	0.97	0.88	0.96
2	0.78	1.00	0.95	0.56	0.91
3	0.97	0.89	0.96	0.65	0.90
4	0.98	0.97	0.94	0.76	0.96
5	0.84	0.94	0.66	0.97	0.87
6	0.83	1.00	0.65	0.90	0.88
7	0.84	0.97	0.85	0.94	0.89
8	0.70	1.00	0.85	0.69	0.80
9	0.82	0.67	0.50	0.51 ^a	0.70
10	0.86	0.94	0.63	0.81	0.85
11	0.63	0.80	0.46	0.79	0.71
12	0.74	1.00	0.21 ^b	0.83	0.72
13	0.83	1.00	0.82	0.80	0.72
14	0.98	1.00	0.72	0.91	0.93

^a $p < 0.002$.

^b $p = 0.11$.

Kendall's tau (b), where unity is represented as 1.00. All probability values are $p < 0.001$ except as indicated.

RESULTS

The questionnaire proved to be acceptable to the patients and was completed satisfactorily despite varying degrees of physical impairment and psychological disturbance (Ellis and Dudley, 1969; Dudley, 1969). The results are presented in Table 1.

The scores obtained on initial testing were correlated with those obtained in the second administration in Table 2. All correlations on the total sample were statistically highly significant ($p < 0.0001$). The lowest correlations were found in responses to the very subjective questions 9 and 11 and the highest with the more discrete questions 1 and 4.

DISCUSSION

It was anticipated that the psychiatric patients would prove to be the least reliable. This was not always the case. The normal volunteers were usually the most reliable of the groups (and never the least reliable). The least reliable group was the surgical for five questions, the medical for seven, and the psychiatric for two. For three questions, the psychiatric group was the most reliable.

In the total sample the reliability of the items (as judged by Kendall's tau) varied from 0.70 to 0.96. Broken down by groups, the correlation coefficients showed a much wider range, but these figures should be regarded with considerable reserve at this level in view of the smaller numbers resulting from this procedure.

The SMH Sleep Questionnaire has already been used successfully to detect changes in the sleep pattern of 100 surgical patients during their stay in hospital (Murphy et al., 1977). Further work should include factor analysis of data from various populations.

APPENDIX: THE SMH SLEEP QUESTIONNAIRE*

This questionnaire refers to your sleep over the past 24 hours. Please try and answer every question. *Official Use Only*

Name: _____

Project Code 2
 Patient Number 5
 Night Number 7
 13
 15
 16

Today's date: ____/____/____

Age: ____ Yrs.

Sex: Male / Female (delete whichever inapplicable) (M = 1 ; F = 2)

At what time did you:

1. Settle down for the night? ____ Hrs. ____ Mins.
2. Fall asleep last night? ____ Hrs. ____ Mins.
3. Finally wake this morning? ____ Hrs. ____ Mins.
4. Get up this morning? ____ Hrs. ____ Mins.

• 20
 • 24
 • 28
 • 32

5. Was your sleep: (tick box)

1. Very light
2. Light
3. Fairly light
4. Light average
5. Deep average
6. Fairly deep
7. Deep
8. Very deep

34

6. How many times did you wake up? (tick box)

0. Not at all
1. Once
2. Twice
3. Three times
4. Four times
5. Five times
6. Six times
7. More than six times

36

How much sleep did you have:

7. Last night? ____ Hrs. ____ Mins.
8. During the day, yesterday? ____ Hrs. ____ Mins.

• 40
 • 44

9. How well did you sleep last night? (tick box)

1. Very badly
2. Badly
3. Fairly badly
4. Fairly well
5. Well
6. Very well

46

If not well, what was the trouble? (e.g., restless, etc.)

1. _____
2. _____
3. _____

48
 50
 52

10. How clear-headed did you feel after getting up this morning? (tick box)

1. Still very drowsy indeed
2. Still moderately drowsy
3. Still slightly drowsy
4. Fairly clear-headed
5. Alert
6. Very alert

54

11. How satisfied were you with last night's sleep?

1. Very unsatisfied
2. Moderately unsatisfied
3. Slightly unsatisfied
4. Fairly satisfied
5. Completely satisfied

56

12. Were you troubled by waking early and being unable to get off to sleep again? (tick box)
1. No |_| 58
2. Yes
13. How much difficulty did you have in getting off to sleep last night? (tick box)
1. None or very little
2. Some |_| 60
3. A lot
4. Extreme difficulty
14. How long did it take you to fall asleep last night?
- _____Hrs. _____Mins. |_| • |_| 64

* Explanatory notes concerning the questionnaire are available from Professor Priest, Academic Department of Psychiatry, St. Mary's Hospital Medical School, Harrow Road, London W9 3RL, England.

REFERENCES

- Dudley HAF. Surgical convalescence. *J R Coll Surg Edinb* 13:1-11, 1969.
- Ellis BW and Dudley HAF. Some aspects of sleep research in surgical stress. *J Psychosom Res* 20:303-308, 1976.
- Johns MW. Methods for assessing human sleep. *Arch Intern Med* 127:484-492, 1971.
- Johns MW. Sleep and hypnotic drugs. *Drugs* 9:448-478, 1975.
- Johns MW. Validity of subjective reports of sleep latency in normal subjects. *Ergonomics* 20:683-690, 1977.
- Johns MW and Dore C. Sleep at home and in the sleep laboratory: Disturbance by recording procedures. *Ergonomics* 21:325-330, 1978.
- Kendall MG. *Rank Correlation Methods*. Griffin, London, 1962.
- Lewis SA. Subjective estimation of sleep: An EEG evaluation. *Br J Psychol* 60:203, 1969.
- Murphy F, Bentley S, Ellis BW, Dudley HAF. Sleep deprivation in patients undergoing operation: A factor in the stress of surgery. *Br Med J* 2:1521-1522, 1977.
- Nie NH, Hull CH, Jenkins JG, Steinbrunner K, and Bent DH. *SPSS: Statistical Package for the Social Sciences*. McGraw-Hill, London, 1975.
- Oswald I and Priest RG. Five weeks to escape the sleeping pill habit. *Br Med J* 2:1093, 1965.
- Priest RG. The Edinburgh homeless: A psychiatric study. *Am J Psychother* 25:194-213, 1971.
- Priest RG. The homeless person and the psychiatric services: An Edinburgh survey. *Br J Psychiatry* 128:128-136, 1976.
- Priest RG. Sleep and its disorders. In: Gajnd R and Hudson B (Eds), *Current Themes in Psychiatry*, Macmillan, London, 1978, Chap 8.
- Priest RG and Rizvi ZA. Nitrazepam and temazepam: A comparative trial of two hypnotics. *J. Int Med Res* 4:145-151, 1976.
- Siegel S. *Non-parametric Statistics for the Behavioural Sciences*. McGraw-Hill, London, 1956.