

Measuring Sleep Quality in The Elderly: A Comparison of Objective and Subjective Assessment of Sleep.

Pi-Hung Tung MD^{1, 2} ; Li-Pang Chuang, MD; PhD¹ ; Shih-Wei Lin, MD¹ ; Ning-Hung Chen, MD¹
 Department of Thoracic Medicine, Chang Gung Memorial Hospital, Taoyuan, Taiwan¹
 Department of Thoracic Medicine, Saint Paul's Hospital, Taoyuan, Taiwan²

INTRODUCTION

Sleep physiology changes with age, and sleep complaints are common in the elderly. Sleep disturbance in old age affect the quality of life of the elderly and are associated with poor cognitive and social performance. Polysomnography (PSG) is considered the gold standard in sleep assessment, but it is extensive and limited in real practice. The aim of the present study was to evaluate the role of actigraphy and the Pittsburgh Sleep Quality Index (PSQI) for sleep assessment in the elderly and to compare the measurement of sleep parameters by actigraphy and PSQI with PSG in practice.

METHOD

One hundred and-seven participants were recruited from the residents of Chang Gung Health and Culture Village. All participants underwent level II PSG, actigraphy measurements, and subjective assessment with PSQI. Sleep was assessed for 14 consecutive nights using actigraphy as an objective measure, and the PSQI for a subjective measure of quality. Measurements of sleep parameters (total sleep time, sleep efficiency, sleep latency) from PSG, actigraphy, and PSQI were recorded and results were compared between PSG, actigraphy and PSQI.

RESULT

Of these 107 subjects, 48 were men and 59 were women with a mean age of 73.9 ± 7.3 years. Patient characteristics are described in Table 1 and sleep parameter data (total sleep time, time in bed, sleep efficiency and sleep latency) obtained by PSG, actigraphy, and PSQI are shown in Table 2. The comparison of sleep parameters from PSG, actigraphy and PSQI is shown in Figure 1. We found that total sleep time and sleep efficiency were significantly overestimated in actigraphy compared to PSG (p-value: 0.01 and 0.001, respectively). Total sleep time and sleep latency appeared to be overestimated in the PSQI, but no significant difference found from the PSG (p-value: 0.09 and 0.7, respectively). Sleep efficiency was significantly overestimated in both actigraphy and PSQI (p-value: 0.001 and < 0.001 , respectively). Time in bed did not differ from actigraphy, but was significantly overestimated in PSQI (p-value : 0.03) compared to PSG.

TABLE 1

Table 1. Demographic data

Demographic	Mean± SD
Age, years	73.9±7.3
Female, %	59 (55%)
Height, cm	160.1±7.5
Weight, kg	61.2±10.9
BMI, kg/m ²	23.8±3.6
Waist circumference, cm	83.3±10
Neck circumference, cm	36.8±2.9
SBP, mmHg	138±17.2
DBP, mmHg	75±10.7
Pulse, bpm	72.7±10.9
Medical History	
Hypertension, n (%)	52 (48.6%)
Hyperlipidemia, n (%)	42 (39.3%)
Diabetes, n (%)	20 (18.7%)
Insomnia, n (%)	20 (18.7%)
Sleep apnea, n (%)	3 (2.8%)
BPH, n (%)	14 (13.1%)
Peptic ulcer, n (%)	9 (8.4%)
Anxiety, n (%)	5 (4.7%)
Glaucoma, n (%)	6 (5.6%)
Osteoporosis, n (%)	7 (6.5%)
Osteoarthritis, n (%)	9 (8.4%)

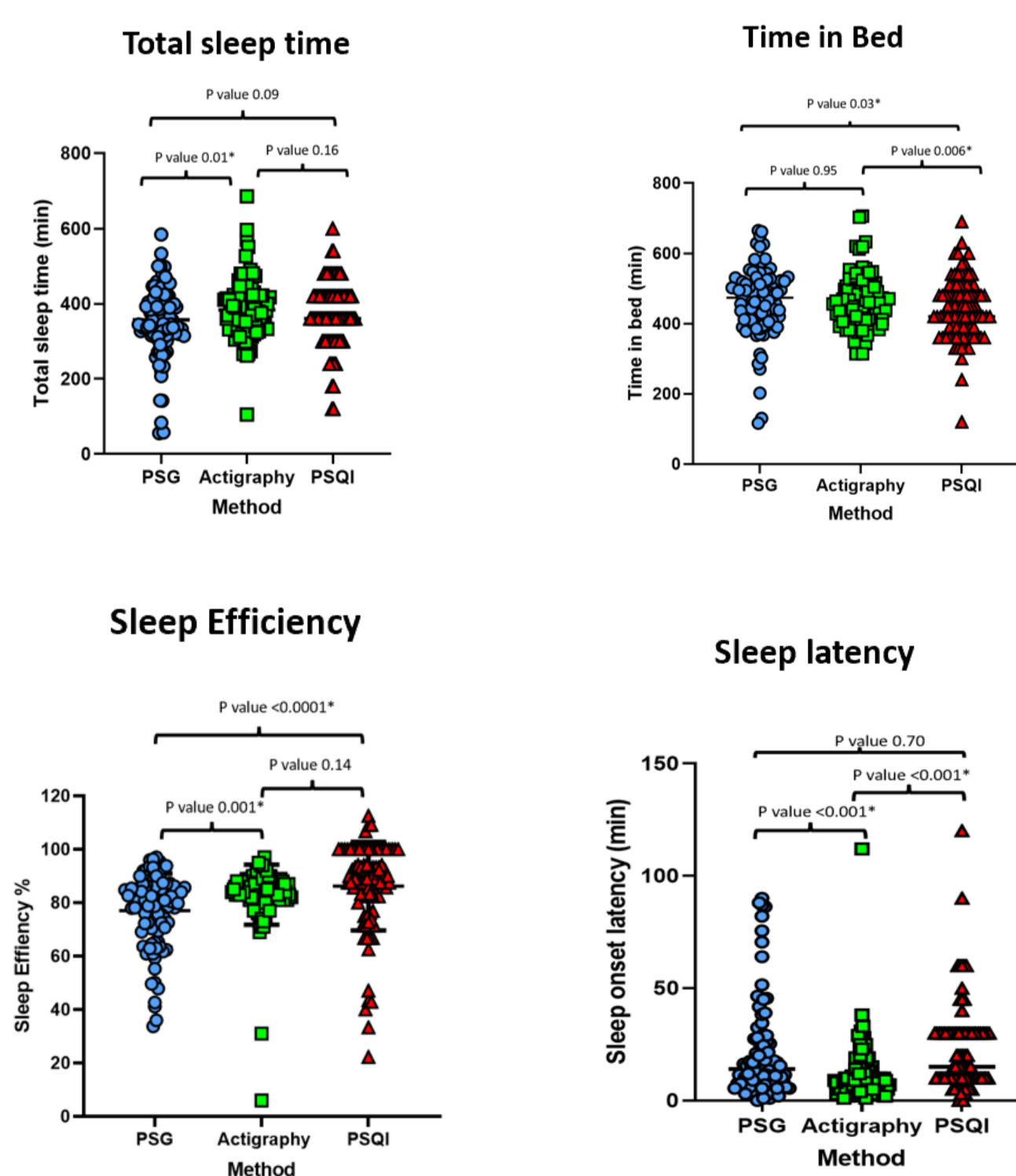
TABLE 2

Table 2. Measurement of sleep parameters from PSG, actigraphy and PSQI

Parameter (mean, SD)	PSG	Actigraphy	PSQI	P value
Time in bed, min	463.28±98.38	463.93±76.89	440.35±86.41	<0.005
Total sleep time, min	353.96±94.07	388.65±76.84	373.69±76.84	<0.005
Sleep latency, min	21.55±21.86	11.52±13.17	22.56±19.45	<0.005
Sleep efficiency, %	77.03±13.9	83.71±8.09	86.16±16.56	<0.005

FIGURE 1

Figure 1. Comparison of sleep parameters from PSG, actigraphy and PSQI



Conclusion

Actigraphy and the PSQI are valuable screening tools for sleep disorders in the elderly, but seem to overestimate sleep parameters compared with the PSG. Combining actigraphy and subjective assessment PSQI is one approach to increase the accuracy of estimates of total sleep time, sleep latency and sleep efficiency by actigraphy.

Contact information

董璧鴻, Pi-Hung Tung MD
 Department of Thoracic Medicine, Saint's Paul Hospital, Taoyuan, Taiwan
 Department of Thoracic Medicine, Chang Gung Memorial Hospital, Taoyuan, Taiwan
 Email: seintseint@cgmh.org.tw