

Supplementary Table 1. Demographic Characteristics of Study Population

(N = 98)

Characteristics	n (%)	M ± SD
Age (yr)		26.76 ± 2.79
Gender		
Woman	98 (100.0)	
Marital status		
Unmarried	91 (92.9)	
Married	7 (7.1)	
Parental status		
No children	93 (94.9)	
Have children	5 (5.1)	
Educational level		
Associate's degree	1 (1.0)	
Bachelor's degree	87 (88.8)	
Master's degree or higher	10 (10.2)	
Work experience (yr)		
< 1	6 (6.1)	
1~5	66 (67.3)	
5~10	23 (23.5)	
≥ 10	3 (3.1)	
Shift type		
Rotating shifts	37 (37.8)	
Fixed night shifts	61 (62.2)	
Number of assigned patients		
Medical/surgical		9.97 ± 3.02
Intensive care		2.33 ± 0.48
Emergency room		12.33 ± 3.06
Working unit		
Medical/surgical	68 (69.4)	
Intensive care	27 (27.5)	
Emergency room	3 (3.1)	
Nursing care model		
Functional method	3 (3.1)	
Team nursing	48 (48.9)	
Total patient care	38 (38.8)	
Mixed-type	9 (9.2)	
Hospital type		
Tertiary hospital	89 (90.8)	
General hospital	9 (9.2)	
Number of beds		
≥ 1,000	61 (62.2)	
500~1,000	37 (37.8)	
Teaching hospital status		
Yes	45 (45.9)	
No	53 (54.1)	

M = Mean; SD = Standard deviation.

Supplementary Table 2. Differences in Sleep Parameters between On-Duty and Off-Duty Days

(N = 515 days, 98 nurses)

	On duty (n = 234)	Off duty (n = 281)	<i>p</i> -value
	Mean [95% CI]		
Minutes in bed	420.49 [395.72, 445.26]	568.56 [545.57, 591.55]	< .001
Minutes asleep	336.85 [316.75, 356.94]	445.63 [427.05, 464.21]	< .001
Latency	21.94 [18.20, 25.67]	29.11 [25.62, 32.59]	.001
Efficiency	80.33 [78.70, 81.95]	78.72 [77.19, 80.25]	.070
WASO	36.84 [27.43, 46.26]	71.38 [62.52, 80.24]	< .001
Sleep quality	6.83 [6.39, 7.27]	6.07 [5.65, 6.49]	< .001

All *p*-values derived from the linear mixed mode.

WASO = Wake time after sleep onset; CI = Confidence interval.

Supplementary Table 3. Differences in Sleep Parameters according to the Days On Which the Study was Conducted (*N* = 515 days, 98 nurses)

	n	Mean [95% CI]	<i>p</i> -value	Bonferroni correction
Minutes in bed				
D0 ^a	93	636.79 [600.00, 672.59]	-	a > e, f > b, c, d
N1 ^b	95	427.58 [392.15, 463.01]	< .001	
N2 ^c	92	425.67 [389.68, 461.65]	< .001	
N3 ^d	47	395.25 [345.39, 445.11]	< .001	
D1 ^e	95	539.18 [503.76, 574.61]	< .001	
D2 ^f	93	530.54 [494.75, 566.34]	< .001	
Minutes asleep				
D0 ^a	93	497.35 [467.78, 526.92]	-	a > e, f > b, c, d
N1 ^b	95	340.65 [311.39, 369.92]	< .001	
N2 ^c	92	342.97 [313.24, 372.70]	< .001	
N3 ^d	47	316.70 [275.35, 358.04]	< .001	
D1 ^e	95	430.08 [400.81, 459.34]	.001	
D2 ^f	93	409.92 [380.35, 439.50]	< .001	
Latency				
D0	93	28.55 [23.16, 33.94]	-	
N1	95	21.91 [16.57, 27.25]	.066	
N2	92	22.16 [16.74, 27.59]	.080	
N3	47	21.52 [14.05, 29.01]	.118	
D1	95	29.80 [24.46, 35.14]	.729	
D2	93	28.95 [23.56, 34.35]	.912	
Efficiency				
D0	93	78.75 [76.49, 81.00]	-	
N1	95	79.53 [77.29, 81.76]	.594	
N2	92	80.87 [78.61, 83.14]	.147	
N3	47	80.92 [77.83, 84.01]	.231	
D1	95	79.35 [77.12, 81.59]	.677	
D2	93	78.04 [75.79, 80.30]	.628	
WASO				
D0 ^a	93	86.31 [73.28, 99.33]	-	a > b, c, d, e
N1 ^b	95	37.46 [24.56, 50.36]	< .001	f > b, c, d
N2 ^c	92	36.63 [23.54, 49.71]	< .001	
N3 ^d	47	35.94 [18.09, 53.78]	< .001	
D1 ^e	95	59.69 [46.80, 72.59]	.002	
D2 ^f	93	68.42 [55.40, 81.45]	.034	
Sleep quality				
D0 ^a	93	5.77 [5.21, 6.33]	-	a < b, c, d
N1 ^b	95	6.79 [6.23, 7.34]	.002	
N2 ^c	92	6.74 [6.18, 7.30]	.003	
N3 ^d	47	7.11 [6.38, 7.85]	.001	
D1 ^e	95	6.32 [5.76, 6.87]	.089	
D2 ^f	93	6.11 [5.55, 6.66]	.301	

The Bonferroni correction was used for the post hoc test.

p-values derived from the linear mixed model.

WASO = Wake time after sleep onset; D0 = The day before first night shift; D1 = The first off-duty day after consecutive night shifts; D2 = The second off-duty day after consecutive night shifts; N1 = The first night shift; N2 = The second night shift; N3 = The third night shift.