A study on nocturnal sleep associated with 24-hour ambulatory blood pressure in family caregivers providing home care

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A study on nocturnal sleep associated with 24-hour ambulatory blood pressure in family caregivers providing home care

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ABSTRACT

We investigated the sleep status during a 24-hour period of 68 family caregivers providing home care and nighttime care for disabled elderly, and analyzed the relationships of the sleep status with diurnal changes in blood pressure in the caregivers. The investigation revealed diurnal changes in blood pressure and heart rate, sleep status in a 24-period, and status of nighttime care of 68 caregivers. The sleep status as well as medications, gender, and age were indicated as a factor that affected blood pressure and heart rate. Effects of sleep status and age differed by gender. This study failed to clarify the effects of nighttime care on diurnal changes in blood pressure, probably because of the effects of confounding factors including gender and age. Further investigation after accumulating additional data is considered necessary.

KEY WORDS

Home care, Family caregiver, Ambulatory blood pressure, Sleep, Actigraph

Introduction

The number of elderly people receiving home-care is increasing due to the aging of the population in Japan. Correlating with this, there is also an increase in the number of elderly patients with chronic disorders. As a result, the burden of caregiving on family members has emerged as an important problem, and the health problems of caregivers have become serious especially when the caregivers themselves are elderly.

Many families complain of sleep problems such as lack of sleep due to worries about the condition of the care-receiver and need to awaken frequently for caregiving[1-3]. Under such conditions, caregivers are expected to develop a disturbance of the diurnal rhythm. However, data on the physical effects of sleep status are scarce. Interruption of night sleep for caregiving is expected to place a heavy burden physically on aged family caregivers. The sleep status of caregivers[4] and effects of nighttime caregiving on their sleep cycle[5] and cardiovascular system[6] have been reported, but the number of subjects was small, and the effects of daytime care were not eliminated.

Also, changes in blood pressure before and after work[7] and responses of blood pressure to stress[8] have been reported to differ depending on whether the subjects were caregivers, but there has not been a report of comparison according to whether the subjects provided nighttime care or not.

We previously conducted a pilot study to identify patterns of nocturnal sleep and nighttime care in order to examine the effect of sleep interruptions on mean

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blood pressure and heart rates in 19 family caregivers who were not taking antihypertensive drugs. Four patterns of sleep interruptions were identified : 3 subjects did not wake up during the nighttime, 3 subjects woke up to urinate, 6 subjects woke up voluntarily for caregiving, and the 7 subjects were awakened involuntarily by the care-receiver. Nighttime blood pressure and heart rate drops differed among these four patterns[9].

Therefore, we hypothesized that the autonomic nervous system responds differently according to the cause of interruption in night sleep, but the small sample size limited the generalization of the results because age and gender are confounded with blood pressure and heart rate. Moreover, we did not examine the effect of sleep interruptions on mean blood pressure and heart rates in family caregivers taking antihypertensive drugs.

This study examined the validity of this hypothesis by ruling out the effect of age and gender and clarifying factors that affect blood pressure and heart rate by increasing the number of subjects who were not taking or taking antihypertensive drugs.

Methods

1. Subjects

The subjects were 68 family caregivers for elderly people receiving home-care. Of the 68 caregivers, 43 caregivers were not taking antihypertensive drugs and 25 caregivers were taking antihypertensive drugs. Contact information for these subjects was obtained from 10 visiting nurse stations in Ishikawa Prefecture, and only those who consented to participate were enrolled in this study. The consent was confirmed in writing. In this study, patient's family caregivers were defined as members of the patients' families who were the primary caregiver.

2. Methods

We visited the subjects' homes twice : on the day of the beginning of investigation and on the day after the end of the investigation. In this investigation, 24-hour ambulatory blood pressure and heart rate were monitored, sleeping or waking periods were determined, activity was monitored, and interview concerning the contents of care was conducted. The investigation was carried out on a day selected by each subject on the day which the subject expected to have routine daytime schedule, night sleep, and provide care. The Subjects were asked not to take a bath during the investigation. Subjects on antihypertensive medications were evaluated under their routine medications.

The investigation was carried out between August, 2001 and January, 2003.

The individual results of the measurements were mailed to subjects later with their consent.

1) 24-hour ambulatory blood pressure and heart rate monitoring

Blood pressure and heart rate were monitored over 24 hours using an ambulatory blood pressure monitoring system (ABP90217[10], Space Labs, USA). The intervals of measurements were 30 minutes from 7:00 to 22:00 and 60 minutes from 22:00 to 7:00. The subjects were asked to record interruptions in sleep or the occurrence of symptoms such as dizziness and to perform measurements manually during such events. The results of measurements were analyzed by using 90121 Software of the ABP Report Management System (Space Labs, USA). In this study, interruption of sleep was defined as leaving the bed for the caregivers' own urination or for caregiving.

The mean values of systolic and diastolic blood pressures and heart rate during the daytime and nighttime were calculated, and the mean values during the nighttime were subtracted from those during the daytime to calculate nighttime drops in values. Then, the results of the activity survey and those of sleep/awake judgments were compared, and the mean values during the active daytime hours (corrected daytime values) were calculated by excluding the values obtained during naps in the daytime. Similarly, the means during actual nighttime sleep (corrected nighttime values) were calculated by excluding the values obtained during interruptions of sleep and periods when the subjects were in bed but were not asleep. Corrected nighttime values were subtracted from corrected daytime values to calculate corrected nighttime drops in values.

2) Sleep/awake judgments

An actigraph (Micro Mini[11], A.M.I., USA) was applied, and the activity level during 24 hours was measured in the zero crossing mode at a sampling

time of 1 minute. The results were analyzed using ACT2000 Software (A.M.I., USA). According to Cole's method for judging the sleep/awake status[12], it was determined whether the subjects were asleep or awake. And the number of interruptions in sleep, duration of sleep, and actual duration of night sleep, and actual duration of sleep during a 24-hour period were calculated. The actigraph was attached to the wrist of the non-dominant hand. The nighttime and daytime were determined individually by comparing the times of going to bed and getting up according to the activity survey and the results of actigraph.

3) 24-hour activity survey

Care activities and activities of living of the caregivers during a 24-hour period were studied by self-recording record.

4) Interviews concerning the contents of care

The caregivers were interviewed about their own characteristics and those of the care-receiver, the contents of care, whether the caregiver felt they themselves had slept well, and the status of interruptions in sleep during the nighttime.

3. Analysis

Statistical analyses were performed using SPSS11.0J by t-test or Welch's test, one-way ANOVA, ANCOVA using age as a covariate, and Bonferroni's or Dunnett's T3 multiple comparison to compare characteristics, sleep status, blood pressure, and heart rate among 4 patterns of sleep interruption. Tests of Spearman's rank correlation and Pearson's correlation coefficient were used to analyze correlations among age, sleep status, blood pressure, and heart rate. Multiple regression analysis was carried out using blood pressure or heart rate as a dependent variable and sleep status and age as independent variables to more closely analyze the effects of sleep status.

Results

1. Differences in blood pressure and heart rate by sleep status in 43 non-medicated caregivers

Similarly to the above 19 subjects, 43 subjects who were not taking antihypertensive drugs (35 females aged 60.2±9.8 years ; 8 males aged 70.9±11.2 years) were classified as pattern 0 to pattern 3 according to whether they woke up during the nighttime and the reason for waking up ; pattern 0 did not wake up (Figure 1), pattern 1 woke up to urinate (Figure 2), pattern 2 woke up voluntarily for caregiving (Figure 3), pattern 3 were awakened involuntarily by the care-receiver (Figure 4).

Then, the characteristics, sleep status, blood pressure, and heart rate among the 4 groups were compared by one-way ANOVA and ANCOVA using age as a covariate.

Table 1 shows characteristics of 43 non-medicated caregivers according to the sleep interruption pattern. Many subjects in the 3 groups except pattern 2 were the daughter-in- law of the care-receiver. In the 11 subjects with pattern 1, the mean age was 68.6 years. In the 8 subjects with pattern 2, the history of home care was long at 70.3 months, and the time spent on care per day was short at 5.8 hours. In the 15 subjects with pattern 3, the time spent on care per day was long at 9.4 hours, and the total time spent on the care-receiver was long at 14.5 hours. However, these characteristics did not significantly differ among the 4 groups by ANOVA (Table 1). Furthermore, ANCOVA using age as a covariate could not be performed because regression model was not recognized significant.

Table 2 shows sleep status in 43 non-medicated caregivers according to the sleep interruption pattern. In the 8 subjects with pattern 2, there were 2.4 interruptions in sleep. However, the duration of sleep was 8.3 hours, which was significantly longer than that in the 11 subjects with pattern 1 by ANCOVA using age as a covariate (Table 2). In the 15 subjects with pattern 3, the actual duration of night sleep was short at 5.9 hours, but the actual duration of sleep in the 24-hour period was long at 7.0 hours including 1.1 hours of nap. Moreover, of the 15 subjects, 9 did not have a feeling of having slept well (Table 2).

Table 3 shows blood pressure and heart rate in 43 non-medicated caregivers according to the sleep interruption pattern. In the 15 subjects with pattern 3 who napped for longer hours during the day, the daytime corrected values during active hours after exclusion of values measured during naps showed systolic blood pressure (130.2mmHg), diastolic blood pressure (79.4mmHg), and heart rate (75.8bpm) were higher than over all daytime values. Then, in the 3 groups

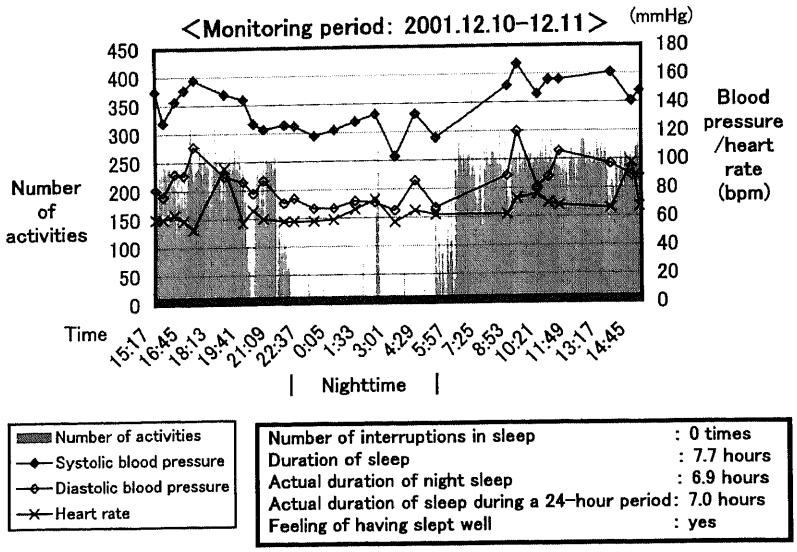

Figure 1. [Pattern 0] Number of activities, blood pressure, and heart rate during a 24-hour period in a 70-year-old female.

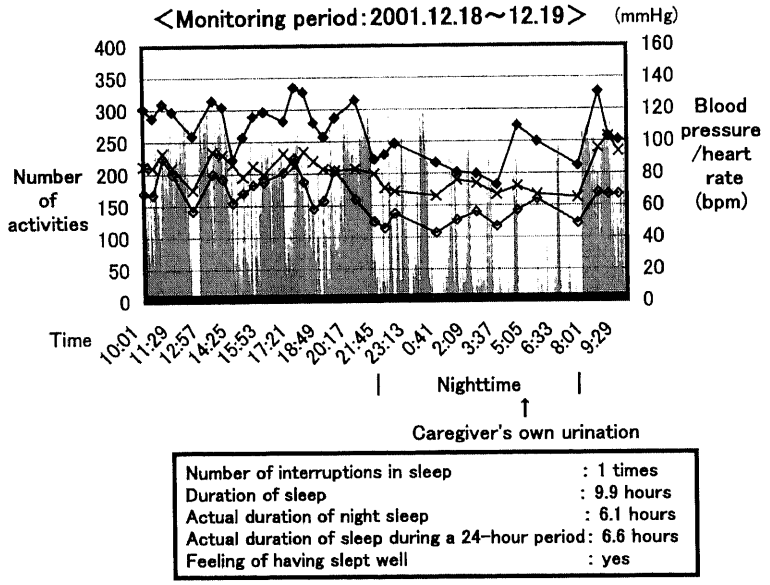

Figure 2. [Pattern 1] 24-hour records of activities, blood pressure, heart rate, and state of sleep in a 91-year-old male.

that woke up during the night (patterns 1, 2, 3), the nighttime corrected values during the hours of actual sleep after exclusion of values measured during interruptions in sleep or periods during which the caregivers were in bed but not asleep showed systolic blood pressures (108.1, 104.2, 109.0mmHg), diastolic blood pressures (66.0, 65.8, 64.9mmHg), and heart rates (62.9, 62.9, 60.4bpm) were lower than all nighttime values. Systolic and diastolic blood pressure and heart rate did not significantly differ among the 4 groups by ANOVA (Table 3). Furthermore, ANCOVA using age as a covariate could not be performed because regression model was not recognized significant.

There was no difference observed in changes in blood pressure and heart rate during interruptions in sleep among the 3 groups who woke up during the night (patterns 1−3).

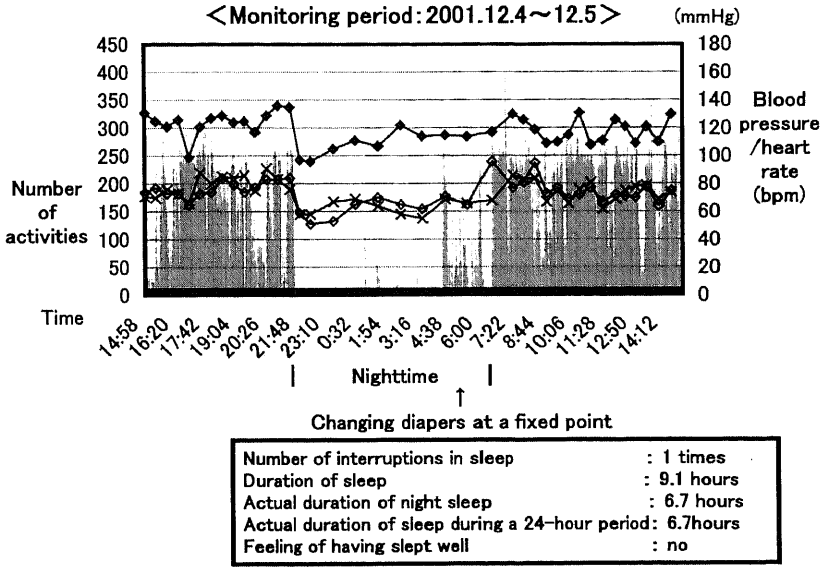

Figure 3. [Pattern 2] 24-hour records of activities, blood pressure, heart rate, and nighttime care activities in a 73-year-old female.

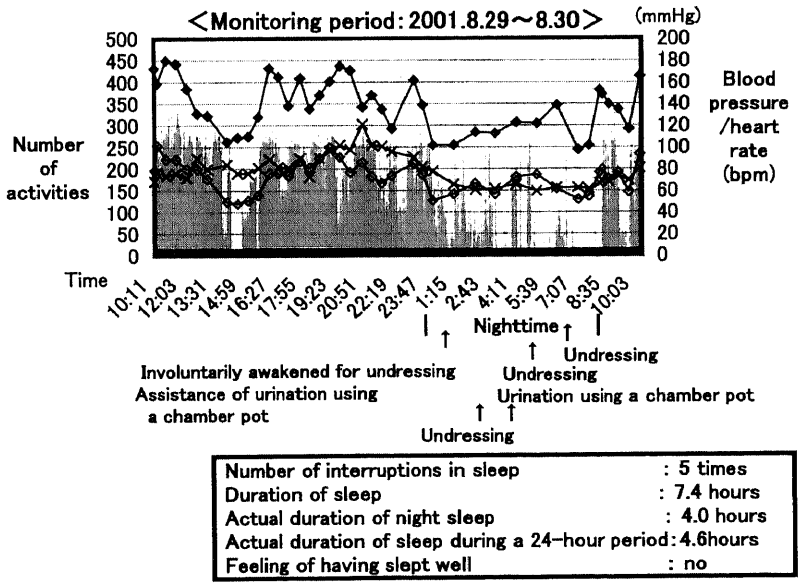

Figure 4. [Pattern 3] 24-hour records of activities, blood pressure, heart rate, and nighttime care activities in a 68-year-old female.

2. Differences in blood pressure and heart rate by sleep status in 25 medicated caregivers

There were no differences observed in blood pressure or heart rate in the 25 subjects taking antihypertensive drugs (15 females aged 64.7±8.5 years ; 10 males aged 71.2±5.0 years) among the 4 patterns.

3. Differences in blood pressure and heart rate by sleep status in medicated and non-medicated females

The female subjects were divided into those taking and not taking antihypertensive drugs, and blood pressure and heart rate were compared according to sleep status. There were no differences observed among the 4 patterns.

Table 1. Characteristics of 43 non-medicated caregivers according to the sleep interruption pattern

	Pattern 0 (9) No interruption of sleep	Pattern 1(11) Waking up for caregivers' own urination	Pattern 2(8) Scheduled voluntary awakening for care	Pattern 3(15) Involuntary awakening for care	ANOVA* p Value
Relationships with the care-receiver	Daughters-in-law(5) Wives(2), Mothers(2)	Daughters-in-law(4) Wives(4), Husbands(2) Female sibling(1)	Child(4), Wives(3) Husbands(1)	Daughters-in-law(4) Wives(4), Child(4) Husbands(2), Mother(1)	
Sex	9females	9females, 2males	6females, 2males	11females, 4males	
Age (y)	58.7 ± 6.6	68.6 ± 12.8	61.3 ± 12.7	60.1 ± 9.1	0.143
Body Mass Index (kg/m^2)	23.8 ± 2.0	22.4 ± 3.6	22.7 ± 3.2	23.9 ± 3.6	0.621
Drinking during monitoring	None	2	None	2	
History of home care (months)	None	1	None	2	
Time spent on care per day (hours)	46.7 ± 38.3	55.2 ± 71.5	70.3 ± 22.9	64.9 ± 102.8	0.906
Total time spent for the care-receiver (hours)	7.1 ± 8.2	7.0 ± 8.1	5.8 ± 7.5	9.4 ± 9.5	0.768
Characteristics of the care-receiver	14.6 ± 10.9	9.0 ± 9.1	12.3 ± 9.2	14.5 ± 10.8	0.530
Sex	5females, 4males	5females, 6males	5females, 3males	11females, 4males	
Age (y)	69.6 ± 25.3	78.9 ± 7.6	77.5 ± 9.4	75.0 ± 16.3	0.605
Disability rating	II(1), III(1), IV(1) V(4), Others(2)	II(2), III(3), IV(3) V(3)	III(2), IV(2), V(3) Others(1)	III(1), IV(3), V(9) Others(2)	
Dementia	4	3	4	7	
Use of public services	Day service(3) Visits of helpers(4) Home bathing service(3)	Day service(3) Visits of helpers(4) Home bathing service(6)	Day service(3) Visits of helpers(2) Home bathing service(2)	Day service(11) Visits of helpers(5) Home bathing service(2)	

Notes: Mean±SD (standard deviation).
*One-way analysis of varience.
Analysis of covariance using age as a covariate could not be performed because regression model was not recoginized significant.

Table 2. Sleep status in 43 non-medicated caregivers according to the sleep interruption pattern

	Pattern 0 (9) No interruption of sleep	Pattern 1(11) Waking up for caregivers' own urination	Pattern 2(8) Scheduled voluntary awakening for care	Pattern 3(15) Involuntary awakening for care	ANOVA‡ p Value	ANOVA‡ Comparison	ANCOVA‖ p Value	ANCOVA‖ Comparison
Sleep status								
Number of interruptions in sleep (times)	0	1.3 ± 0.6	2.4 ± 1.2	2.1 ± 1.3	<0.001	0 < 1 and 2 and 3§		
Duration of sleep (hours)*	6.6 ± 1.3	6.8 ± 1.7	8.3 ± 0.9	7.0 ± 1.3	0.053		0.023	1 < 2¶
Actual duration of night sleep (hours)†	6.4 ± 1.1	5.7 ± 1.4	6.2 ± 0.9	5.9 ± 1.4	0.618		0.260	
Actual duration of sleep during a 24-hour period (hours)	6.9 ± 1.3	6.4 ± 1.6	6.6 ± 0.7	7.0 ± 1.5	0.687		0.284	
Feeling of having slept well	Yes(8), No(1)	Yes(8), No(3)	Yes(4), No(4)	Yes(6), No(9)				

Notes: Mean±SD (standard deviation).
*Calculated from the times of going to bed and getting up determined by comparing the automatic activity records and actigrams.
†Calculated by subtracting the periods when the caregivers interrupted their sleep or they were in bed but were not asleep from duration of sleep.
‡One-way analysis of variance.
§Dunnet T3 multiple comparison.
‖Analysis of covariance using age as a covariate.
¶Bonferroni's multiple comparison.

Table 3. Blood pressure and heart rate in 43 non-medicated caregivers according to the sleep interruption pattern

	Pattern 0 (9) No interruption of sleep	Pattern 1(11) Waking up for caregivers' own urination	Pattern 2(8) Scheduled voluntary awakening for care	Pattern 3(15) Involuntary awakening for care	ANOVA‡ p Value	ANOVA‡ Comparison	ANCOVA‖ p Value	ANCOVA‖ Comparison
Sleep status								
Number of interruptions in sleep (times)	0	1.3 ± 0.6	2.4 ± 1.2	2.1 ± 1.3	<0.001	0 < 1 and 2 and 3§		
Duration of sleep (hours)*	6.6 ± 1.3	6.8 ± 1.7	8.3 ± 0.9	7.0 ± 1.3	0.053		0.023	1 < 2¶
Actual duration of night sleep (hours)†	6.4 ± 1.1	5.7 ± 1.4	6.2 ± 0.9	5.9 ± 1.4	0.618		0.260	
Actual duration of sleep during a 24-hour period (hours)	6.9 ± 1.3	6.4 ± 1.6	6.6 ± 0.7	7.0 ± 1.5	0.687		0.284	
Feeling of having slept well	Yes(8), No(1)	Yes(8), No(3)	Yes(4), No(4)	Yes(6), No(9)				

Notes: Mean±SD (standard deviation).
*Calculated from the times of going to bed and getting up determined by comparing the automatic activity records and actigrams.
†Calculated by subtracting the periods when the caregivers interrupted their sleep or they were in bed but were not asleep from duration of sleep.
‡One-way analysis of variance.
§Dunnet T3 multiple comparison.
‖Analysis of covariance using age as a covariate.
¶Bonferroni's multiple comparison.

4. Factors that affect blood pressure and heart rate

To clarify factors that affect blood pressure and heart rate, the subjects were divided according to medication status and gender, and correlations among age, sleep status, blood pressure, and heart rate were analyzed. Table 4 shows sleep status, blood pressure, and heart rate related to age according to medication and gender. Regardless of medication status, age was positively correlated with systolic blood pressure in females and negatively correlated with diastolic blood pressure in males, showing a gender-related difference (Table 4). Furthermore, some sleep patterns were positively correlated with age (Table 4).

To more closely analyze the effects of sleep status, multiple regression analysis was carried out using blood pressure or heart rate as a dependent variable and sleep status and age as independent variables. Table 5 shows multiple regression analysis using blood pressure and heart rate as dependent variables and sleep status and age as independent variables according to medication and gender. As a result, sleep status was identified as a predictive variable of blood pressure or heart rate, but the relationships of this variable with blood pressure and heart rate differed by gender. While the actual duration of sleep was a negative predictive independent variable for systolic blood pressure and heart rate in the 35 females not taking antihypertensive drugs, the number of interruptions in sleep was a positive predictive independent variable for systolic and diastolic blood pressures in the 8 males not taking antihypertensive drugs (Table 5). The relationships of age with blood pressure and heart rate differed by gender, similar to the results on simple correlation analysis. Age was positively correlated with systolic blood pressure in females but negatively correlated with diastolic blood pressure in males (Table 5).

Discussion

In this study, diurnal changes in blood pressure and heart rate in elderly family caregivers were evaluated according to the status of nighttime care. The findings are expected to provide useful clinical data.

Caregivers who woke up for own urination were older. This suggests a relation between aging and frequent urination during the nighttime. Caregivers who woke up voluntarily for care spent significantly longer hours in bed and provided care for fewer hours than those in the other groups, suggesting that caregivers who woke up voluntarily to provide care have learned to control the 24-hour cycle at their own pace through many experiences during the long history of home care. Caregivers who woke up involuntarily for care provided care and were tied to the care-receiver for longer hours per day. These effects on blood pressure and heart rate could not be explained, but are expected to affect the actual duration of night sleep and the feeling of having slept well.

In this study, it is interesting that family caregivers showed blood pressure and heart rate during actual activity during the daytime and during actual sleep during the night as determined with an actigraph. It has been reported that healthy subjects show physiologic decreases in blood pressure during night sleep[13,14] and that hypertensive nighttime workers are at greater risk of increases in nocturnal blood pressure[15]. We also obtained results suggesting differences in the decrease in nocturnal blood pressure in the same subjects depending on sleep interruption[16].

We, therefore, expected diurnal changes in blood pressure to show different characteristics depending on the state of nighttime care and the characteristics to differ between healthy and hypertensive individuals. These hypotheses, however, could not be confirmed in this study because we could not completely rule out the effects and there were few male subjects. Nevertheless, the sleep status as well as medication, gender, and age[17,18] has been demonstrated to concretely affect diurnal changes in blood pressure and heart rate. Moreover, the relationship between the state of nighttime care and diurnal changes in blood pressure was expected to be affected by confounding factors including gender and age.

To clarify the effects of nighttime care on diurnal changes in blood pressure in elderly family caregivers, further evaluation of the effects of medication, gender, age, sleep status, state of the cared, care behavior, and daily behavior is needed. For this purpose, an increase in the number of subjects and analysis of a larger quantity of data are needed.

Table 4. Sleep status, blood pressure, and heart rate related to age according to medication and gender

	A: Non-medicated/female(35)		B: Medicated/female(15)		C: Non-medicated/male(8)		D: Medicated/male(10)	
Sleep status	Number of interruptions in sleep for caregivers' own urination	(0.34)	Duration of night sleep	0.64 (0.65)	Duration of night sleep	0.76 (0.72)		
			Actual duration of night sleep	0.62 (0.62)				
			Actual duration of sleep in a 24-hour period	0.55 (0.53)				
SBP	24-hour SBP	0.37 (0.39)	24-hour SBP	0.59 (0.58)			24hour SBP	-0.65
	Daytime SBP	0.36 (0.38)	Daytime SBP	0.57 (0.57)				
	Nighttime SBP	0.40 (0.39)	Nighttime SBP	0.60 (0.69)				
	Corrected daytime SBP	0.36 (0.39)	Corrected daytime SBP	0.59 (0.57)				
	Corrected nighttime SBP	0.40 (0.41)	Corrected nighttime SBP	0.56 (0.66)				
DBP					24-hour DBP	-0.74 (-0.85)	24hour DBP	-0.81 (-0.85)
					Daytime DBP	(-0.62)	Daytime DBP	-0.80 (-0.80)
					Nighttime DBP	-0.71 (-0.74)	Nighttime DBP	-0.92 (-0.88)
					Corrected daytime DBP	-0.74	Corrected daytime DBP	-0.74 (-0.79)
					Corrected nighttime DBP	(-0.74)	Corrected nighttime DBP	-0.95 (-0.91)
HR							Nighttime HR	(-0.69)
							Corrected nighttime HR	(-0.66)

Notes: The above items showed significant correlations ($p<0.05$) with age.
The numbers are Spearman's correlation coefficients, and the numbers in ( ) are Pearson's correlation coefficients.
SBP = systolic blood pressure, DBP = diastolic blood pressure, HR = heart rate

Table 5. Multiple regression analysis using blood pressure and heart rate as dependent variables and sleep status and age as independent variables according to medication and gender

		A: Non-medicated/female(35)	B: Medicated/female(15)	C: Non-medicated/male(8)	D: Medicated/male(10)
SBP	24-hour value			Number of interruptions in sleep (0.69)	
				Age (-0.39)	
	Nighttime mean	Actual duration of night sleep (-0.34)	Duration of night sleep (0.64)	Number of interruptions in sleep (0.72)	
		Age (0.45)	Age (0.27)	Age (-0.48)	
	Corrected nighttime value	Actual duration of night sleep (-0.33)	Duration of night sleep (0.61)	Number of interruptions in sleep (0.68)	
		Age (0.47)	Age (0.26)	Age (-0.52)	
		Actual duration of sleep in a 24-hour period (-0.33)			
		Age (0.50)			
DBP	24-hour value			Number of interruptions in sleep (0.70)	
				Age (-0.48)	
	Daytime mean			Number of interruptions in sleep (0.69)	
				Age (-0.44)	
	Corrected Daytime value			Number of interruptions in sleep (0.69)	
				Age (-0.45)	
	Nighttime mean			Number of interruptions in sleep (0.62)	Number of interruptions in sleep (0.38)
				Age (-0.57)	Age (-0.74)
	Corrected nighttime value			Number of interruptions in sleep (0.59)	Number of interruptions in sleep (0.30)
				Age (-0.59)	Age (-0.80)
HR	24-hour value	Actual duration of sleep in a 24-hour period (-0.46)			
		Age (-0.09)			
	Daytime mean	Actual duration of sleep in a 24-hour period (-0.44)			
		Age (-0.08)			
	Corrected Daytime value	Actual duration of sleep in a 24-hour period (-0.43)			
		Age (-0.08)			
	Nighttime mean				Number of interruptions in sleep (0.54)
					Age (-0.48)
	Corrected nighttime drop	Actual duration of night sleep (-0.42)			
		Age (-0.06)			

Notes: This table shows that sleep status that was significant independent variable ($p < 0.05$) in the predictive equation for BP or HR.
The numbers in ( ) are standardized partial regression coefficient of sleep status and age.
Sleep status includes the number of interruptions in sleep, duration of night sleep, actual duration of night sleep, or actual duration of sleep in a 24-hour period.
SBP = systolic blood pressure, DBP = diastolic blood pressure, HR = heart rate

Conclusions

This study clarified 24-hour changes in blood pressure and heart rate, sleep status, nighttime care status in caregivers providing home-care for elderly family members. This study also indicated that sleep status in relation to medication, gender, and age is a factor affecting blood pressure and heart rate. The effect of sleep status and aging differed by gender.

However, we could not validate our hypothesis that diurnal changes in blood pressure in home caregivers differed according to the need for nighttime care and the cause of sleep interruption, probably because of

the effects of confounding factors including gender and age. Further evaluation after accumulating additional of data is considered necessary.

Acknowledgments

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在宅介護における家族介護者の夜間の睡眠と24時間血圧日内変動の関係

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要　　旨

要介護高齢者の在宅介護を行っている68名の家族介護者を対象とし，24時間の睡眠状況と夜間介護の実態を調査して，夜間の睡眠状況と血圧日内変動の関係を分析した。本研究結果より，68名の家族介護者の血圧と心拍数の日内変動，24時間の睡眠状況と夜間介護の実態を明らかに示すことができた。血圧と心拍数に影響する要因として，内服，性別，年齢に加え，夜間の睡眠状況が挙げられた。睡眠状況と年齢の影響は，性別により異なっていた。しかし本研究において，夜間介護による血圧日内変動への影響を解明するまでには至らなかった。これは性別と年齢などの交絡因子による影響が考えられる。今後さらに調査対象を増やして解明していくことが必要である。