

CHAPTER 4

RESULTS AND DISCUSSION

Results

This descriptive study was conducted to explore sleep of elderly during hospitalization and to describe factors perceived by hospitalized elderly as sleep interference. The results of the study were presented under the following headings:

1. Personal data of the subjects
2. Health information, including the subjects' health status and sleep history
3. The subjects' sleep quality during hospitalization
4. Factors interfering with the subjects' sleep

1. Personal Data of the Subjects

A total of 100 elderly medical patients who met the inclusion criteria were recruited for this study. They were hospitalized in six medical wards at two hospitals in Medan. Table 1 shows the distribution of demographic characteristics of the subjects. The subjects' age ranged from 60 to 85 years with an average of 66.77 years. Most of them were married (83%), male (72%), Batak origin (68%), and Christian (55%). Sixty percent of the subjects had education level less than high school. At that time, 54% of the subjects were not working. The majority (75%) of subjects received a monthly income of below 1,000,000 rupiahs. Almost 40% of subjects received total reimbursement of their medical expenses.

Table 1 Percentage of the subjects' demographic characteristics (N=100)

Characteristics	Percentage
Age	
60 – 70	73
71 – 85	27
<u>M</u> = 66.77, <u>SD</u> = 6.52	
Gender	
Male	72
Female	28
Race	
Batak	68
Javanese	13
Others	19
Educational level	
Less than high schooling	60
High school or more	40
Marital status	
Married	83
Others	17
Religion	
Christian	55
Islam	45
Work-retirement status	
Not working	54
Working	46
Terms of medical payment	
Wholly reimbursed	38
Partially reimbursed	36
Totally self payment	26
Income per month	
< 1,000,000 rupiahs	75
1,000,000 – 1,600,000 rupiahs	25
<u>M</u> = 760,000 rupiahs <u>SD</u> = 285,180 rupiahs	

Table 2 shows the percentage of the subject's demographic characteristics regarding home location, residential status, number of people living in the same household and number of the patients in the same room during hospitalization. Eighty nine percent of the subjects lived in urban areas. Sixty three percent of the subjects lived with their children, and 9% of the subjects lived alone. The majority of subjects (69%) were living with 2 – 5 people in their household ($M = 4.89$, $SD = 2.09$). During hospitalization, 68% of the subjects reported staying with 2 – 5 other patients in the same room.

Table 2 Percentage of the subjects' demographic characteristics regarding home location, residential status, number of people living in the same household and number of the patients in the same room during hospitalization (N=100)

Characteristics	Percentage
Home location	
Urban area	89
Rural area	11
Residential status	
Spouse with children	63
Only spouse	28
Others	9
Number of people living in the same household	
Two to five people	69
Six to ten people	31
Number of the patients in the same room	
Two to five people	68
Six to ten people	23
Eleven to fifteen people	9

2. Health Information

2.1 Health status

The subjects reported many different medical diagnoses. Table 3 presents the percentage of the subjects with different medical diagnoses. The majority of the subjects were admitted to hospital with respiratory problems (47%) and digestive problems (36%). Among these problems, the major ones were respiratory infections (21%), followed by dyspepsia (12%), COPD (12%), and cirrhosis hepatics (10%).

Table 3 Percentage of the subjects with different medical diagnosis (N = 100)

Medical Diagnosis	Percentage
Respiratory problems	
Respiratory infection	21
COPD	12
Tuberculosis	9
Lung cancer	3
Asthma	2
Digestive problems	
Dyspepsia	12
Cirrhosis hepatics	10
Diabetes mellitus	9
Hepatoma	4
Cholelithiasis	1
Cardiovascular problems	
CHF	8
Hypertension	4
Unstable angina	3
Renal problems	
UTI	1
CRF	1

Table 4 presents the percentage of the subject's characteristics in relation to health status and health behavior. Thirty nine percent of the subjects were admitted to hospital for the second time. Fifty two percent of the subjects reported having chronic illness. Almost 90% of the subjects reported that they used stimulating substances at home; particularly tea which was the most used stimulating substance (38%). Thirty percent of the subjects used several kinds of stimulating substances at home, however, when staying in the hospital, 80% of the subjects did not use any stimulating substance.

Table 4 Percentage of the subjects' characteristics in relation to number of admission to the hospital, health status and health behavior

Characteristics	Percentage
Number of admissions to the hospital	
First time	32
Second time	39
Three times or more	29
Having chronic illness	
Yes	52
No	48
Use of stimulating substances at home	
Teas	38
Tobacco	13
Coffee	7
None	12
Use of stimulating substance in hospital	
Tobacco	1
Tea	19
None	80

Table 5 shows the percentage of the subjects who used medications that could influence sleep at home and during hospitalization. At home, the subjects used drugs which might induce sleep, such as cough syrup (8%), sedatives (6%), and analgesics (6%) and drugs, which could interfere with sleep, such as bronchodilators (12%), beta-blocker (11%), diuretics (9%), and corticosteroids (3%). During hospitalization, 25% of the subjects received drugs inducing sleep (sedatives, analgesics and cough syrups) and 83% of them received drugs that could interfere with their sleep (diuretics, beta-blockers, bronchodilators, and corticosteroids). Several of the subjects received drugs, which both induce and interfere with sleep.

Table 5 Percentage of medications used by the subjects influencing sleep at home and during hospitalization

Medication influencing sleeps	Home (%)	Hospital (%)
Drugs inducing sleep		
Sedatives (sleeping pills)	6	13
Analgesics	6	5
Cough syrups	8	7
Drugs interfering with sleep		
Diuretics	9	26
Beta blockers	11	26
Bronchodilators	12	23
Corticosteroids	3	8

2.2 Sleep History

Sleep quality

Forty three percent of the subjects considered themselves to be poor sleepers with a mean (SD) of 10.07 (4.66) ranging from 5 to 26. Table 6 presents the subjects' sleep parameters at home. The majority of the subjects slept for more than 5 hours and took more than half an hour to fall asleep. Only 3% of the subjects did not wake at all through the night, while the majority (79%) woke 1 – 4 times. Even so, feeling refreshed on awakening in the morning was reported by 43% of the subjects and 42% never had any trouble staying awake to do their daily activities. Only 17% of the subjects reported very deep sleep while 42% of the subjects rated their sleep satisfaction at a moderate level. Seventy four percent of subjects did not take a nap at all but among those who took a nap, it was less than 60 minutes. Twenty six percent of the subjects took a nap for more than 60 minutes.

Table 6 Percentage of the subjects with references to sleep parameters at home

Sleep parameters	Percentage
Total sleep time	
< 5 hours	28
5 – 6 hours	43
> 6 – 7 hours	24
> 7 hours	5
<u>M</u> = 5.67, <u>SD</u> = 1.18, Range = 4–11 hours	
Sleep latency	
> 60 minutes	37
31 – 60 minutes	42
16 – 30 minutes	14
< 15 minutes	7
<u>M</u> = 50.40, <u>SD</u> = 25.70, Range = 5–90 minutes	

Table 6 (continued)

Sleep parameters	Percentage
Number of times awakening at night	
> 5 times	18
3 – 4 times	39
1 – 2 times	40
None	3
<u>M</u> = 2.92, <u>SD</u> = 1.71, Range = 0–6 times	
Feeling refreshed at morning awakening	
Very sleepy	5
Moderately sleepy	19
Mildly sleepy	33
Refreshed, clear, and alert	43
Depth of sleep	
Very shallow	19
Sleep and awaken	22
Sleep but not deep	42
Very deep sleep	17
Satisfaction with sleep	
Not at all	32
Little	19
Moderate	42
Very much	7
Daytime dysfunction-sleepiness	
Once a week	19
Twice a week	18
Three or more times a week	21
Never	42

Home environment interfering with sleep

Table 7 shows the factors in the home environment which the subjects reported that they interfered with sleep. Fifty four percent of the subjects reported no environmental factors at home that interfered with their sleep, while 30% reported one

factor, and 16% reported two to five factors. Hot room temperature (30%) was the factor most reported, followed by cool temperature (10%), bright light (10%), and poor ventilation in 9% of the subjects.

Table 7 Percentage of the subjects' reporting home environment factors that interfered with sleep

Home environment factors	Percentage
Hot room temperature	30
Cool room temperature	10
Bright light	10
Poor ventilation	9
Sleeping partner	5
Others (noise)	4

3. Sleep during hospitalization

3.1 Sleep quality

During hospitalization, the majority of the subjects (77%) rated their sleep as poor with a mean (SD) of 6.87 (4.65) ranging from 0 to 19. Table 8 presents the percentage of the subjects with certain sleep parameters during hospitalization. Sixty two percent of the subjects had a total sleep time of less than 5 hours (M = 5.16, SD = 1.13). Fifty seven percent of the subjects had a sleep latency of more than 60 minutes with a mean (SD) of 65.76 (35.21). Frequent awakenings, at least three times or more at night were mentioned by eighty percent of the subjects.

Only 12% of subjects reported that they felt refreshed, clear, and alert in the morning awakening. Moreover, 55% of the subjects reported that their sleep was very shallow and 51% were not at all satisfied with their sleep. A small number of the subjects did not feel sleepy during the daytime. Most subjects did not take a nap, but among subjects who did it was less than 60 minutes. One-fourth of the subjects took a nap more than 60 minutes.

Comparing sleep at home and sleep during hospitalization, there were significantly different with a mean of 6.87 vs 10.07, $p < .001$, respectively (Table A1, appendix). The subjects had higher total sleep quality score, longer total sleep time, shorter total sleep latency, had less number of awakenings at home than during hospitalization. In addition, a high proportion (77%) of the subjects considered their sleep as poor during hospitalization, whereas a low proportion (43%) of the subjects considered their sleep as poor at home.

Table 8 Percentage of the subjects with references to sleep parameters during hospitalization

Sleep parameters	Percentage
Total sleep time	
< 5 hours	62
5 – 6 hours	19
> 6 – 7 hours	16
> 7 hours	3
<u>M</u> = 5.16, <u>SD</u> = 1.13, Range = 4–10 hours	
Sleep latency	
> 60 minutes	57
31 – 60 minutes	26
16 – 30 minutes	11
< 15 minutes	6
<u>M</u> = 65.76, <u>SD</u> = 35.21, Range = 10–120 minutes	

Table 8 (continued)

Sleep parameters	Percentage
Number of times awake at night	
> 5 times	43
3 – 4 times	37
1 – 2 times	17
None	3
$\underline{M} = 4.54$, $\underline{SD} = 2.45$, Range= 0–8 times	
Feeling refreshed at morning awakening	
Very sleepy	9
Moderate sleepy	43
Mild sleepy	36
Refreshed, clear, and alert	12
Feeling refreshed at morning awakening	
Very sleepy	9
Moderate sleepy	43
Mild sleepy	36
Refreshed, clear, and alert	12
Depth of sleep	
Very shallow	55
Sleep and awaken	17
Sleep but not deep	21
Very deep sleep	7
Satisfaction with sleep	
Not at all	51
Little	28
Moderate	18
Very much	3
Daytime Dysfunction-sleepiness	
Nearly all the time	13
Very often	33
Some times	40
Not at all	14

4. Factors interfering with sleep

4.1 Physiological factors

Table 9 presents symptoms which the subjects experienced during hospitalization and which were reported as interfering with sleep. Of the fourteen symptoms listed the seven most common that the subjects experienced were nocturia (87%), NGT/IV-Line (69%), pain (66%), dyspnea (65%), mobility restriction (65%), cough (64%), and headache (52%). Among these symptoms, pain (97%), dyspnea (96%), and cough (94%) were perceived as interfering with sleep by the majority of subjects. Although itching and incontinence were not commonly experienced, a high proportion of the subjects reported that the two symptoms interfered with their sleep at the level of very much (50% and 33%, respectively). The subjects had scores of physiological factors interfering with sleep ranging from 0 to 24 with a mean (SD) of 10.46 (4.85).

Table 9 Number and percentage of the subjects experiencing symptoms and the degree of sleep interference

Symptoms	Experience n	Degree of Sleep Interference			
		None n (%)	Little n (%)	Moderate n (%)	Very Much n (%)
Nocturia	87	18 (21)	30 (34)	20 (23)	19 (22)
NGT/IV-Line in place	69	15 (22)	29 (42)	24 (35)	1 (1)
Pain	66	2 (3)	23 (35)	17 (26)	24 (36)
Dyspnea	65	3 (4)	15 (23)	20 (31)	27 (42)
Mobility restriction	65	11 (17)	32 (49)	16 (25)	6 (9)
Cough	64	4 (6)	15 (23)	17 (27)	28 (44)
Headache	52	2 (4)	26 (50)	21 (40)	3 (6)
Abdominal distention	43	8 (18)	17 (40)	10 (23)	8 (19)

Table 9 (continued)

Symptoms	Experience n	Degree of Sleep Interference			
		None n (%)	Little n (%)	Moderate n (%)	Very Much n (%)
Nausea vomiting	39	4 (10)	16 (41)	11 (28)	8 (21)
Palpitation	30	1 (3)	18 (60)	10 (34)	1 (3)
Fever	29	0 (0)	17 (59)	6 (21)	6 (21)
Itching	22	1 (5)	4 (18)	6 (27)	11(50)
Incontinence	12	3 (25)	3 (25)	2 (17)	4 (33)
Others	10	6 (60)	1 (10)	1 (10)	2 (20)

4.2 Routine nursing interventions

Table 10 shows the subjects' experience of the affect of routine nursing interventions on sleep. The most common ones were nurses attending to other patients, giving treatments, and checking vital signs (90%, 89%, and 73%, respectively). Of these routine nursing interventions, majority of the subjects perceived them as sleep interference at the low level of interference only. Checking vital signs and giving treatments were perceived by a small number of the subjects as sleep interference at the level of very much (1% and 2%, respectively). The subjects scores of sleep interference related to routine nursing interventions ranged from 0 to 9 with a mean (SD) of 2.88 (1.96) where the total possible score of the subjects' physiological factors ranged from 0 to 18.

Table 10 Number and percentage of the subjects experiencing routine nursing interventions during the night and degree of sleep interference

Routine Nursing Interventions	Exposure n	Degree of Sleep Interference			
		None n (%)	Little n (%)	Moderate n (%)	Very Much n (%)
Nurses attending other patients	90	22 (24)	60 (67)	8 (9)	-
Giving treatments	89	15 (17)	58 (65)	14 (16)	2 (2)
Checking vital signs	73	22 (30)	40 (55)	10 (14)	1 (1)
Giving medications	63	27 (43)	31 (49)	5 (8)	-
Recording intake and output	47	33 (70)	14 (30)	-	-
Others	5	4 (80)	1 (20)	-	-

4.3 Environmental factors

Table 11 shows the subjects' experience of the hospital environment that effect on sleep. A majority of the subjects reported experiencing noises from all sources, unfamiliarity with environment, hot room temperature, discomfort with bed or pillows, lack of privacy, and bright light in ward. However, most did not identify these as a major interference to sleep. In fact, the subjects perceived these environmental factors as little or moderate sleep interference. Among the subjects who experienced mosquito bites; 46% reported them as a higher degree of sleep interference. The range of scores of sleep interference related to the hospital environment reported by the subjects was 1 to 18 with a mean (SD) of 7.38 (3.69), where the total possible score was 0 to 39.

Table 11 Number and percentage of the subjects experiencing interference from the hospital environments at night and the degree of sleep interference

Hospital Environments	Experience n	Degree of Sleep Interference			
		None n (%)	Little n (%)	Moderate n (%)	Very Much n (%)
Noise from other patients or family members	98	7 (7)	57 (58)	24 (25)	10 (10)
Noise from outside room	86	24 (28)	36 (42)	18 (21)	8 (9)
Noise from conversation	75	19 (25)	38 (51)	17 (23)	1 (1)
Noise from equipment	53	5 (9)	29 (55)	19 (36)	-
Noise during changing sift work	51	10 (20)	26 (51)	14 (27)	1 (2)
Unfamiliar environment	87	37 (43)	43 (49)	5 (6)	2 (2)
Hot room temperature	60	7 (12)	40 (66)	9 (15)	4 (7)
Discomfort bed/pillow	59	17 (29)	34 (58)	8 (13)	-
No privacy	52	38 (73)	10 (19)	4 (8)	-
Bright light in ward	46	25 (54)	7 (15)	10 (22)	4 (9)
Poor ventilation	25	6 (24)	12 (48)	4 (16)	3 (12)
Unpleasant odor	15	1 (7)	12 (80)	2 (13)	-
Mosquito bites	11	2 (18)	2 (18)	2 (18)	5 (46)

4.4 Psychological factors

Table 12 presents the percentage of the subjects who experienced anxiety and depression during hospitalization. Based on the hospital anxiety depression scale (HADS), 24% of the subjects experienced anxiety, while 43% reported depression during hospitalization.

Table 12 Number, mean, and standard deviation of anxiety and depression experience perceived by the subjects

Experience	Percentage	Mean	SD
Anxiety	24	12.96	1.30
Depression	43	14.07	2.47

Discussion

This is a descriptive research study aimed at exploring the sleep quality of the elderly during hospitalization and describing the factors perceived by these hospitalized elderly as sleep interference. A total of 100 elderly patients from six medical wards were recruited from two hospitals in Medan, Indonesia.

1. The subjects Characteristics

The majority of subjects' ages ranged from 60 to 70 years with a mean (SD) of 66.7 (6.52) years. This group of elders belongs to the young old (Ebersole & Hess, 1998) and their attributes are similar to the majority of elderly population in Indonesia (Rosmalina & Yuniar, 2001). The majority of subjects (72%) were male. These were more males bring met the inclusion criteria than females. Generally in these hospitals males were more often admitted to general wards and females to private rooms. As this study only included patients from general wards more male than female recruited.

The majority of subjects were married, Christian, and had less than high school education level. Fifty four percent of the subjects were not working. Most (75%) of them received an average monthly income of 760,000, rupiahs which is slightly higher than the standard minimum salary in Indonesia (Annual Report BPS, 2000). This income included

support from family members. Eighty nine percent of the subjects lived in urban areas. And, around 9% stayed alone with house keeper in part of time, while 31% reported that there were 6 to 10 people living with them in the same household. Most of the subjects had been admitted to the hospital two or more times, and agrees with their reporting of chronic illness (52%). The major problems were respiratory, digestive, and cardiovascular diseases. These diseases are common health problems among the elderly in Indonesia (Boedhi-Darmojo & Martono, 1999; Maria-Sirait & Riyadina, 1999).

2. Sleep History

Overall, 43% of the subjects slept poorly when at home. Twenty eight of the subjects slept less than 5 hours; 37% had sleep latency more than 60 minutes; and 57% experienced awakenings three times or more during the night (Table 6). The findings consistent with Southwell and Wistow (1995) reporting that 35% of 438 respondents had poor sleep at home. Consistent with a previous study, poor sleep quality at home is associated with changes in sleep patterns due to aging and the factors associated with increased prevalence of sleep interference (Miller, 1995).

Previous study reported that several factors such as chronic illness and stimulating substances can cause poor sleep quality at home (Ancoli-Israel, 2000; Ersser et al., 1999). Among the subjects who considered themselves as poor sleeper; 56% had chronic illness and 88% used stimulating substances when at home (Table A2, appendix).

In addition, a previous study reported that elderly people used more medications than any other age group (Beyth & Shorr, 1998). Similarly this study noted that some subjects received multiple drugs at home (two or more kinds of drugs) because of multiple diseases. They took drugs prescribed by doctors or bought in the pharmacy.

The study of Smeltzer and Bare (2000) reported that 12.6% of the elderly population used more medications with or without a prescription medication. According to Ancoli-Israel (2000) multiple drug interactions may produce adverse effects that can manifest as sleep interference in the elderly during the night.

3. Sleep quality of the elderly during hospitalization

Sleep quality is a subjective judgment of “good” or “poor” sleep, and the meaning of sleep quality depends on how the individual perceives it. In this study, the sleep quality score and subjective quality of sleep based on the subjects’ perception were used as global indicators of sleep.

The majority of subjects (62%) had total sleep time less than 5 hours ($M= 5.16$). This result supports the findings of previous studies, which found that a mean of total sleep time in medical wards was 5–6 hours among elderly patients (Yilan 2000), and adult-older adult patients (Yinnon, Ilan, Tadmor, Altaresco, and Hershko, 1992). According to Manefee et al. (2000) a mean total sleep time was 5.5 hours among patients with nonmalignant pain conditions. These findings show that the total sleep time during hospitalization is about 1 – 2 hours less than the 6.5 – 7.5 hours sleep of the elderly population that was reported by Evan and Rogers (1994) and Miller (1995).

More frequent awakenings among hospitalized elderly were also found in this study. Most of the subjects (80%) woke at least three times or more through the night. This finding was similar to that of Yilan (2000) who found that the elderly medical patients woke on average three times during the night. The findings were also similar to those reported by Ersser et al. (1999), where it was found that 61% of the subjects

reported waking more frequently during the night, but they did not report the number of awakenings.

Among healthy elderly, Evans and Rogers (1994) reported that all of the subjects woke up during the night at least three times or more. It can be concluded that the elderly wake at night not only because of the effects of hospitalization, but also due to physical changes with ageing. Miller (1995) stated that frequent awakenings can be the result of any of the risk factors of age related-changes such as physical discomfort, pain, mobility restriction, nocturia, and lack of daytime activity.

Nearly sixty percent of the subjects reported sleep latency longer than 60 minutes ($M= 66$ minutes). This result could suggest that the subjects might take more time to fall asleep due to symptoms of illness that could interfere with their sleeping. This finding was similar to the result of the study by Edell-Gustaffon (2002) who reported that longer sleep latency 50 – 70 minutes was found among subjects aged 45 – 70 years and those with poor overall health status. Sleep latency reported by the subjects in this study longer than in a study by Manefee et al. (2000) who found that mean sleep latency was 41 minutes among patients with nonmalignant chronic pain who had an average age of 45.7 years. Evans and Rogers (1994) found that normal elderly had sleep latency from 10 – 15 minutes. These figures indicate that sleep latency could increase if the subjects had physical discomfort, pain, illness, or poor health status.

Not feeling refreshed at the morning awakening was reported in 52% of the subjects at level of moderate to very sleepy. This result is slightly lower than in a study by Fass, Fullerton, Tung, and Mayer (2000) who reported that not feeling refreshed when awakens was found in 61.8% of hospitalized patients with irritable bowel syndrome and functional dyspepsia, whereas Bliwise, King, Harris, and Haskell, (1992) whose study in

a healthy population aged 50 to 65 years showed that experiencing not feeling refreshed was found in 35% men and 37.9% women, which suggests that an age related decline in physical health and deterioration of sleep due to frequent awakenings and longer wakefulness may result in experiencing not feeling refreshed after sleep. These findings indicate that hospitalization seems to have affected not feeling refreshed at morning awakening although the older age of subjects may also have an affect.

More than half of the subjects (55%) perceived their sleep as very shallow, which was supported by a previous study that suggested it is a common complaint among the elderly. Vitiello and Prinzl (1990) reported that between 25 and 40% of elderly complained that they had longer time in lighter sleep. In a similar result, the elders were found to spend less time in depth of sleep stage 3 & 4, and most of the night was spent in lighter sleep (Cohen-Zion, Gehrman, & Ancoli-Israel, 2002; Swift & Shafiro, 1993). Moreover, Miller (1995) stated that hypnotic drugs can reduce deep sleep, although the initial responses to hypnotic drugs promote sleep but adverse effects are likely to occur.

A majority (79%) of the subjects reported feeling dissatisfied with their sleep. According to Lee (1997) the elderly patients complained that they were not satisfied with their sleep during hospitalization. Consistent with the previous finding of Chiu et al. (1999) who reported that slightly less than half of the subjects were dissatisfied with their sleep, and Southwell and Wistow (1995) who found that 50% of the patients were not satisfied with their sleep during hospitalization. Support for these findings comes from Roy and Andrews (1999) who explained that physical discomfort and pain were the most common causes reducing the level of satisfactory sleep. Also, anxiety and depression can induce a feeling of unsatisfactory sleep (Roy & Andrews, 1999). Consistent with the authors' explanation, in this study found that majority of the subjects had experienced

physical discomfort and pain (Table 9), 24% of the subjects experienced anxiety, and 43% of them reported depression during hospitalization (Table 12).

Forty six percent of the subjects felt fatigued, sleepy, and not able to concentrate during the daytime, indicating that the subjects experienced difficulties with nocturnal sleep, spent more time to fall asleep and an increase in night time awakenings. Supporting data (Table 8) showed that 57% of the subjects had a sleep latency of more than 60 minutes and 80% of the subjects reported more frequent awakenings at least three times or more during the night. A previous study in hospitalized elderly found that those with the highest frequency of arousal and lighter sleep at night had the greatest daytime sleepiness (Roehers, Carskadon, Dement, & Roth, 2000).

Pacini and Fitzpatrick (1982, cited by Miller, 1995) reported that more daytime sleepiness was found among hospitalized than non hospitalized older adults. The authors identified that environmental influences, health status, and state of fatigue impact on sleep during hospitalization. Other studies mentioned that increasing daytime sleepiness could be affected by age related changes in the sleep cycle, medications being used, and medical diseases (Miller, 1995; Thompson, McFarland, Hirsch, & Tucker, 1997). Thus, a high percentage of daytime sleepiness was not surprising among the hospitalized elderly.

The results of study clearly show that the overall sleep quality in the majority (77%) of the subjects who were admitted to medical wards was poorer. Poorer sleep during hospitalization among the subjects in this study are consistent with previous studies who reported that sleep quality of the patients during hospitalization in medical wards was worse than sleep quality at home (McGuire, 1999; Yinnon, Ilan, Tadmor, Altaresco, & Hershko, 1992). The results also consistent with findings of Ersner et al.

(1999), who found that in their study 75% of the elderly reported poorer sleep quality in hospital than that at home. Similar results were also found by Laempet (2001) in which elderly medical patients reported that sleep during hospitalization was worse than sleep at home at the significance level of .001. Poor sleep quality during hospitalization could result from many risk factors. These are symptoms of diseases, discomfort, environment, institutional setting, anxiety, and depression (Craven & Hirnle, 2000; Miller, 1995; Redeker, 2000).

4. Factors Interfering with Sleep

4.1 Physiological factors

The results showed that the subjects experienced three common symptoms and the major physiological factors perceived by the subjects as sleep interference were pain, dyspnea, and cough. This finding is similar to the studies of Yilan (2000) and Laempet (2001) who reported that pain, dyspnea, and cough were the major factors interfering with sleep among hospitalized elderly patients. However, their studies did not mention the degree of sleep interference.

Most of the subjects (97%) who experienced pain perceived that pain interfered with their sleep at low to high level. This supports previous reports that having pain in parts of body causes the patients to awake more frequently and makes it difficult to maintain and stay asleep (Reimer, 2000; Southwell & Wistow, 1995). The pain may come from respiratory infection, irritable bowel syndrome, functional dyspepsia, angina attacks, cancer, and headache (Fass, Fullerton, Tung, & Mayer, 2000; Larson, Halliburton, & Julio, 1993; Menefee et al., 2000; Redeker, Tambury, & Howland, 1998).

According to Manefee et al. (2000) the level of sleep interference is generally influenced by the intensity of the pain.

Dyspnea and cough did interfere with the subjects' sleep, as found by a previous study, Reimer (2001) who mentioned that dyspnea and cough contributed to difficulty in falling asleep and more frequent arousals with shortness of breathing. Further supported by Eliopoulus (1997) explained that sleep interference might arise from respiratory problems producing orthopnea.

Itching from skin problems due to diseases or mosquito bites were perceived by 50% of 21 subjects as sleep interference at the higher level (Table 8). Bender and Leung (2003) reported that more frequent awakenings were associated with increasing itch. A study by Laempet (2001) among elderly medical patients found that all of the subjects who experienced itching perceived it as sleep interference but the study did not mention the level of sleep interference.

4.2 Routine nursing interventions factors

The study found that various nurses' activities at night interfered with sleep but only at the low level of sleep interference. Only a few of the subjects perceived the interference at the moderate or high level. Similar to Yilan's (2000) which 1% to 22% of the subjects mentioning nurses' routine interventions at night interfered with their sleep, but the study did not report degree of sleep interference.

Other studies showed that nurses' routine interventions interfered with sleep only in some patients (Laempet, 2001). In contrast, Simpson, Lee, and Cameron (1996) reported that nurses' activities did not interfere with the patients' sleep. The reason, they gave was that the subjects accepted nurses' routine interventions as essential and helped relieve them of symptoms.

4.3 Environmental factors

A majority of the subjects perceived many of the hospital environments as poor but not all were identified as sleep interference. The most common sleep interference perceived by the subjects was noise from the all sources, hot or cool room temperature, and bright light in the wards.

Noise from all sources was found as sleep interference at the moderate and very much level. This indicates that noise levels in the wards during the night might be above 40 dB. The U.S. Environmental Protection Agency (EPA) (1974, cited by Freedman, Kotzer, and Schwab, 1999) recommends that hospital noise levels less than 40 dB is required for sleep at night. Moreover, Hilton (1987, cited by Simpson, Lee, & Cameron, 1996) found that many of the noises on the general medical-surgical unit were above the recommended levels, for example toilets flushing (44 – 76 dB), intercoms and call lights (48 – 70 dB). Thus, it can cause awakenings, take longer time to fall asleep, and reduce sleeping time (Toft, Bookman, & Arand, 1996).

Ninety three percent of the subjects perceived that noise from other patients or family members interfered with their sleep at the low to moderate level. This is consistent with previous studies which mentioned that noise from other patients or family members were sources of sleep interference (Southwell & Wistow, 1995); Yilan, 2000), but the studies did not report the degree of sleep interference. Laempet (2001) found that noise from other patients or families was the most frequent sleep interference among other environmental factors. Also, Yilan (2000) found that 47% of elderly reported noise from other patients and family members interfered with their sleep. This finding showed that the higher perception of noise as sleep interference is possibly due to the subjects sharing in the general wards and the hospital allowing families to stay with the patients at night.

Moreover, 74% of the subjects indicated that nurses' conversation interfered with their sleep at a low and moderate level of sleep interference. The result was higher than studies of Yilan (2000), and Southwell and Wistow (1995) who found that nurses' conversation was mentioned as a source of sleep interference reported by patients at only 2% and 13%, respectively.

All the subjects perceived that noise from equipment interfered with their sleep at low and moderate level and none reported it at the level of very much. By contrast, Fordham (1991) reported that the loudest noise in the wards came from equipment. In addition, Craven and Hirnle (2000) and Southwell and Wistow (1995) found that only 9% of the subjects reported noise from equipment being used as the source of sleep interference but they did not mention the degree of sleep interference. The difference in the findings could be because of noise level was higher and it has been reported that the level of noise in the ward influences sleep during the night (Freedman, Kotzer, and Schwab, 1999).

The result study found that 42% of the subject perceived noise from outside the room interfered with their sleep at the low level, 21% moderate and only 9% at the high level of sleep interference. This finding is supported by a previous study where 22% (N= 100) of the subjects complained of noise from outside the ward, because the hospital was located at the center of the city (Yilan, 2000). Southwell and Wistow found that 9% (N= 41) of the patients reported noise from outside the ward interfered with their sleep, but the level of sleep interference was not measured. In addition, Fordham (1991) mentioned that people – hospital staff and equipment were the most frequent sources of noise during the night, which is possible from outside of the ward.

Almost 90% of the subjects perceived that hot room temperature interfered with their sleeping. Of these, the majority were at the low level and only a few at level of moderate and very much. Yilan (2000) presented that 26% of the elderly patients complained that hot room temperature interfered with their sleep. Other findings mentioned that hot room temperature due to the cooling system can be an interfering factor, because inadequate cooling system contributes to less efficient sleep (Miller, 1995; Roy & Andrews, 1999).

Another result showed that 46% of subjects perceived bright light in the ward interfered with their sleep. This result was consistent with the study by Yilan, who found that 16% of the subjects reported light interfered with their sleep. Kozier, Erb, Berman, and Burke (2000) agreed that the subjects might have difficulty to sleep in the bright light, because they were accustomed to dim light while sleeping at home. However, Craven and Hirnle (2000) argued that inadequate control of light in hospital might be possible, as nurses on duty must turn on the lights while monitoring and giving interventions to patients.

In conclusion, many environmental factors interfered with sleep but mostly at low to moderate level suggesting that although the subjects were aware of these disturbances they in fact did not see them as interfering with sleep. This finding may be associated with Indonesian culture, especially that of the Batak who are the major respondents of study. McElroy and Townsend (1996) explained that culture, a unique characteristic of human beings, plays a very important role in creating their ability to adapt to new environments. Moreover, previous experience can help an individual to adapt the current encounters (Craven & Hirnle, 2000). Thus, when they are admitted to

hospital their previous experience and culture might help them easily adapt to the new sleeping environment in the hospital setting.

4.4 Psychological factors

Anxiety among hospitalized patients is common as the patients could be worried due to having chronic illness, medical treatment and procedures, financial concern, and unfamiliarity with the hospital environment, fear of death, and uncertain conditions (Craven & Hirnle, 2000; Webster & Thompson, 1985).

The results found that 24% of the subjects who participated in this study experienced anxiety. Among the 24 subjects who had experienced anxiety; 29% (N= 22) reported poor sleep quality (Table A3, appendix). This result was lower than a study of Southwell and Wistow (1995) who found that 76% of the patients reporting being worried did not have enough sleep and the majority of them were on elderly care wards, and in cardiac surgical wards they found that more than 50% of the patients reported anxiety interfering with their sleeping.

Moreover, Yilan (2000) reported that 14% to 24% of elderly medical patients worrying about their illness, medical expenses, treatments and procedures could cause sleep interference. According to Miller (1995) and Fordham (1991) anxiety may interfere with sleep cause frequent awakening during the night with difficulty returning to sleep and early morning arousal.

It is known that depression leads to poor sleep quality and is more prevalent among elderly inpatients or outpatients (Cartwright, 1985; Laury, Lepisto, & Kappeli, 1997; Miller, 1995). According to Steiner, Yonkers, and Eriksson (2000) depression was a common finding in hospitalized elderly patients with a prevalence of 10% – 45%. It supports the finding in this study that 43% of the subjects had depression during

hospitalization, and of these, 48% (N= 37) reported poor sleep quality while in hospital (Table A3, appendix). This is lower than found by Reimer (2000) who reported that depression was accompanied by sleep disturbances in 90% of people who suffer from it.