

Factors Influencing Sleep Quality Among Elderly At Geriatric Residence Of Rindang Asih Ungaran Semarang

¹⁾S. Hudijono

²⁾Budi Widiyanto

^{1,2)}Dosen Jurusan Keperawatan Poltekkes Kemenkes Semarang
Jl. Tirto Agung, Pedalangan, Banyumanik, Semarang
E-mail:

Abstract

Sleep is needed by persons in one third of their lifetime and is the regularly condition. It is influenced by much kind of factors. The factors is divided into 2 kinds, there are intrinsic and extrinsic factors. Age and activity are the most factors influencing sleep. Older people have a problem with their sleep because circadian rhythm of older peoples becomes shorter. This reason make the older people have poor sleep quality in their life. Older female have lower sleep quality than older male. It has effect with their life quality. Life quality becomes lower equal with decreasing sleep quality. Sleep disturbance may be one of the symptoms indicating poor health or life quality deficits.

The objective of this study was to describe sleep quality and identify factors influencing sleep quality among elderly at geriatric residence of Rindang Asih , Ungaran, Semarang

The research design was descriptive study, using purposive sampling. 20 elderly at geriatric residence are being respondent in this study. Collecting data used Pittsburgh Sleep Quality Index and factors influencing sleep quality check list which made by the researcher.

The research result has shown poor quality of elderly at geriatric residence of Rindang Asih , Ungaran, Semarang dominant in this setting and it was dominated by elderly on 75 years old or older. Sleep quality in this setting was influenced by age, physical illness, activity, anxiety, and physical environment.

The health care provider should know the sleep problems, sleep necessary and habitual sleep of patients by assessment so that a good intervention for the clients can be performed satisfactorily.

Key Word: Sleep quality, factors influencing sleep quality, geriatric residence

1. Introduction

In the beginning of the 4th decade, the numbers of awakenings during the night gradually increased (Miller, 1999). Sleep pattern in everyone can be affected by activity, age, habit and etc. Some of these factors cause sleep disorder like insomnia. Luce and Segal (Nugroho, 2000) said that age is the main factor which has effect with quality of sleep. Sleep complaints are common in geriatric patients (McCall, 1995). Therefore, the normal elderly person sleeps lighter, awakens more during the night, and sleeps less than younger people (Goldstein, 1953 in Lau, Kung & Chung, 1983). Melissa Galea (2008) on her study reported that 52 participants from 74 participants who are older people were

self reported poor sleepers, with 21 using benzodiazepine hypnotic medication regularly and 31 not using hypnotic medicines.

As with various somatic diseases, the prevalence of sleep problems increases relating to aging process (Sivertsen, 2006). Sleep disorders can be conveniently grouped into disorders characterized by inadequate sleep, the insomnias; disorders characterized by too much sleep, the hypersomnias (Stephen, 2007). Sleep disorders affect approximately 65 million adult Americans and are most prevalent in the elderly: rates of 50% in community-dwelling people aged 65 years and older and 67% in nursing facility residents have been reported. In a survey by Monane and associates, 65% of 145 nursing facility

residents complained of sleeping difficulties, particularly early morning awakenings (Cramer, Chaponis, Bauwens, & Chamberlain, 1999).

According to WHO (Nugroho, 2000) elderly divided into 4 types based on the age, they are: Middle age (45 - 59 years old), Elderly (60 - 74 years old), Old (75 - 90 years old), Very old (more than 90 years old).

At Rindang Asih Residence which is commonly used to take care of the elderly people, it is very important to make a descriptive survey relating the problems of sleeping among them. Since there is not any research of sleeping before performed in this geriatric residence.

2. Metode

Research Design and Variables

This research uses a non-experimental descriptive survey research design and has two variables. The independent variable is factors of sleep. The dependent variable is sleep quality of elderly.

Population And Sampling Method

The population of this research is the elderly who lived at geriatric residence of Rindang Asih, Ungaran, Semarang. The total number of the research's population is 32 elderly people. The sampling method used in this research is purposive sampling.

Instrumentation

Pittsburgh Sleep Quality Index was adapted to measure patient sleep quality. It was calculated by seven sleep component scores as follows :

1. Sleep Quality;
 - Very good : score 0,
 - Fairly good : score 1,
 - Fairly bad : score 2,
 - Very bad : score 3.
2. Sleep Latency : Length to fall asleep:
 - </= 15 minutes : score 0, 16-30 minutes : score 1, 31-60 minutes : score 2, > 60 minutes : score 3. Fall to sleep more than 30 minutes: Not during the past month : score 0, Less than one a week : score 1, Once or twice a week : score 2,

Three or more times a week : score 3. Sleep latency. It is a sum of scores, above: 0: score 0, 3-4 : score 2, 1-2: score 1, 5-6 : score 3.

3. Sleep Duration; > 7 hours:score 0, 5-6 hours:score 2, 6-7 hours:score 1, <5 hours:score 3
4. Habitual sleep efficiency [Time asleep/time in bed × 100%]
 - a. > 85% : score 0,
 - b. 75%-84% : score 1,
 - c. 65%-74% : score 2,
 - d. < 65% : score 3
5. Sleep disturbances
 - a. Questions sleep disturbance: 1). Not during the past month : score 0, 2). Less than one a week : score 1, 3). Once or twice a week : score 2, 4). Three or more times a week : score 3
 - b. Sum of score 9 questions: 1). 0: score 0, 2). 10-18 : score 2, 3). 1-9 : score 1 4). 19-27 : score 3, 3).
6. Sleep medications:
 - 1). Not during the past month: score 0,
 - 2). Less than one a week:score 1,
 - 3).Once or twice a week:score 2 ,
 - 4). Three or more times a week:score 3
7. Daytime dysfunction
 - a. Questions about daytime dysfunction: 1). Not during the past month: score 0, 2). Less than one a week: score 1, 3). Once or twice a week: score 2, 4). Three or more times a week : score 3
 - b. Sum of score 2 questions: 1). 0: score 0, 2). 1-2: score 1, 3). 3-4: score 2, 4). 5-6: score 3

Besides that, to identify the factors influencing of sleep quality, researcher used the check list contained 24 questions.

1. Validity, Reliability and Initial Study

The Pittsburgh Sleep Quality Index (PSQI) was done to validate the research and had internal consistency and a reliability coefficient (Cronbach's alpha) of 0.83 for its seven components (Smyth, 2007). Clinical and clinometric properties of the PSQI were assessed with "good"

sleepers (healthy subjects, $n = 52$) and "poor" sleepers (depressed patients, $n = 54$; sleep-disorder patients, $n = 62$). Instruments validations were established with content and construct validity and validated by the experts from Health Polytechnic of Semarang. The results showed that 24 questions were relevant being the check list used. The initial study performed with 20 respondents at Pucang Gading Geriatric Residence. The result showed that Cronbach's alpha value was 0, 733. It means that the reliability was considered acceptable.

2. Method of Data Collection and Processing

Data gathering was performed by filling the check lists and distributed to the respondents directly. Frequency distribution and proportion was applied to the demographic data conducted with Microsoft Excel to process the data.

3. Ethical Considerations

In this research used ethical considerations included University Approval, Informed Consent, Autonomy, Confidentiality, Anonymity (no name)

3. Result And Discussion.

1. Result Of Study

Sample Characteristics

The respondent's characteristics in this study include gender, age and educational background.

a). Age of Respondents

Table 4.1 Ages of Respondents in Geriatric Residence of Rindang Asih, Ungaran, Semarang, November 2009

Age	Frequency (n)	Percentage (%)
60-74	10	50
75-90	9	45
>90	1	5
	20	100

Table 4.1 indicates that respondent's age in Geriatric Residence of Rindang Asih were between 60-74 years old (50%). 45% were 75-90 years old and just 5% of respondents were >90 years old.

b). Gender of Respondents

Table 4.2 Genders of respondents in Geriatric Residence of Rindang Asih, Ungaran, Semarang, November 2009

Gender	Frequency (n)	Percentage (%)
Male	0	0
Female	20	100
	20	100

From table 4.2 it could be seen that all of respondent were female consisted of 20 respondents.

c). Educational background of Respondents

Table 4.3 Educational background of respondent in Geriatric Residence of Rindang Asih, Ungaran, Semarang, November 2009

Educational background	Frequency (n)	Percentage (%)
Elementary School	5	25
Junior High School	2	10
Senior High School	0	0
Diploma Degree	0	0
Bachelor Degree	0	0
No Educational Background	13	65
	20	100

Table 4.3 shows that 65% of the respondents in Geriatric Residence of Rindang Asih had no educational background. 25% of the respondents already graduated from Elementary School. Just 10% of the respondents in Geriatric Residence of Rindang Asih Ungaran have already graduated from Junior High School.

2. Factors Influencing Sleep of Respondents in Geriatric Residence of Rindang Asih, Ungaran, Semarang

The factors influencing sleep of respondents described in the below tables from table 4.4a - table 4.4

Table 4.4a Physical illness as factor influencing sleep of respondents in Geriatric Residence of Rindang Asih, Ungaran, Semarang, November 2009

category of	yes/no	f	%
-------------	--------	---	---

factors			
physical illness	yes	5	25
	no	15	75
total		20	100

Table 4.4a shows that 25% respondent has complained with their sleep because of physical illness and 75% respondent has no complained with their sleep because of physical illness.

Table 4.4b Drugs as factor influencing sleep of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang, November 2009

category of factors	category		
	yes/no	f	%
Drugs	Yes	0	0
	No	20	100
total		20	100

Table 4.4b shows that sleep of all respondents is not influenced by drugs

Table 4.4c Daily activities as factor influencing sleep of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang, November 2009

category of factors	category		
	yes/no	f	%
daily activities	Yes	1	5
	No	19	95
total		20	100

Table 4.4c shows that 5% respondent has complained with their sleep because of daily activities and 95% respondent has no complained with their sleep because of daily activities.

Table 4.4d Anxiety as factor influencing sleep of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang, November 2009

category of factors	category		
	yes/no	f	%
Anxiety	Yes	6	30
	No	14	70
total		20	100

Table 4.4d shows that 30% respondent has complained with their sleep because of anxiety and 70% respondent has no complained with their sleep because of anxiety.

Table 4.4e Physical environment as factor influencing sleep of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang, November 2009

category of factors	category		
	yes/no	f	%
physical environment	Yes	5	25
	No	15	75
total		20	100

Table 4.4e shows that 25% respondent has complained with their sleep because of physical environment and 75% respondent had no complains with their sleep related to physical environment.

Table 4.4f Exercise regularly as factor influencing sleep of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang, November 2009

category of factors	category		
	yes/no	f	%
exercise regularly	Yes	20	100
	no	0	0
Total		20	100

Table 4.4f shows that all of respondents have complained with their sleep because of physical environment.

3. Sleep Quality of Respondents based on PSQI (Pittsburgh Sleep Quality Index) in Geriatric Residence of Rindang Asih , Ungaran, Semarang

The sleep quality of respondents describes in table 4.5.

Table 4.5 Sleep quality of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang, November 2009

Sleep Quality	Frequency (n)	Percentage (%)
Good	9	45
Poor	11	55
Total	20	100

Table 4.5 shows that 9 respondents (45%) had good sleep quality and the majority of respondents in geriatric residence, 11 elderly (55%), had poor sleep quality.

4. *Sleep qualities related to ages of Respondents in Geriatric Residence of Rindang Asih I, Ungaran, Semarang*

The sleep quality related to ages of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang described in table 4.6.

Table 4.6 Sleep qualities related to ages of respondents in Geriatric Residence of Rindang Asih, Ungaran, Semarang, November 2009

age	sleep quality			
	Good sleep		Poor sleep	
	F(n)	%	F(n)	%
60-74	3	60	7	47
75-90	2	40	7	47
>90	0	0	1	6
total	5	100	15	100

Table 4.6 shows that the good sleepers (60%) were found in 60-74 years old more often than 75-90 years old or >90 years old. The poor sleepers were dominant in 60-74 years old and 75-90 years old which each 47% in every stage age also 6% in >90 years old.

5. *Sleep qualities related to educational background of Respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang*

The sleep quality related to educational described in table 4.7.

Table 4.7 Sleep qualities related to educational background of respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang, November 2009

Educational Background	Sleep Quality	F(n)		%
		F(n)	%	
Elementary School	Good	2	10	
	Poor	3	15	
Junior High school	Good	1	5	
	Poor	1	5	
No educational background	Good	2	10	
	Poor	11	55	
Total		20	100	

Table 4.7 shows that the poor sleepers (55%) were dominated by elderly who had no educational background. In elementary school background was dominated by poor sleepers (15%) and in junior high school background was equal between good sleeper and poor sleeper (5%).

2. *Discussion and Analysis*

a. *Respondent's Characteristics*

The characteristics of respondents in this study were ages, gender and educational background. In this study, 50% respondents were range between 60-74 years old and this age was dominant in geriatric residence. Based on this data, life expectation of elderly in this geriatric residence is still lower than other developed countries like Japan and Europe. Life expectation of elderly can be increased by improving the quality of health care services and then health status of elderly will increase (Suyono, 2001). Beside that, About 40% of elderly people complain about their problems sleeping at night. Sleep problems, however, can affect sleep quality (Vitiello, 1998). Unfortunately, it is unclear as to how much sleep disorders affect sleep quality in the elderly. Improvements in sleep hygiene can dramatically improve the quality of sleep (Miller, 1998).

Furthermore, 100% of respondent were female. This number is high risk with sleep disorder and poor sleep quality because female gender and/or older (≥ 75 years) age were significantly associated with depression because of defeat and loss in the past also lack of enthusiasm (Kaira, 2008). In other research showed that older female reduced sleep quality (71% increased risk) (Bliwise, Foley, Vitello, Ansari, Ancoli-Israel, and Walsh, 2008). It means that older female have high risk with decreasing of sleep quality.

Table 4.3 shows that 65% respondents had no educational background. Based on interviewing to elderly, they said that they could not go to school because of low economy level

on their family. Besides that, Swasono (2008) said that low of education level on female was caused by discrimination of female on family to get education and restriction of female activity during colonize era. The discrimination of female caused lower life expectation than male and the problems will appear as long as female is being left behind the male. This problem can influence the sleep quality of someone. It's suitable with the result illustrated on table 4.7 which poor sleepers are dominated by elderly who's had no educational background.

b. Factors Influencing Sleep of Respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang

The findings data of this study indicates that elderly in Geriatric Residence of Rindang Asih , Ungaran, Semarang took an exercise in geriatric residence (100%) and felt anxiety (30%). The other factors were physical illness (25%) and physical environment (25%) that affect with sleep of elderly.

Some respondents said that they could take rest and sleep well when they did exercise everyday like senam lansia regularly. They felt their body very comfortable after it. It was indicated the elderly would have a good quality of sleep when they did exercise. It is supported by Ferris et al's research (2005) which showed that regular exercises program can improve major skeletal muscle strength and quality of sleep who are characterized as "good sleepers."

Based on interviewed, elderly said if they worried with other elderly and feel anxiety with their condition , they could not sleep well. It was appropriate with other research that the common problem of sleep in elderly (65-74 years old) was anxiety (Morgan, Healey, and Healey, 1999). Beside that, Alapin, Libman, Bailes, & Fichten (2003) in Galea's research showed that anxious and worried about sleep may be linked to the complaint of insomnia in elderly people and having a poor of sleep quality. Anxiety can influence the sleep quality

because of metabolic process in the body will also increase and the neurotransmitter (acetylcholine) production will be increased in line with elevation of RAS stimulation. If acetylcholine become higher amount in the body, someone will feel difficult to sleep. It means that anxiety is the factors influencing sleep in elderly .

Other factor was physical illness (25%). Elderly could not sleep well if they had sick like pain because of rheumatoid disease and eczema. They felt disturbed with this factor like itchiness in their skin (4%). But some of them could keep their sleep well when they felt pain on their knees. Elderly said that they could manage their pain or illness when they slept. This matter is different with the study conducted by Ohayon, Zulley, Guillemineault, Smirne, and Priest (2001) who interviewed 13.057 subjects who 18.6% of samples were elderly (65 years of age or older) in three countries (United Kingdom, Germany, and Italy), in which one third of elderly had a physical illness and it was disturbing their sleep. Based on the above statement, response of every person with physical illness is different so physical illness is not always influencing the sleep quality.

Some elderly (25%) said that their sleep is commonly disturbed by environment which was not conducive for sleeping. If the condition of environment was being quite and cool, the elderly could sleep well although lamp on the room was turn on every night and this condition was not disturbing the elderly for sleep. Elderly said that the condition of room at every night sometimes so noise at the middle of night and it disturbed others elderly to sleep. Controlling of environment is an effort to solve external factor influencing sleep quality (Potter & Perry, 2005).

c. Sleep Quality of Respondents in Geriatric Residence of Rindang Asih , Ungaran, Semarang

This study results showed that 45% of the elderly in geriatric residence had a

good quality of sleep and 55% had a poor quality of sleep. It is concluded that the number of elderly in geriatric residence were in poor quality of sleep .

Poor quality of sleep level was included by eleven elderly who 47% of elderly in 60-74 years old, 47% of elderly in 75-90 years old and 70 years old or over. It was commonly happen in the older people that sleep quality is influenced by internal factors, there are sickness, age and stress, and the external factor is environment (Potter & Perry, 2005). This statement is appropriate with Elbersole and Hess's statement (1998) that the quality of sleep deteriorates with age. It means that sleep quality is influenced by age and sleep quality will decrease as long as the aging process.

4. Conclusion And Recommendation

A. Conclusion

The research about factors influencing sleep quality in geriatric residence of Rindang Asih Ungaran, Semarang has been done. It can be concluded:

1. The total of respondents was 20 of elderly. All of elderly were female. Most of respondents were on the ages 60-74 years old. The respondents were dominated (65%) with no educational background.
2. Twenty respondents in geriatric residence, who participated in this research, were reported that elderly who experienced poor sleep quality (55%) are more than elderly who experienced good sleep quality (45%).
3. Sleep quality of elderly in geriatric residence of Rindang Asih I, Ungaran, Semarang could be influenced by age, gender, educational background, regularly exercise (100%), anxiety (30%), physical environment (25%), and physical illness (25%).

B. Recommendation

The findings of this study give support for the following

recommendations for actions to be taken for a better future management.

1. For Geriatric Residence

The geriatric residence management should make similar quiet condition among rooms to modify a conducive situation for sleeping.

2. For Health Care Providers

The health care providers should assess the sleep problem and the factors regularly because the frequencies of poor sleepers (55%) are more often than good sleeper (45%). Beside that, health care provider should facilitate proper sleep habits of elderly like avoidance of excessive time in bed; give the elderly daily activity and exercise; and limitation of loud noise, excessive light and uncomfortable room environmental.

5. Ucapan Terimakasih

Ucapan banyak terimakasih disampaikan atas kesempatan yang diberikan untuk mendapatkan Dana Risbinakes DIPA Politeknik Kesehatan Kemenkes Semarang, sehingga penelitian ini dapat terselesaikan.

6. Bibliography

- Acuri, J. 2008. Journal sleep: insomnia may perpetuate depression in some elderly patients. Westchester: American Academy of Sleep Medicine. Available: <http://aasmnet.org> (April 5th, 2008)
- Addicott, M., Jaramillo, A. and Moore, H. 2006. The physiology of sleep and dreaming. Available: <http://macalester.edu> (May 6th, 2008)
- American Sleep Apnea Association. 2007. Sleep apnea information. Washington: American Sleep Apnea Association. Available: <http://sleepapnea.org> (July 3rd, 2008)

- Arikunto, S. 2002. *Prosedur penelitian: suatu pendekatan praktek*. Jakarta: Rineka Cipta
- Bliwise, D.L., Foley, D.J., Vitello, M.V., Ansari, F.P., Ancoli-Israel, S., and Walsh, J.K.. Nocturia and disturbed sleep in the elderly. Atlanta: Emory University School of Medicine. Available: <http://nlm.nih.org> (December 12th, 2008)
- Buyse, D.J. 2001. *The international classification of sleep disorders, revised : diagnostic and coding manual*. U.S.A: American Academy of Sleep Medicine. Available: <http://hp200406ageingprocess.org.uk> (April 19th, 2008)
- Buyse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. 1989. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Pittsburgh: Department of Psychiatry. Available: <http://nlm.nih.org> (July 3rd, 2008)
- Chesson, A., Hartse, K., Anderson, W.M, Davila, D., Johnson, S., Littner, M., Wise, M., and Refcase, J.. 2000. Practice parameters for the evaluation of chronic insomnia. 23: 1-4. Rochester: American Academy of Sleep Medicine. Available: <http://aasmnet.org> (April 5th, 2008)
- Cramer, G.W., Chaponis, R.J., Bauwens, S., and Chamberlain, T.. 1999. Evaluation of sleep disorders in nursing facilities. *America: American Society of Consultant pharmacist*. 14:545-556. Available: <http://ascp.com> (June 10th, 2008)
- Doghramji, K. 2006. Epidemiology and diagnosis of insomnia. 12:S214-S220. U.S.A: *The American Journal of Managed Care*.. Available: <http://ajmc.com> (June 21st, 2008)
- Ellipoulus, C. 2005. *Gerontological nursing 6th edition*. New York, Philadelphia: Lippincott
- Feinsilver, S.H 2008. Sleep apnea in the elderly. Available: <http://uptodateonline.com> (April 8th, 2008)
- Ferris, L.T., Williams, J.S., Shen, C.L., O'keefe, K.A., Hale, K.B.. 2005. Resistance training improves sleep quality in older adult: a pilot study. 4:354-360. Texas: *Journal of Sports Science and Medicine*. Available: <http://www.jssm.org> (November 25th, 2008)
- Galea, M. 2008. Subjective sleep quality in the elderly: relationship to anxiety, depressed mood, sleep beliefs, quality of life, and hypnotic use. Victoria: School of Psychology. Available: <http://wallaby.vu.edu.au> (May 6th, 2008)
- Gallagher, K. and Tank, C.. 2007. *Restless legs syndrome*. Rochester: Restless Legs Syndrome Foundation. Available: <http://rls.org> (July 3rd, 2008)
- Groulx, B. 1998. *Elderly sleep disorder and alzheimer's diseases: part one*. Canada: The Canadian Alzheimer Diseases. Available: <http://stacommunications.com> (April 25th, 2008)
- Harvey, AG. 2001. Insomnia: symptom or diagnosis: *clin psychol rev*.;21:1037-1059. Available: <http://maedica.ro> (June 8th, 2008)
- Kaira, Suchi. 2008. Age-related bias creates depression in elderly. Available: <http://catfull.com> (December 16th, 2008)
- Karger, A.G. 2000. Sleep patterns and mortality among elderly patients in a geriatric hospital. 46:318-322. Basel: *Gerontology*. Available: <http://content.karger.com> (April 8th, 2008)

- Lau, B.W.K., Kung, N.Y.T, Chung, J.T.C.. 1983. Pattern of sleep disturbance in a primary care setting. 35: 77-84. Hong Kong: The Bulletin of The Hong Kong Medical Association. Available: <http://sunzi1.lib.hku.hk> (May 6th, 2008)
- Le, K.D.D. and Raharjo, Y.. 2002. Community-based support for elderly in indonesia: the case of PUSAKA. Jakarta: Research Centre for Population Indonesia Institute of Sciences. Available: <http://iussp.org> (June 3rd, 2008)
- London Sleep Centre. 2007. What are sleep disorder?. Available: <http://LondonSleepCentre.com> (May 2nd, 2008)
- Lubitz, J., Cai, L., Kramarow, E., and Lentzner, H.. 2003. Health, life expectancy, and health care spending among the elderly. 349:1048-1055. Available: <http://content.nejm.org> (June 3rd, 2008)
- Lynn, 1986 in Arwani.2008. Hand Out Mendisain dan Uji Kuesioner. Semarang
- MacDonald, I. 2004. Care of elderly: the ageing process in a nutshell. Glasgow: Gartnavel General Hospital. 11: 239-240. Available: <http://pharmj.org.uk> (April 19th, 2008)
- McCall, W.V. 2004. Sleep in the elderly : burden, diagnosis, and treatment. 6:9-20. Winston-Salem: Department of Psychiatry and Behavioral Medicine, Wake Forest University. Available: <http://www.psychiatrist.com> (April 4th, 2008)
- Miller, E.A. 1999. Nursing care of older adults (theory and practice). New York, Philadelphia: Lippincott
- Miller, Kent 1998. Sleep and aging: recent research. Available: <http://hope.edu> (December 12th, 2008)
- Notoatmodjo, S. 2003. Metode penelitian kesehatan. Jakarta: PT. Rineka Cipta.
- Nugroho, W 2000, Keperawatan gerontik edisi 2 . Jakarta: EGC
- Ohayon, M.M., Zully, J., Guilleminault, C., Smirne, S., Priest, R.G.. 2001. How age and daytime activities are related to insomnia in the general population? Consequences for elderly people. 49(4):360-6. Available: <http://sleepeval.com> (November 25th, 2008)
- Polit, D.F., and Hungler, B.P. 1999. Nursing research: principles & methods. Philadelphia: Lippincott.