Effects of Laughter on Quality and Hours of Sleep and Blood Pressure among Elderly in Indonesia

Richard Kasenda and Susy A Jael

Adventist University of the Philippines susy_jael@yahoo.com

Abstract

The study aimed to determine the effects of laughter on quality and hours of sleep, systolic and diastolic blood pressure among the elderly and made use of a quasi-experimental interrupted time-series design. Forty participants were selected through purposive sampling, 20 were randomly assigned to experimental group and 20 to control group. Findings revealed that in the control group the baseline mean for quality of sleep and post intervention was average. In the experimental group, the baseline mean for quality of sleep and first week post intervention was average, while in the second week post intervention was good. The hours of sleep was highest in the experimental group on the second week post intervention. The mean of systolic and diastolic was lowest in the experimental group on the second week post intervention. There was a significant difference in the experimental group in the quality of sleep, hours of sleep, and systolic blood pressure between baseline and second week post intervention, but no significant difference in the diastolic blood pressure. There was a significant difference in the pattern of change across the three time period in quality of sleep, hours of sleep, and systolic blood pressure between control and experimental group, while no significant difference in the diastolic blood pressure. Gender and educational attainment made no significant difference in the quality of sleep, hours of sleep, and systolic blood pressure, while there was a significant difference in diastolic blood pressure.

Keywords: laughter therapy, quality of sleep, hours of sleep, blood pressure

I. Introduction

Elderly are an extremely diverse individual who possess a broad range of abilities and needs in all domains of function. They continue to experience a varied loss of physical, mental, and independence. This reality, along with the varied lifestyles, environmental conditions, and life histories creates the need for highly individualized nursing care. This scenario posts a challenge to the care givers especially to the nurses.

The United Nations has reported that the number of persons 60 years old and older worldwide is estimated to be two billion by the year 2050 as compared with about 841 million in 2013 (UN, 2013). In 1950, there were 55 million men and women in Asia ages 65 and above, while in 2000, there were 207 million. Moreover, the report claimed that by 2050, the elderly population is projected to be 865 million. In Indonesia, in the year 2010, there were
18.04 million elderly citizens, and by 2020 it is estimated to reach 28.8 million (Webadmin, 2012).

Aging is associated with major physical, psychological and sociological change. One of these is in relation to sleep. Sleep serves to rest body organs, conserve energy, preserve biorhythm and restore mental alertness. According to The American Geriatrics Society (2009), elderly with sleep disorders are more likely to develop hypertension, depression, cardiovascular, and cerebrovascular disease. Carskadon and Dement, (2005) found out that there is a strong association between sleep disorders and illness or early death. They claimed that as many as 50% of older individuals complain about sleep problems, including disturbed or ‘‘light’’ sleep, frequent awakenings, early morning awakenings, and undesired daytime sleepiness. In Indonesia sleep disorders strike 50% of people aged 65 years or older who were living at home, 66% of people who live in facilitated maintenance, and approximately 20% 50% of elderly reported insomnia
(Stanley, Mickey & Patricia, 2006).

Laughter is a part of everyday life, and recently it is receiving increased attention as a form of therapy. According to a study done by Hae and Chang (2011), laughter therapy is considered to be useful,

cost-effective, and easily accessible intervention that has positive effects on sleep quality in the elderly. Laughter relaxes the whole body, relieves physical tension and stress. Laughter improves the function of blood vessels and increases blood flow, which can helps protect against a heart attack and other cardiovascular problems. Laughter dissolves distressing emotions. Laughter helps relax and recharge. It reduces stress and increases energy, enabling a person to stay focused and accomplish more (Seagel & Smith, 2014).

Many older individuals have high blood pressure arising from the vasoconstriction associated with aging, which produces peripheral resistance (Eliopoulos, 2014). According to Miller as cited by Laughing Diva (2014), the benefits of laughter can decrease blood pressure and increase blood flow through the expansion of the inner lining of arteries. A study done by Peeples (2011) found out that laughter therapy dropped 6 mmHg (Peeples, 2011). Moreover, according to America
Medical Journal and Association for
Applied and Therapeutic Humor (2013**)** ten minutes of laughter drops 10-20mmHg in blood pressure. According to Touhy and Jet (2012), blood pressure, especially systolic blood pressure, increases with age, with a leveling off or decrease of the diastolic pressure for persons about 60 years of age and older. Arterial wall stiffening consistently increases and baroreceptor activity decreases, which is thought to be associated with changes in catecholamine level. Erber (2013) stated that, over time the walls of the arteries become less elastic and blood pressure often increases. Mauk (2014) added that as persons age increases, the systolic blood pressure tends to rise, and the risk of stroke associated with hypertension also rises.

Research has shown that many elders suffer from physiological disorders that include sleep disorder and changes in the blood pressure. Thus, prevention and effective treatment of the disorder in old age can lead to significant reduction in sleep deprivation, morbidity, mortality, medical illnesses and health care costs. In this study, the researcher has examined the effect of laughter therapy on quality of sleep, hours of sleep, systolic and diastolic blood pressure.

II. METHODS

This study utilized the quasiexperimental interrupted time-series with pre and post-test research design. Time series design involves the collection of data over an extended time period, with multiple data collection points to both before and after intervention to a single group of participants (Polit & Beck, 2010).

The research design used in this study is summarized in Figure 1.

Figure 1. *Time Series Design Utilizing Experimental and Control Group*

Expt O_1 X_1 X_2 O_2 X_3 X_4 O_3 Control O_4 O_5 O_6

Where :

O1 pre observation of quality and hours of sleep and blood pressure on the experimental group.

X1 intervention of laughter therapy immediately after the pre-measurement. X2 intervention of laughter on the first week, on Wednesday

O2 post observation of blood pressure on Wednesday of the first week, 15 minutes after the laughter therapy and quality and hours of sleep on Thursday at 9:00AM.

X3 intervention of laughter therapy on the second week, on Tuesday

X4 intervention of laughter therapy on the second week, on Wednesday

O3 post observation of blood pressure on Wednesday of the second week 15 minutes after intervention. Post measurement of quality and hours of sleep on Thursday 9:00 AM.

O4 initial observation of quality and hours of sleep and blood pressure on first week on the control group, on Tuesday

O_5 observation of blood pressure in the first week, on Wednesday, and measurement of quality and hours of sleep on the first week on Thursday

O6 observation of blood pressure on the second week on Wednesday and measurement of quality and hours of sleep on the second week on Thursday.

Forty participants were selected through purposive sampling, 20 were randomly assigned to experimental group and 20 to control group. Subjects in the experimental group had the laughter therapy for 25 minutes a day for two times a week, total of four (4) times in two weeks. The subjects in the control group did not receive any intervention. Both the experimental group and control group filled out the questionnaire on sleep quality, and hours sleep and their blood pressure was measured.

The participants were given a complete and detailed explanation about the nature and the purpose of the study. The researcher emphasized to the target participants that participation is voluntary, and that they have the freedom to withdraw from the study

anytime. Moreover, it was explained that confidentiality and anonymity would be observed. A signed written consent was A signed written consent was secured after the explanation and before the conduction of the study. Fifteen minutes
after the last intervention, debriefing was done by the researcher. The participants were allowed to express their feeling and thoughts about the study.

III. Results

Quality of Sleep, Hours of Sleep, Systolic and Diastolic Blood Pressure

The data in Table 1 reveals that the mean for quality of sleep and hours of sleep are highest in the experimental group on the second week after the intervention. Also, the mean of systolic and diastolic are lowest in the experimental group on the second week after the intervention. This result of the study shows that laughter therapy improved the quality of sleep from *fair* to *good* and increased the hours of sleep and decreased the values of systolic and diastolic. The quality of sleep in the control group did not improved statistically from a rating of fair, however, the quality of sleep the participants from the experimental from had improved from fair to good after the laughter therapy.

Table 1. *Descriptive Statistics of Quality of Sleep, Hours of Sleep, Systolic and Diastolic Blood Pressure in the Control and Experimental Group.*

	Baseline	Post 1st week		Post 2nd week			
	M	SD	M	SD	M	SD	
Control							
Quality of sleep	10.80	2.73	10.55	2.66	10.15	2.66	
Hours of sleep	6.40	1.23	6.45	1.23	6.35	1.27	
Diastolic	81.50	7.45	79.75	7.52	82.25	7.34	
Experimental							
Quality of sleep	11.05	2.26	12.50	1.88	14.05	1.19	
Hours of sleep	5.75	1.33	6.30	1.03	7.00	1.45	
Systolic	122.50	9.25	118.25	9.36	114.75	7.69	
Diastolic	80.75	7.99	79.50	7.59	77.75	7.16	

Legend : A=Fair, 9-12;, G = Very Good 13-15

Difference in the Quality of Sleep, Hours of Sleep, Blood Pressure Between the Baseline and Post Intervention in the Experimental Grou

Table 2
Difference in the Quality of Sleep, Hours of Sleep, Systolic and Diastolic Blood Pressure Between the Baseline and Post Intervention in the Experimental

	Baseline		Post 2nd week				
	M	SD	M	SD	t	p	
Quality of sleep	11.05	2.26	14.05	1.19	-5.62	.000**	
Hours	5.75	1.33	8.25	1.45	-3.77	.001**	*Group*
Systolic	122.50	9.25	114.75	7.69	11.46	.000**	***Sig at .01*
Diastolic	80.75	7.99	77.75	7.16	1.98	.062	

The result in Table 2 shows that there was a significant difference in the experimental group between baseline and second week post intervention specifically on the quality of sleep, hours of sleep, and systolic blood pressure. However, the data reveals that there was no significant difference in the diastolic blood pressure.

Difference in the Pattern of Change across the Three Time Period Between Control and Experimental

Group in the Quality of Sleep

The result in Table 3 shows that there was a significant interaction of time and group (time*group) for quality of sleep, F = 49.71, p=.00. This indicates that the difference in the pattern of change in quality of sleep across the three time period is significantly different between the control and experimental group. Further, it was noted that in the three time period in the experimental group the pattern of change for quality of sleep is increasing from baseline to post intervention second week while in the control group it is decreasing from baseline to post intervention second week.

Table 3
Difference in the Pattern of Change Across the three Time Period Between Control and Experimental

Source	SS	df	MSS	F	P	E_2
Quality of Sleep	27.62	2	13.81	20.6	.00	.35
Quality of sleep*group	68.72	1.5	44.33	49.7	.00	.57
Error (Quality of sleep)	51.00	76	.67			

Group in the Quality of Sleep

SS-Sum of Squares, df-degrees of Freedom. MSSMean Sum of Squares, E^2-Partial Eta Square

Difference in the Pattern of Change across the Three Time Period Between Control and Experimental Group in the Hours of Sleep

Table 4
Difference in the Pattern of Change Across the three Time Period between Control and Experimental Group in the Hours of Sleep

Source	SS	df	MS	F	P	Eta_2
Hoursof Sleep	7.20	2	3.60	9.70	.00	.20
Hoursof sleep*gro up	8.60	1.48	5.79	11.58	.00	.23
Error (Hoursof sleep)	28.2	76	.37			

SS-Sum of Squares, df-degrees of Freedom. MSS-Mean Sum of Squares, E^2-Partial Eta Square

Table 4 shows that there was a significant interaction of time and group (time*group) for hours of sleep, F = 11.58, p=.00. This indicates that the pattern of change in hours of sleep across the three time period is different between the control and experimental group. Further, it was noted that in the three time period in the experimental group the pattern of change of hours of sleep is increasing from baseline to post intervention second week while in the control group the pattern of change is decreasing from post intervention first week to post intervention second week.

Difference in the Pattern of Change Across the Three Time Period Between Control and Experimental Group in the Systolic Blood Pressure

Table 5
Difference in the Pattern of Change Across the three Time Period Between Control and Experimental Group in the Systolic Blood Pressure

Source	SS	df	MS	F	P	Partial Eta²
						.40
Systolic	261.25	2	140.62	25.96	.00	
systol-ic*group	323.71	2	161.67	29.88	.00	.44
Error (systolic)	411.66	76	5.41			

SS-Sum of Squares, df-degrees of Freedom. MSS-Mean Sum of Squares, E^2-Partial Eta Square

The result shows that there was a significant interaction of time and group (time*group) for systolic blood pressure, F(2)= 29.88, p=.00. This implies that the difference in the pattern of change in systolic blood pressure across the three time period is different between the control and experimental group. Further, it was noted that in
the three time period in the experimental group the pattern of change in the systolic blood pressure is significantly decreasing from baseline to post intervention second week, while in the control group the pattern of change is almost the same across the three time period.

Difference in the Pattern of Change across the Three Time Period Between Control and Experimental Group in the Diastolic Blood Pressure

There was no significant interaction of time and group (time*group) for diastolic blood pressure, F(2) = 2.47, p=.09. This implies that the difference in the pattern of change in diastolic blood pressure across the three time period is not different between the control and experimental group. Further, it was noted that in the three time period in the experimental group the was no significant difference in the quality of sleep, hours of sleep, and systolic blood pressure in the first week post intervention when gender was considered, it is noteworthy that there was a significant difference in the diastolic blood pressure. Further, that the diastolic mean was higher in male than in female during the first week post intervention and that the difference was statistically significant.

Table 7
Gender Differences in the Three-time Period of the Quality of Sleep, Hours of Sleep, Systolic and Dias-tolic Blood Pressure on Experimental Group.

	Male		Female				
	M	SD	M	SD	t	P	VI
Baseline							
Quality of Sleep	11.00	2.30	11.10	2.33	-.09	.87	NS
Hours	5.60	1.64	5.90	.99	-.49	.10	NS
Systolic	124.0	8.43	121.0	10.2	.71	.93	NS
Diastolic	80.50	6.43	81.00	9.66	-.13	.32	NS
Post-Int 1st							
Quality of Sleep	12.40	1.50	12.60	2.27	-.23	.60	NS
Hours	6.20	1.31	6.40	.69	-.42	.08	NS
Systolic	121.0	8.09	115.5	10.1	1.3	.57	NS
Diastolic	80.50	4.37	78.50	10.0	.57	.02	Sig
Post-Int 2nd							
Quality of Sleep	14.10	.73	14.00	1.56	.18	.25	NS
Hours	7.10	1.10	6.90	1.79	.30	.32	NS
Systolic	116.0	7.37	113.5	6.18	.71	.92	NS

Diastolic	79.00	6.14	76.50	8.18	.77	.38	NS

Further results revealed that there was no significant difference in the quality of sleep and blood pressure in three-time period when educational attainment was considered. The mean in the baseline, post in-tervention first week and second week are not significant in all levels of education. The mean for the category "noschool" and "college" were decreased from baseline to post intervention par-ticularly during the second week, but the mean of elementary and high school was slightly increased. On the other hand the result also showed that there was no significant difference in the systolic blood pres-sure in three times period for noschool, elementary, high school and college. The mean for the category, no school, high school, and college were increased from baseline to post inter-vention second week, but for elemen-tary there was a decrease but not sig-nificant.

IV. DISCUSSION

Among the elderly, laughter can significantly improve the quality of sleep and increase hours of sleep and could decrease the systolic blood pressure. Although, the decrease in the diastolic blood pressure was not statistically significant, it is noteworthy that there was a decrease in its value. The result also implies that the more the client experience laughter then the more it can improve the quality of sleep, the higher will be the hours of sleep, and the higher will be the decrease in the systolic and diastolic blood pressure values. The result of the study is consistent with the findings of the study of Ko and Youn (2011). Their study found out that laughter therapy has positive effects on the quality of sleep. Moreover, Stacy (2011) claimed that 15 minutes of laughter is equal to the benefits of two hours of sleep. Further, the result of the study supports the claim of Preidt (2014), Ghodsbin, Ahmadi, Jahanbin, and Shariff (2015). According to them laughter lowers the blood pressure and increases blood flow. Moreover, according to research that was conducted by O'riordan (2008) subjects who laughed had reduced their systolic blood pressure for more than 6 mm Hg. Moreover, a study done in Japan by Miller and Knepper (2014) reveals that laughter can drop 5 to 7 mmHg in systolic blood pressure, lowering the likelihood of blood vessel stiffness. America Medical Journal added (2013) that ten minutes of laughter drops 1020mmHg in blood pressure. Epstein (2014) stated elderly are at a higher risk of having high blood pressure, and laughter helps to balance or lower blood pressure by increasing vascular blood flow.

The result also implies that gender made a significant influence on the diastolic blood pressure, but not with the quality of sleep, hours of sleep, and systolic blood pressure among the elderly. The study done by Abel as cited by Capps (2014) found that, there was no significant gender difference on measure of sense of humor. The result of the study done by Silva, Andersen, De Mello, Bittencourt, Peruzzo and Tufik (2008) also found no significant differences between genders in the percentage of REM sleep and sleep efficiency. The result of this study also supports that sex differences were noted with males having higher systolic blood pressure and diastolic blood pressure than the females (Jervase, Barnabas, Emeka, & Osondu, 2013). The result implies that educational attainment made a significant effect on the diastolic blood pressure but made no influence on quality of sleep, hours of sleep, and systolic blood pressure among the elderly. The result of the study is not consistent with the results in previous related studies done. According to study done by Patel, Grandner, Xie, Branas, Gooneratne (2010) they found that poor sleep quality is strongly associated with education. Their study suggests that education is significantly mediated only to those with low education. In addition, study done by Eder, Zou, Grote, and Hedner (2011) found that lower educational attainment was associated with sleep problems. The research study that was conducted by Zawisza, Adamczyk, Galas, and Brzyska (2014) found out that the level of education has an effect in the sleep duration. The lower the education the extreme is the sleep duration (≤ 5 or ≥ 9 hours/day). On the other hand, the result of this study supports the research done by Gulliford, Mahabir and Rocke (2003) that there is no association of systolic blood pressure with education in women. While in men there was weak evidence that the prevalence of hypertension was not associated with educational attainment. There is no consistent association between education and blood pressure in men.

V. CONCLUSION

Based on the findings of the study, the result implies that laughter therapy can improve the quality of sleep, increase the hours of sleep, and decrease the value of systolic and diastolic blood pressure among the elderly. Moreover, the more is the laughter experience, the better is the quality and hours of sleep, and the higher is the reduction in the systolic blood pressure. Gender and educational attainment as a modifying variable made no significant difference in the quality and hours of sleep, and to the systolic blood pressure. On the other hand, gender and educational attainment made significant changes in the diastolic blood pressure among the elderly.

VI. RECOMMENDATIONS

Nurse educators need to emphasize in their teaching the beneficial effects of laughter to sleep and blood pressure. Nurse practitioners need to include laughter therapy as part of their intervention to the elderly clients and to encourage elderly to make laughter as their lifestyle. Health care administrators should provide a nurse who will take an active role in creating and implementing laughter therapy program.

For future research, the study can be replicated utilizing a higher number of population and a longer period of implementing laughter therapy. It is also recommended to consider the amount of laughter exerted by the participants, the type of personality of the participants, and to utilize other forms of laughter therapy. Moreover, it is recommended to utilize other population groups to strengthen and widen the empirical evidence of laughter therapy.

REFERENCES

America Medical Journal and AATH (2013). *37 University and journal based research on laughter you should know about. retrieved* from http://rialhu.wordpress.com/2013/04/12/37-university-andjournal-based-research-onlaughter-you-should-knowabout/

Capps, D (2014) *Laughter ever after ministry of good humor.* Retrieved from : https://books.google.com.ph/books?id=1QZhHbxsoeIC&pg=PA16&lpg=PA16&dq=laughter+has+no+significant+difference+on+gender&source=bl&ots=KjfTu6w3tT&sig=rznFKl6cEk_PzBLPo91gVIYhglo&hl=en&sa=X&ei=Af32VKmqMsK2mAWpkYGoCQ&ved=0CDcQ6AEwBg#v=onepage&q=laughter%20has%20no%20significant%20difference%20on%20gender&f=false

Carskadon M, Dement W (2005). *Normal human sleep: Principles and practice of sleep medicine* (4th ed.) Retrieved from : http://www.ncbi.nlm.nih.gov/books/NBK19956/

Eliopoulos, C (2014). *Gerontological Nursing* (8th Ed). Wolters Kluwer health, Lippincott, Williams & Wilkins.

Eder D, N. Zou, D. Grote L, Hedner J (2011). *Self-reported features of sleep, utilization of medical resources, and socioeconomic position: a Swedish population survey.*

Epstein, S (2014). *Health benefits of laughter for seniors: It's no joke*. Retrieve from : http://www.retireathome.com/news/benefits-laughter-seniors/

Erber, J, T (2013). Aging & Older Adulthood (3rd Ed.). WileyBlackwell. A John Wiley & Sons, Inc., Publication

Ghodsbin, F. Ahmadi, Z, S. Iran Jahanbin, I. Sharif, F (2015).The effects of laughter therapy on general health of elderly people referring to Jahandidegan Community Center in Shiraz, Iran, 2014: A Randomized Controlled Trial Retrieved from : http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4280555/

Gulliford, MC, D Mahabir and B Rocke (2003). Socioeconomic inequality in blood pressure and its determinants: cross-sectional data from Trinidad and Tobago Retrieved from: https://www.google.com.ph/ur

l?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CBwQFjAA&url=http%3A%2F%2Fwww.nature.com%2Fjhh%2Fjournal%2Fv18%2Fn1%2Fpdf%2F1001638a.pdf%3Forigin%3Dpublication_detail&ei=1ekPVeH4O5DX8gWm04LYCA&usg=AFQjCNEb8frH981B7OeibE6z8ftpVtaXA&bvm=bv.88528373,d.dGc

Hae- J. K. & Chang- H Y (2011). Original Article :*Effects of laughter therapy on depression, congition and sleep among the communitydwelling elderly*

Jervase E, Barnabas, D, Emeka,A, Osondu, N(2013). *Sex differences dnd relationship between blood pressure and age among the Ibos Of Nigeria.* Retrieved from http://ispub.com/IJBA/3/2/3743

Ko. H, J and Youn, C, H. (2011). *Effects of laughter therapy on depression, cognition and sleep among the community-dwelling elderly*. Retrieve from : http://www.laughterourbestmedicine.com/images/peerrev.pdf

Laughing Diva (2014). *Scientific research and benefits*. Retrieved fromhttp://www.laughingdiva.com/what-is-laughter-yoganyc/intro-laughter-yoga nyc/laughter-yoga-nyc-researchand-benefits/

Mauk, K, L (2014). *Gerontological Nursing, competencies for care* (3rd ed). Philippine edition. Jones and Bartlett Publishers.

Miller, M & Knepper, C (2014) The positive emotions prescription to prevent and reverse heart disease. Heal Your Heart. Retrieved from : https://books.google.com.ph/books?id=5LNGBQAAQBAJ&printsec=frontcover#v=onepage&q&f=false

O'Riordan, M (2008). Laughing your way to lower blood pressure and less stress. Retrieve: http://www.medscape.com/viewarticle/574552

Patel, N, P. Grandner, M, A. Xie, D. Charles C Branas, C, C. Nalaka Gooneratne235 (2010). "Sleep disparity" in the population: poor sleep quality is strongly associated with poverty and ethnicity.

Peeples, L (2011) Laughter, Music May Lower Blood Pressure. Retrieved from http://news.health.com/2011/03/25/laughter-music-bloodpressure/

Preidt, R (2014). *A Memory Aid for Seniors: Laughter*. Retrieved from: http://consumer.healthday.com /cognitive-health-information26/memory-problems-healthnews-468/laughter-may-bememory-aid-687179.html

Seagel, J & Smith, M (2014). *Laughter is the best medicine*. Retrieved from http://www.helpguide.org/articles/emotional-health/laughteris-the-best-medicine.htm

Stanley, Mickey. Patricia GauntlettBeare. (2006). *Buku Ajar Keperawatan Gerontik Edisi 2*. Jakarta : EGC.

Silva, A. Andersen, M.L. De Mello, M.T. Bittencourt, L.R.A. Peruzzo, D and. Tufik, S (2008). *Gender and age differences in polysomnography findings and sleep complaints of patients referred to a sleep laboratory.* Retrieved from https://www.google.com.ph/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCwQFjAB&url=http%3A%2F%2Fwww.scielo.br%2Fpdf%2Fbjmbr%2Fv41n12%2F7159.pdf&ei=Kg82VPfC9CwuQS674DICw&usg=AFQjCNFou3zzPEeuqs7BZe7hjRcbLMUZQ&b

vm=bv.76943099,d.c2E

The American Geriatrics Society (2009). *Evidence-Based Recommendations for the Assessment and Management of Sleep Disorders in Older Persons*. Retrieved from : http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2748127/

Touhy and Jett (2012). *Toward Healthy Aging* (8th ed). Human needs & Nursing Response. Ebersole & Hess'.

United Nations (2013). *World Popula*health-services-under-thespotlight/

World Health Organization (2014). Definition of an older or elderly person. *Health statistics and information systems* :Retrieved from http://www.who.int/healthinfo/survey/ageingdefnolder/en/

Zawisza, K. Adamczyk, B, T. Galas, A. Brzyska, M (2014). *Sleep duration and mortality among older adults in a 22-year follow-up study: An analysis of possible effect modifiers*. Retrieved from: http://link.springer.com/article/10.1007%2Fs10433-014-0318- 8

Webadmin, (2012). *As Indonesia Grows Older, Social Attitudes, Health Services Under the Spotlight*. http://www.thejakartaglobe.co m/archive/as-indonesiagrows-older-social-attitudes