

# TINDAKAN TRADISIONAL: *SIREP* MEMPENGARUHI KADAR KORTISOL, IFN- $\gamma$ AND IL-10 PADA LANSIA DENGAN GANGGUAN TIDUR

(*Traditional Actions: SIREP Influence Cortisol, IFN- $\gamma$  and IL-10 In Elderly with Sleep Disorders*)

Joni Haryanto\*, Suhartono Taat Putra\*\*

\*Fakultas Keperawatan, Universitas Airlangga, Kampus C Mulyorejo Surabaya, 60115

\*\*Fakultas Kedokteran, Universitas Airlangga

E-mail: joni.h.unair@gmail.com

## ABSTRAK

**Pendahuluan:** *Sirep* merupakan salah satu tindakan tradisional orang Jawa timur Indonesia khususnya suku Tengger. *Sirep* dengan menggunakan mantra untuk memenuhi kebutuhan tidur manusia. Lansia di Indonesia adalah seseorang yang memiliki usia lebih dari 60 tahun. Lansia pada umumnya sering mengalami gangguan pemenuhan kebutuhan tidur namun efek keperawatan *sirep* sebagai immunomodulator terhadap kadar kortisol, IFN- $\gamma$  dan IL-10 masih belum diketahui. Tujuan penelitian teridentifikasi karakteristik samples, immunomodulator dan sleep hygiene lansia di Panti Lanjut Usia Tulungagung. **Metode:** Populasi sebanyak 70 lansia dengan jumlah sampel 43 lansia. Penelitian ini melibatkan 23 lansia sebagai kelompok yang diberikan intervensi keperawatan *sirep* selama 6 bulan (usia rata-rata,  $69,6 \pm 5,2$  tahun) dan 20 kontrol ( $65,8 \pm 5,4$  tahun). Kebutuhan tidur dengan tidur dapat diobservasi dengan mengevaluasi tingkat kortisol, IFN- $\gamma$  and IL-10. Biologi molekuler dari sampel ditentukan dengan menggunakan analisis ELISA. Data statistik dianalisis menggunakan anova dan t-test. **Hasil:** Setelah intervensi selama 6 bulan, terdapat perubahan yang signifikan kortisol dalam serum ( $p=0,0001$ ) dan uji beda intervensi dengan kontrol juga significant ( $p=0,0013$ ). Perubahan kadar IFN- $\gamma$  dalam serum significant ( $p=0,0003$ ) dan uji beda intervensi dengan kontrol juga significant ( $p=0,0164$ ), sedangkan perubahan kadar IL-10 dalam serum significant ( $p=0,0003$ ) dan uji beda intervensi dengan kontrol no significant ( $p=0,1143$ ). **Diskusi:** Hasil penelitian ini sesuai hipotesis bahwa keperawatan *sirep* dapat meningkatkan modulator imun pada lansia. Namun, modulator imun menunjukkan sedikit perbaikan dalam kelompok intervensi keperawatan *sirep*, hal ini menunjukkan bahwa diperlukan intervensi yang lebih lama lagi dan lebih sering.

**Kata Kunci:** *Sirep*, Kebutuhan tidur lansia, tingkat kortisol, tingkat IFN- $\gamma$ , tingkat IL-10

## ABSTRACT

**Introduction:** *Sirep*, is one of the traditional intervention of people in East Java Indonesia, especially Tengger tribe using spells to meet the needs of human sleep. Elderly in Indonesia is someone who has more than 60 years of age. Elderly in general often experience sleep disturbances fulfillment, But the effects of nursing *Sirep* as an immunomodulator to the levels of cortisol, IFN- $\gamma$  and IL-10 is still unknown in nursing perspective. **Method:** The population of this study were 70 elderly with the number of respondents were 43 elderly. They were divided into two groups for 23 elderly with 6-month *sirep* intervention (mean age,  $69.6 \pm 5.2$  years) as an experiment group and 20 elderly as control group ( $65.8 \pm 5.4$  years). The need of sleep is implemented to Evaluate the sample of immune modulation, cortisol levels, IFN- $\gamma$  and IL-10. The molecular biology of the samples was determined using ELISA analysis. The statistical analysis of the data used Determine ANOVA and t-test. **Results:** After the 6-month intervention, there is significant changes in serum cortisol levels ( $p = 0.0001$ ) and a different test with a control intervention was also significant ( $p = 0.0013$ ). Significant changes in serum levels of IFN- $\gamma$  is ( $p = 0.0003$ ) and a different test with a control intervention is also significant ( $p = 0.0164$ ), while the change in the levels of IL-10 in serum is significant ( $p = 0.0003$ ) and test different intervention with no significant control ( $p = 0.1143$ ). **Discussion:** This study supports the hypothesis that *sirep* can improve immune modulator in elderly. However, immune modulator showed a slight improvement in the nursing intervention of *sirep* group, suggesting that a longer or more frequent sessions of intervention might have an effect.

**Key Word:** *Sirep*, Elderly Sleep needs, Cortisol level, IFN- $\gamma$  level, IL-10 level

## INTRODUCTION

World Health Organization (WHO, 2005) reports that elderly population is estimated at 9,11% of the total world population. Elderly in Indonesia amounted to 11.34% of the population. In East Java, the number of elderly at about 11,40%, where is the second highest number after Yogyakarta which is at about 13.04%. (United Nation 2004; Avidan A 2005). In addition, the number population of

East Java is greater than Yogyakarta. Elderly population majority stays in Folk Home Elderly (Rahayu 2002; Huang WF 2005)

Elderly generally have a sleep less than 5 hours per day and the prevalence of sleep disorder is about 30-40% in the elderly aged 60-69 years (Hashimoto R, Meguro K, Lee E, Kasai M, Ishii H 2006; Lumbantobing 2004; Hister A 2006).

Folk Home Elderly In Tulungagung, East Java Indonesia has 70 elderly aged over

60 years, whom 43 elderly suffered from sleep disorder. Sleep disorder in elderly is associated with the severity of the disease in elderly.

The purpose of this research was to identify characteristics of the samples, immunomodulator, and sleep hygiene Folk Home Elderly elderly in Tulungagung. *The survey from Duke University Center for Demographic Studies* (1998) reports that the number of sleeps elderly disturbed at around 90.4% (Prijosaksono 2002). Philip et al (1999) reports that 85% elderly suffered from failure of nighttime sleep (Warwicker, P. , Goodship, T. H., & Goodship 1997). Elderly frequently experience insomnia, sleep rhythm disorders, namely shortening phase *rapid eyes movement sleep* (REM), also accompanied by elongation phase of *non-rapid eyes movement sleep* (N - REM) (Risch, N., & Merikangas 1996; Hayflick L 2004).

Sleep disturbance affects the human circadian cycle. Sleep disorder also causes the decrease of immunity. Lymphocyte T is the conductor of the immune system, T lymphocytes proliferates and differentiates into cytotoxic T lymphocytes (Tc), lymphocytes T helper (Th), lymphocytes T regulatory (Tr) and lymphocyte T suppressor (Ts). The process of autoimmune diseases in Elderly and degenerative diseases is a common example. The quality and quantity of sleep in elderly is bad. So that, elderly easily overcome the state of multiple diseases (Kirkwood 2005; Wei YH 1998; Wei YH 2002)

Immunity is affected by the human leukocyte antigen (HLA). Changes in sleep patterns associated with mutations of genes. A person with the sleep disorder narcolepsy with cataplexy are HLA DQB1 \*0602 allele. Human leukocyte antigen is a gene associated with foreign materials as antigens of the body, which consists of three loci that are HLA class 1 consisting of A, B and C, HLA class 2 consisting of DR, DQ and DP, whereas HLA class 3 for cytokines and complement (Kirkwood 2005; Wei YH 1998; Wei YH 2002)

The significance of HLA DQB \*0602 allele is a gene associated antigen recognition by T lymphocytes in the locus 1 and 2 on the allele \* 0602 is a type of genes of people with the sleep disorder narcolepsy with cataplexy (Kirkwood 2005; Wei YH 2002)

Cortisol is a stress hormone, and increases when the elderly has sleep disorder which can

suppress the body's immunity, namely IFN- $\gamma$  and IL-10. As a result, the elderly experience *multiple diseases*. (Davis 1995; Fogel J 2003)

## MATERIAL AND METHOD

A Quasy Experimental design was used in this study to compare pre-post test intervention in the treatment group: *sirep* intervention (for cortisol level, IFN-gRa and IL-10 in serum) and control groups in Folk Home Elderly in Tulungagung East Java Indonesia. The population in this study was respondents with sleep disorder in the Folk Home Elderly in Tulungagung East Java Indonesia. Sample of this study were taken using simple random sampling and the inclusion criteria was elderly with sleep disorder. The sample size was 43 elderly divided into an 23 respondent in intervention group and 20 respondent in a control group.

Independent variable in this study was traditional intervention in East Java Indonesia: *sirep*. Dependent variable was cortisol level, IFN-gRa and IL-10 in serum. Analysis of the study used Enzyme Linked Immunosorbent Assay (ELISA) which is technique indicator using enzyme with better sensitivity.

Data in this study was ratio scale, so that to measure the change in pre and post *sirep* nursing intervention and control group used ANOVA meanwhile the comparison of post intervention and control used t test or Mann-Whitney U test with a level significance  $\alpha = 0.05$ .

## RESULT

The results of this study showed that 23 sample in the traditional East Java of *sirep* Indonesia group [mean age  $\pm$  standard deviation (SD) [69.6  $\pm$  5.2 years] and 20 in the control group (65.8  $\pm$  5.4 years). There were no adverse events in either group. Table 1 shows the baseline characteristics of samples. The average rate of Traditional East Java of *Sirep* attendance was 95%. There was no significant difference in the baseline characteristics, age ( $p=0,079$ ), weight ( $p=0,075$ ), education (years) ( $p=0,077$ ), long in folk home ( $p=0,122$ ), and body mass index ( $p=0,783$ ) between the two groups. There are differences between the intervention group and control group in a significant sleep disorder ( $p = 0.001$ ).

Table 1 Baseline characteristics of the two groups

	Intervention		Control		p
	n	Mean ± SD	n	Mean ± SD	
Age (year)	23	69.6 ± 5.2	20	65.8 ± 5.4	0.079
Weight (kg)	23	50.2 ± 5.4	20	49.8 ± 6.6	0.075
Education	23	4.5 ± 9.2	20	5.1 ± 1.9	0,077
Long in Folk Home	23	12.3 ± 4.8	20	10.9 ± 3.2	0,122
Sleep disorder	23	98.02 ± 12.58	20	88.31 ± 5.46	0.001
Body mass index	23	21.0 ± 2.8	20	20.9 ± 3.0	0.783

SD = Standard deviation

Table 2 Immunomodulator in two groups at baseline and after 6 months

	Baseline				p	After 6 month				p
	Intervention		Control			Intervention		Control		
	n	Mean ± SD	n	Mean ± SD		n	Mean ± SD	n	Mean ± SD	
Cortisol	23	18.95 ± 2.13	20	18.98 ± 2.26	0.115	23	10.15 ± 1.05	20	14.85 ± 2.26	0.001
IFN- $\gamma$ R $\alpha$	23	445.36 ± 45.3	20	416.00 ± 35.3	0.082	23	499.36 ± 122.1	20	422.80 ± 121.0	0.016
IL-10	23	24.09 ± 3.44	20	25.70 ± 3.64	0.211	23	29.45 ± 5.72	20	26.00 ± 5.44	0.114

Table 3 Sleep hygiene in two groups at baseline and after 6 months

	Baseline				p	After 6 month				p
	Intervention		Control			Intervention		Control		
	n	Mean ± SD	n	Mean ± SD		n	Mean ± SD	n	Mean ± SD	
Quality	23	88.32 ± 6.16	20	86.62 ± 6.16	0.311	23	98.02 ± 12.58	20	88.31 ± 5.47	0.001
Quantity	23	55.63 ± 6.32	20	57.63 ± 6.62	0.126	23	63.59 ± 7.64	20	65.75 ± 6.42	0.691
Problem	23	12.89 ± 12.65	20	12.11 ± 11.02	0.097	23	09.19 ± 10.65	20	11.77 ± 10.35	0.003
Needs	23	25.98 ± 8.82	20	27.01 ± 7.91	0.182	23	18.88 ± 7.88	20	26.21 ± 8.76	0.003

Table 2 reports a repeated measurement method, independent t-test was immunomodulator on the samples of test did not show a significant difference between the traditional East Java of *sirep* and control groups (IL-10) and show a significant different between the traditional East Java of *sirep* and control groups after 6 moth intervention cortisol level ( $p=0,001$ ) and IFN- $\gamma$ R $\alpha$  ( $p=0.016$ ). Tables 3 shows a repeated measurement method, independent t-test was sleep hygiene in elderly on folk home elderly Tulungagung East Java Indonesia. The test shows significant different between the traditional east java of *sirep* and control groups quality sleep, sleep problems and needs of sleep.

## DISCUSSION

### Cortisol level

The initial conditions of elderly before getting traditional interventions East Java Indonesia (*Sirep*) have average levels of cortisol in serum (18.95 + 2.13), while the control group with high levels of serum cortisol (18.98 + 2.26) showed no significant difference between two groups:  $p = 0.115$ ) using independent t-test analysis. After 6

months of intervention is given every two weeks, both groups showed a significant difference, with a confidence level ( $\alpha = 0.05$ ) then ( $p = 0.001$ ). Client's condition as samples with the baseline data as in table 1 above, that among the intervention group and the control group no significant difference. Only sleep disorder variable that there is a difference between intervention and control groups, namely ( $p = 0.001$ ). Elderly frequent sleep disturbances and an increase in serum cortisol levels due to physical and psychological stress. Seniors who experience insomnia associated with high cortisol levels, IFN- $\gamma$ R $\alpha$  and IL-10 producer, namely as macrophages, NK cells and T lymphocytes.

*Sirep* can improve sleep quality and quantity of sleep. The pray of *Sirep* suggestively clients can improve the sleep disorder, so the client easily initiate sleep and serum cortisol levels can balance (Yayasan Bali Galang 2002). *Sirep* an act of personal communication that is effective and able to raise the level of suggestibility, so clients get a sleep disorder and achieved strong expectation condition serum cortisol elderly clients become balance (Yayasan bali Galang 2003). Cortisol is balanced to facilitate the development of

immunity of the body, so it is possible clients achieve optimal health status. The sirep spells make the client be sure and suggests, so that the limbic system in the brain to respond to influence the pre-frontal order hypothalamus secretes corticotrophin relasing factors balanced.

Corticotropine generated capable of stimulating the pituitary to produce ACTH and cortisol-secreting adrenal medulla in balance. Conditions of cortisol in the balance is the right amount to maintain healthy body immunity quality.

### **IFN- $\gamma$ R $\alpha$ level**

Levels of cytokines IFN- $\gamma$ R $\alpha$  level produced by such cell monocyte, macrophage, NK cells and T lymphocytes. Activities of cells is strongly influenced by the quality and quantity of sleep Elderly. Levels of IFN- $\gamma$ R $\alpha$  level before intervention was quiet (445.36 + 45.3) and showed not significant different of IFN- $\gamma$ R $\alpha$  level with control group (416.00 + 35.3) much from the levels of IFN- $\gamma$ R $\alpha$  level in a statistical test independent t-test with a significance level ( $\alpha = 0.05$ ) and outcome ( $p = 0.082$ ). After 6 months of intervention sirep given once every 2 weeks between the intervention group and control group with a significant difference ( $\alpha = 0.05$ ) and the result ( $p = 0.016$ ). Sirep to improve the quality and quantity of sleep. Activities of monosite, macrophages, NK cells and T lymphocytes can release IFN- $\gamma$ R $\alpha$  level. Sleeps hygiene can facilitate the activity of IFN- $\gamma$ R $\alpha$  produced of cells such as monosite, macrophages, NK cells and T lymphocytes. A Sirep able to create a healthy sleep to elderly clients who active IFN- $\gamma$ R $\alpha$  level experience sleep disturbances, so the cells that produce IFN- $\gamma$ R $\alpha$  level and increase levels of the cytokine IFN- $\gamma$ R $\alpha$  indicated the health of elderly people with the sleep disorder will improve IFN- $\gamma$ R $\alpha$ . Sirep can increase levels of IFN- $\gamma$ R $\alpha$  level

### **IL-10 level**

Cytokine IL-10 are produced by T lymphocytes, the T Halper 2 as an indicator of the activity of lymphocytes T as endurance. Clients elderly who experience sleep disturbances before give the sirep intervention had higher levels of IL-10 with a mean (24.09 + 3.44) in the intervention group and the control group (25.70 + 3.64) between the two is not significant difference, namely ( $p = 0.211$ ).

After 6 months of intervention sirep given every two weeks, then there is no difference between the two intervention groups fallen with the control group, with a significance level ( $\alpha = 0.05$ ) then ( $p = 0.114$ ). Although there are differences between the levels of IL-10 prior to the intervention by 6 months after the intervention ( $p = 0.003$ ). According to Albright (2003) someone who is experiencing chronic insomnia will mutate the gene HLA DQB allele \*0602 so that the activity of T lymphocytes decreased activity Halper 2 and IL-10 produced no maksimal (Ann Salat, D.H. 2005).

Sirep is not able to increase the activity of cells that produce cytokines IL-10 significantly, but the pray of sirep capable of improving sleep hygiene clients who experience sleep disturbances.

### **Sleep Hygiene**

Sleep hygiene is a combination of quality and quantity of sleep, compared with sleep problems and sleep needs of elderly clients. Condition sleep quality of elderly before the given intervention fallen between the intervention group and control group, both groups there was no significant difference is ( $p = 0.311$ ), sedanagkan after 6 months given intervention fallen into two groups there is a significant difference, namely ( $p = 0.001$ ).

The quantity of sleep before being given the actions fallen between the two groups, the intervention fallen to the control group no significant difference, namely ( $p = 0.126$ ), whereas after 6 months given intervention fallen once every 2 weeks is also no significant difference is ( $p = 0.691$ ),

Problems sleeping elderly, before being given fallen, both groups between the intervention group and control group was not significant difference is ( $p = 0.097$ ), whereas after 6 months of administration fallen once every 2 weeks both groups significant difference is ( $p = 0.003$ ), Sleep needs of elderly, before being given fallen, both groups between the intervention group and control group no significant difference, namely ( $p = 0.182$ ), whereas after 6 months given intervention fallen given every two weeks, there were significant differences between the intervention groups fallen with the control group ( $p = 0.003$ ).

According to Philip et al (1999) in his research 85% Elderly failure nighttime sleep.

Elderly often suffer from insomnia, sleep rhythm disorders, namely shortening phase rapid eyes movement sleep (REM), also accompanied by elongation phase of non-rapid eyes movement sleep (N-REM) (Hipolide, D.C., Suchecki, D., Pimentel De Carvalho Pinto, A., Chiconelli Faria, E., Tufik, S., Luz 2006; Cohen-Mansfield J 1997). Has fallen spells that can improve suggestions and expectations are high for the client, so easily happen personal communication with the sub conscious mind and pre-frontal be comfortable.

*Sirep* to improve the quality and quantity of sleep elderly who have sleep disorders. *Sirep* also able to reduce sleep problems and the needs of elderly sleep with the sleep disorder. *Sirep* is an activity that promotes effective communication into the pre-frontal, so that the hypothalamus secreting neurotransmitters like corticotropine relasing factors that can generate activity for secreting adenocorticotropic pituitary and adrenal glands hormone cortisol menskresi within reasonable limits.

## CONCLUSION AND RECOMMENDATION

### Conclusion

This study supports the hypothesis that *sirep* can improve immune modulator in elderly. However, immune modulator showed a slight improvement in the nursing intervention of *sirep* group, suggesting that a longer or more frequent sessions of intervention might have an effect.

### Recommendation

The results of these studies clearly *sirep* generating modules with spells can be used to improve the quality and quantity of sleep, also decrease cortisol levels, IFN- $\gamma$ R $\alpha$  and IL-10, then we recommend to be used as a standard module and nursing care beds meet the needs of elderly clients, either level health facilities Level I, Level II Health facilities and Health facility Level III.

### Acknowledgments

This study was supported by Grants-in-Aid for Comprehensive Research on Aging and the Elderly Commissions in East Java Indonesia and Faculty of Nursing Universitas Airlangga Surabaya Indonesia.

## REFERENCE

- Ann Salat, D.H., et. al, 2005. Age-related changes in prefrontal white matter measured by diffusion tensor imaging. *NY Acad Sci.*, 1064, pp.37–49.
- Avidan A, 2005. Epidemiology, Assesment and Treatment of Insomnia in the Elderly Patient.
- Cohen-Mansfield J, W.P., 1997. Management of verbally disruptive behaviors in nursing home residents. *J Gerontol Ser A Biol Sci Med Sci.*, 52.
- Davis, 1995. *Panduan relaksasi & reduksi stres* E. III, ed., Jakarta: EGC.
- Fogel J, 2003. Behavioral Treatments for insomnia in primary care setting.
- Hashimoto R, Meguro K, Lee E, Kasai M, Ishii H, Y.S., 2006. Effect of age and education on the trail making test and determination of normative data for Japanese elderly people: the Tajiri Project. *Psychiatry Clin Neurosci.*, 60(422e8).
- Hayflick L, 2004. The not-so-close relationship between biological aging and ageassociated pathologies in humans. *J Gerontol A Biol Sci Med Sci.*, 59.
- Hipolide, D.C., Suchecki, D., Pimentel De Carvalho Pinto, A., Chiconelli Faria, E., Tufik, S., Luz, J., 2006. Paradoxical sleep deprivation and sleep recovery: effects on the hypothalamic-pituitary-adrenal axis activity, energy balance and body composition of rats. *J. Neuroendocrinol.*, 18, pp.231–238.
- Hister A, 2006. *Growth hormones and the effect on sleep.*, Mediresource. Inc. Toronto.
- Huang WF, L.I., 2005. Patterns of sleep-related medications prescribed to elderly outpatients with insomnia in Taiwan. *Drugs Aging*, 22.
- Kirkwood, 2005. Understanding the odd science of aging. *Cell.*, 120(437e447).
- Lumbantobing, 2004. *Sleep Disorder*. Edisi.136 ed., Jakarta.
- Prijosaksono, A., 2002. *Mengatasi insomnia*, SURABAYA: Fakultas Ilmu Sosial dan Ilmu Politik Universitas Airlangga.
- Rahayu, 2002. *Karakteristik Penyakit Pada Usia Lanjut. Naskah lengkap temu ilmiah nasional I dan konferensi kerja III, Perhimpunan Gerontologi Medik Indonesia (Pergemi)*, Semarang: Badan Penerbit Universitas Diponegoro.
- Risch, N., & Merikangas, K., 1996. The future of genetic studies of complex human diseases. *AAAS-Weekly Paper Edition*, 273, pp.1516–1517.
- United Nation, 2004. *In: World Population to 2300*, New York: Beman Assoc.
- Warwicker, P. , Goodship, T. H., & Goodship, J.A., 1997. Three new polymorphisms in the human complement factor H gene and promoter region. *Immunogenetics.*, 46, pp.437–438.

- Wei YH, 1998. Oxidative stress and mitochondrial DNA mutations in human aging. *Proc Soc Exp Biol Med*, 217(53e63).
- Wei YH, L.H., 2002. Oxidative stress, mitochondrial DNA mutation, and impairment of antioxidant enzymes in aging. *Exp Biol Med (Maywood)*, 227(671e682).
- Yayasan Bali Galang, 2002. *Lontar Usada Pamugpug*, Denpasar: Fakultas Sastra. Universitas Udayana.
- Yayasan bali Galang, 2003. *Usada Kuranta Bolong*, Denpasar: Fakultas Sastra. Universitas Udayana.