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20 SELECTED PUBLICATIONS

ORIGINAL ARTICLES:

Sleep studies:

1. Polo-Kantola P, Erkkola R, Helenius H, Irjala K, Polo O.

When does estrogen replacement therapy improve sleep quality?

Am J Obstet Gynecol 1998; 178:1002-1009

IF 4.7; Citations WoS: 132

Importance of the paper:

Our study was one of the first published RCT-study of the effect of climacteric and hormone replacement therapy (HRT) on subjective sleep quality in literature: HRT improves subjective sleep quality during climacteric, especially if other climacteric symptoms (most strongly vasomotor symptoms) are also relieved. In addition, some of the women perceive an alleviation of sleep disturbances with HRT even though they do not report having climacteric symptoms.

2. Polo-Kantola P, Erkkola R, Irjala K, Pullinen S, Virtanen I, Polo O.

The effect of short-term transdermal estrogen replacement therapy on sleep: a randomized double-blind crossover trial in postmenopausal women.

Fertil Steril 1999; 71:873-880

IF 4.4; Citations WoS: 64

Importance of the paper:

One of the first RCT-studies in the field. Use of the all-night polysomnography- technique, which is a golden standard to study the objective sleep quality. Use of transdermal hormone replacement therapy (HRT) instead of oral gave new information. Despite the significant improvement in subjective sleep quality, the only improvement in objectively measured sleep quality during HRT is the reduction in the number of nocturnal awakenings.

3. Lampio L, Saaresranta T, Polo O, Polo-Kantola P.

Subjective sleep in premenopausal and postmenopausal women during work and leisure days: a sleep diary study

Menopause 2013; 20(6):655-60

IF 3.2; Citations Wos: 3

Importance of the paper:

The sleep quality was assessed with the two-weeks sleep diary. In general, sleep problems are more common in postmenopausal women than in premenopausal. However, the differences are more pronounced on workdays than on leisure days. These observations suggest that postmenopausal women have the capacity for good sleep but they are more vulnerable to sleep problems which are associated with work-related stress.

4. Lampio L, Saaresranta T, Engblom J, Polo O, Polo-Kantola P.

Predictors for sleep disturbances in menopausal transition.

Maturitas 2016;94:137-142

IF 3.1; Citations Wos: 0

Importance of the paper:

Increase in sleep problems is generally acknowledged in climacteric women. Although the alleviation in hormone production is essential, the etiology is probably multifactorial. According to our study several factors (like depressive symptoms, CNS medication and personal crises)

already 5 years before menopause predicted decrease in sleep quality after menopause. Follow-up studies like ours in menopausal transition are sparse and thus essential.

5. Polo-Kantola P, Laine A, Aromaa M, Rautava P, Markkula J, Sillanpää M.

A population-based survey of sleep disturbances in middle-aged women – Associations with health, health related quality of life and health behavior.

Maturitas 2014;77(3):255-62

IF 3.1; Citations Wos: 4

Importance of the paper:

Menopause is an essential hallmark for the increase of sleep problems. However, part of the women reports sleep problems already earlier. This study utilized a large cohort of middle-age women (n=850). Sleep problems were frequent: almost one-quarter of middle-aged women were dissatisfied with their quality of sleep. Existence of chronic disease, use of medications and worse health related quality of life were associated with sleep problems.

6. Kalleinen N, Polo O, Himanen S-L, Joutsen A, Urrila AS, Polo-Kantola P.

Sleep deprivation and hormone replacement therapy in postmenopausal women

Sleep Medicine 2006; 7:436-447

IF 3.3; Citations WoS: 13

Importance of the paper:

There is discordance between subjective and objective sleep quality. Increased sleep propensity after sleep deprivation may exclude some of the confounding factors. We performed, for the first time in the literature, a total night (40h) sleep deprivation study in postmenopausal women. Although sleep in postmenopausal women was worse than in young women, the recovery response following sleep deprivation was relatively well preserved.

7. Polo-Kantola P, Rauhala E, Helenius H, Erkkola R, Irjala K, Polo O.

Breathing during sleep in menopause; a randomized, controlled, cross-over trial with estrogen therapy.

Obstet Gynecol 2003; 102:68-75

IF 5.7; Citations Wos: 34

Importance of the paper:

The study was one of the first to evaluate the occurrence of sleep disordered breathing after menopause and the first study to evaluate the effect of estrogen replacement therapy (ERT) on nocturnal breathing. We used objective measurements. Findings: Partial upper airway obstruction is the most prevalent form of sleep-disordered breathing. ERT has only a minor effect on sleep apnea and no effect on partial airway obstruction.

8. Saaresranta T, Polo-Kantola P, Rauhala, E, Polo O.

Medroxyprogesterone in postmenopausal females with partial upper airway obstruction during sleep.

Eur Resp J, 2001; 18:989-995

IF 8.3; Citations Wos: 32

Importance of the paper:

Previously studies of sleep disordered breathing have been conducted mainly in men. However, after menopause, nocturnal breathing problems increase also in women. We were one of the first to perform these studies in women. We found that medroxyprogesterone acetate improved ventilation in postmenopausal women. The ventilatory improvement was sustained for at least 3 weeks posttreatment.

9. Polo-Kantola P, Laine A, Kronholm E, Saarinen MM, Rautava P, Aromaa M, Sillanpää M.

Gender differences in actual and preferred nocturnal sleep duration among Finnish employed population.

Maturitas 2016;94:77-83.

IF 3.1*Importance of the paper:*

We compared sleep durations in women and men in a large cohort (women n=524, men n=525) and found that women slept longer both on work- and on leisure days compared to men. Also their preferred sleep duration was longer. This may imply that work induced sleep loss was not compensated enough and thus may lead for accumulation of sleep loss, especially in women.

10. Polo-Kantola P, Aukia L, Karlsson H, Karlsson L, Paavonen EJ.

Sleep quality during pregnancy: Associations with depressive and anxiety symptoms. *Acta Obstetr Gynecol Scand* 2016 Nov 12. doi: 10.1111/aogs.13056.

IF 2.2*Importance of the paper:*

Decrease in sleep quality during pregnancy is well acknowledged among clinicians. However, literature in this field is sparse. In our prospective follow-up study we found that insomnia and snoring increased along pregnancy. However, no increase in sleepiness was found, presumably indicating a compensatory capacity against sleep impairment. Additionally, depressive and anxiety symptoms and sleep disturbances were only cross-sectionally associated.

Cognition studies:**11. Polo-Kantola P, Portin R, Polo O, Helenius H, Irjala K, Erkkola R.**

The effect of short-term estrogen replacement therapy on cognition: a double-blind cross-over trial in postmenopausal women.

Obstet Gynecol 1998; 91:459-466

IF 5.7; Citations WoS: 142*Importance of the paper:*

Our study was one of the first RCT-studies in the field. Previous studies with various study designs and assessment of different cognitive functions had gained conflicting results. At the time of the study (in 1990-2000) the use of hormone replacement therapy (HRT) was frequent also with the indication of improving cognition. We found, using a large panel of cognitive tests, that HRT does not influence cognition after menopause.

12. Alhola P, Polo-Kantola P, Portin R, Erkkola R.

Estrogen therapy and cognition: A 6-year single-blind follow-up study in postmenopausal women.

Neurology 2006; 67:706-709

IF 8.2; Citations Wos: 11*Importance of the paper:*

This paper was a follow-up study for the above study. Based on the previous studies the effect of hormone replacement therapy (HRT) on cognition was controversial: it had been shown to have some positive effects, no effect at all or even deteriorative effects. The previous studies were mainly short-term. In our follow-up study we found that cognitive performance was well maintained. Long-term HRT did not affect cognition.

13. Karakorpi M, Alhola P, Urrila AS, Kylmä M, Portin R, Kalleinen N, Polo-Kantola P.

Hormone treatment gives no benefit against cognitive changes caused by acute sleep deprivation in postmenopausal women.

Neuropsychopharmacol 2006; 31, 2079-2088

IF 6.4; Citations Wos: 8*Importance of the paper:*

Our study was the first to investigate the effect of sleep deprivation on cognition in different reproductive states. The postmenopausal women tried to maintain their performance at the expense of reduced reaction speed and the young women did so at the expense of accuracy.

Subjective alertness was reduced equally in all groups as wakefulness continued, and it was not immediately restored by the recovery night. The use of HRT did not give any advantage.

Quality of Life studies:

14. Katainen RE, Engblom JE, Siirtola TJ, Erkkola RU, Polo-Kantola P.

Climacteric symptoms in middle-aged women with chronic somatic diseases.

Maturitas. 2016;86:17-24

IF 3.1; Citations Wos: 2

Importance of the paper:

During climacteric the occurrence of several somatic diseases increases, probably mimicking some of the climacteric-related symptoms. For this study we enrolled randomly a large female cohort (n=3 421). We found that many climacteric symptoms manifested also in association with chronic diseases. Therefore, health-care professionals should consider the origin of the symptoms when treating middle-aged women.

Autonomic nervous system studies:

15. Virtanen I, Kalleinen N, Urrila AS, Leppänen C, Polo-Kantola P.

Cardiac autonomic changes after 40 hours of total sleep deprivation in women.

Sleep Medicine 2015;16:250-7

IF 3.3; Citations Wos: 2

Importance of the paper:

Sleep loss is associated with cardiovascular morbidity and overall mortality. Our study was the first to evaluate the effect of acute total sleep deprivation on the autonomic nervous system in different female reproductive states. Sleep deprivation had a deleterious effect on the autonomic nervous system in all women, but a more pronounced effect in postmenopausal women. Hormone replacement therapy gave no protection against these changes.

Hormone studies:

16. Kalleinen N, Polo-Kantola P*, Irjala K, Porkka-Heiskanen T, Vahlberg T, Virkki A, Polo O*.

24-Hour serum levels of growth hormone, prolactin and cortisol in pre- and postmenopausal women: the effect of combined estrogen and progestin treatment.

J Clin Endocrinol Metab 2008;93:1655-1661

IF 5.5; Citations Wos: 20

*equal contribution

Importance of the paper:

Growth hormone (GH), prolactin (PRL) and cortisol are essential in sleep regulation. For the first time in literature, we evaluated the diurnal secretion of these hormones with blood samples in menopausal women and assessed the effect of hormone replacement therapy (HRT) in a RCT study. Menopause was associated with decreased 24-h levels of GH and PRL, which were reversible with HRT. In contrast, cortisol levels were not affected by menopause or HRT.

17. Toffol E, Kalleinen N, Haukka J, Vakkuri O, Partonen T, Polo-Kantola P.

Melatonin in perimenopausal and postmenopausal women: associations with mood, sleep, climacteric symptoms and quality of life

Menopause 2014;21(5):493-500

IF 3.2; Citations Wos: 6

Importance of the paper:

Our study was the first study to evaluate the effect of menopause on nocturnal melatonin levels. We used repeated blood-sampling and found that postmenopausal women had lower nighttime serum melatonin concentrations and exposure levels compared with perimenopausal women. As melatonin synthesis is also modulated by estrogen and progesterone, these findings may partly explain the effect of menopause and hormone replacement therapy on sleep.

Obstetric studies:

18. Polo-Kantola P Lampi KM, Hinkka-Yli-Salomäki S, Gissler M, Brown AS, Sourander A. Obstetric Risk Factors and Autism Spectrum Disorders in Finland.

J Pediatr 2014;164(2):358-65

IF 3.9

Importance of the paper:

This study was based on Finnish registers. Cases of childhood autism, Asperger syndrome and pervasive developmental disorders (PDD) (n = 4 713) were enrolled with four matched controls. Low Apgar scores and conditions requiring neonatal special follow-up were important risk factors. For PDD also delivery by elective cesarean was important. The later finding indicated the importance of vaginal delivery also for the neuropsychiatric health of the offspring.

REVIEW ARTICLES AND BOOK CHAPTERS

19. Alhola P*, Polo-Kantola P*.

Sleep deprivation: impact on cognitive performance.

Neuropsychiatric Disease and Treatment 2007;3:1-15

IF 1.9

*equal contribution

Importance of the paper:

Sleep loss is common in our society. It has detrimental effects especially on cognition. This review article discusses both the effect of acute total sleep deprivation and chronic partial sleep restriction. A wide range of cognitive functions are considered.

20. Polo-Kantola P.

Sleep problems in midlife and beyond

Maturitas 2011;68:224-32

IF 3.1; Citations Wos: 38

Importance of the paper:

This review article covers sleep problems from middle-aged premenopausal women to late postmenopausal women. The effect of various climacteric symptoms, as well as the effect of hormone replacement therapy is also discussed. The review can be used for educational purposes.