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Non-Pharmacological Treatment  
Options For Quality Sleep In Elderly  
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Degree Master of Science

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### Abstract

The case study presented is inspired by the initial encounter of an elderly female age 89, who presented to the clinic for the Family Nurse Practitioner student to perform a graded and supervised objective structured clinical exam (OSCE). The patient presented with signs and symptoms of ongoing and unrelenting cough without a history of viral or bacterial infection. The differential diagnoses included gastro esophageal reflux disease (GERD), ace-inhibitor induced cough, pulmonary pathology, and a psychosocial problem e.g., loneliness. The patient stated she had difficulty sleeping and achieving quality sleep. This intrigued the further examination of non-pharmacological treatment options and adjuvants to traditional prescriptive pharmacological treatments in order to achieve quality sleep in the elderly population.

Extensive literature review was accomplished through the cumulative index to nursing and allied health literature (CINAHL) and the PubMed databases. The search builders used were “sleep” AND “elderly” AND “old” AND “quality” AND “non-pharmacological” AND “diet” AND “aromatherapy” AND “acupressure,” with limiters set at 5 years and full text. Between CINAHL and PubMed the journal articles found were between 3-121. The non-pharmacological treatment options that were investigated included diet, increased activity, acu-pressure and aromatherapy.

The importance of recognizing and educating patients about quality sleep using non-pharmacological treatment modalities is deemed important and useful as it can help decrease drug interactions and poly-pharmacy in an at-risk patient population.

Recognizing alternative treatment options to achieving high quality sleep in the elderly is beneficial for providing safe and good quality care to the aging patient.

## Non-Pharmacological Treatment Options For Quality Sleep In Elderly

### **Background**

During an objective structure clinical exam (OSCE) by a third year family nurse practitioner student, an elderly patient with a chief complaint of lingering cough was examined. Under the supervision of nursing faculty the nurse practitioner student was able to interview and assess the elderly female Caucasian patient. During the interview the nurse practitioner student addressed the topic of quality sleep and the patient stated that her sleep was poor at times. The patient reported that falling asleep and staying asleep can be hard to achieve and that she does not use any prescription medications or complimentary therapies in order to realize quality sleep.

Quality sleep is important for all people. Sleep is important for cognitive function and quality of life and it is estimated that up to half of all elderly people suffer from poor sleep (Simoncini et al., 2014). Experiencing poor sleep can have many negative consequences, especially in the elderly population. Impaired memory, increased falls, increased injuries and decreased independence are all associated with poor sleep in the elderly (Bu, Wang, Huo, Xu, Li, & Li, 2018). Elderly are at increased risk of complications from poly-pharmacy, adding medications to induce sleep is not always feasible or safe for the elderly patient, this includes the use of both prescription sleep aids and over the counter sleep aids (Abraham, Schleiden, & Albert, 2017; Abraham, Schleiden, Brothers, & Albert, 2017). Therefore, a thorough literature review regarding options for quality sleep in the elderly population using non-pharmacological modalities was examined.

Providers in primary care often have elderly patients that seek help for poor sleep quality. Being aware and properly educated on the complimentary and alternative options for achieving quality sleep in the elderly population can therefore be very beneficial.

### **Case Report**

The elderly female patient presented with a chief complaint of chronic cough. The patient was a poor historian, however believed that the cough was ongoing for 2-3 months. She was unsure if the cough started shortly after starting lisinopril, which is an ACE-Inhibitor, known to have cough as a common side effect. She stated that she had not had any signs or symptoms associated with a viral or bacterial illness, e. g., fever, dysphagia, sore throat, chest pain or pressure, increased sputum production, increased headaches, increased sinus pressure or nasal discharge. The patient also stated that she had not noticed any aggravating or alleviating factors, including food intake, fluid intake, over the counter (OTC) cold medications and OTC acid reducing medications, none of which had made any change to the dry cough. The patient stated that it was difficult to fall asleep at times and that she had not tried any interventions to improve sleep. The patient had no pertinent medical or surgical history. The only medical history included in the case was hypertension. The lab tests that were ordered were CBC, CMP, and CRP to examine the patient for any infectious process or electrolyte abnormality. A 2-view chest x-ray was also ordered to further investigate possible pulmonary pathology. The differential diagnoses after interview and physical assessment were pulmonary complication, viral illness, GERD, ACE-Inhibitor induced cough, psychosocial cause in nature due to loneliness.

The patient was encouraged to complete the laboratory blood work and the radiographic imaging. The ACE-inhibitor prescription for hypertension was changed to losartan at a therapeutic dose exchange. Losartan is an angiotensin receptor blocker medication, not known to induce a cough like an ACE-Inhibitor. The patient was encouraged to follow-up in two weeks to evaluate the effectiveness of the medication change, measure blood pressure and examine the persistence of the dry cough. At this time the patient was also informed that further discussion regarding quality sleep would be addressed. Finding alternative or complimentary treatment options to achieve quality sleep would be optimal, in order to avoid poly-pharmacy and potential medication interactions and consequent adverse events.

### **Literature Review and Discussion**

An online literature search was performed in order to find supporting or informative information regarding achieving quality sleep in the elderly population using non-pharmacological treatment options. The PubMed and the CINAHL databases were accessed through the University of North Dakota's School of Medicine & Health Sciences library, specifically the Harley E. French Library of Health Sciences. The subjects used for the literature search were sleep, elderly, alternative options, diet, activity, acupressure, aromatherapy and non-pharmacological options. The search engines that were utilized included PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The PubMed database was selected and the advanced search builder was selected. The builders used were "sleep" AND "elderly" AND "non-pharmacological." Limits were set to within the last 5 years and full text; the result yielded a list of 60 journal articles. All 60-journal article titles were reviewed and four

articles specifically were selected for more thorough review. The four selected journal articles were found to be applicable in addressing quality sleep in the elderly using non-pharmacological treatment intervention. A second attempt using the PubMed database was completed using the advanced search builder. The builders used were “sleep” AND “old” AND “quality” AND “alternative,” with a 5 year limit and full text only. This search yielded 121 full text journal articles. After reviewing the titles of the 121 journal articles, two were deemed to be appropriate for the topic at hand. It appears that the builder “old” was not as discriminatory as the builder “elderly” in the previous search. The second PubMed search included journal articles that presented both old children and old adults, not elderly specifically. A third attempt using PubMed with the advanced search builder “elderly” AND “aromatherapy” OR “acupressure” AND “sleep,” with limits of 5 years and full text. The results yielded 61 journal articles, six of which was chosen for in depth review.

The CINAHL database was selected and identical builders were used to the above-mentioned PubMed search, “sleep” AND “elderly” AND “non-pharmacological.” Limiters of 5 years and full text were added, which narrowed the results to 3 journal articles, however one was in Chinese and not usable. The year limiter was increased to 7 years and 4 journal articles were identified. After reviewing the results, two journal articles were deemed appropriate to help provide quality information for the search topic at hand. A second search was completed with the CINAHL database using limiters “old” AND “quality” AND “sleep” and “alternative.” Limiters applied were 5 years, full text and peer reviewed; this search yielded 8 journal articles, two of which were usable for the research topic. A third CINAHL database search was performed using the builders



“elderly” AND “sleep” AND “aromatherapy.” The limiter was set at 5 years and full text. The search yielded three journal articles, all of which were deemed applicable to address the topic of the research paper.

To respect the space limitation and due to the seemingly vast topic of non-pharmacological treatment options for quality sleep in the elderly, four topics were chosen for further detailed review; these include diet, physical activity, acupuncture and aromatherapy.

**Diet and sleep.** Dietary intake has a direct physiological impact on all body systems (Welch-White, Dawkins, Graham, & Pace, 2013). Eating excess of certain nutrients can have negative impacts, just like eating below the recommended dietary requirement of specific macronutrients and vitamins can also result in negative consequence and vice versa (Welch-White, Dawkins, Graham, & Pace, 2013). Seeing as how diet can have a direct impact on body systems, it is not surprising that diet can also directly affect sleep. An interesting study was done that implemented bi-daily fatty fish meals into the diet of people in order to study vitamin D levels and quality of sleep. The findings published showed that as vitamin D levels increased in the fish-consuming group, the quality sleep measures also rose (Hansen et al., 2014).

It has also been shown that decreased food consumption 2-3 hours before sleep may help to lengthen the overall sleep time, older adults (age 65+) is the population that sleeps the shortest amount (6-7 hours) compared to other age groups, therefore increasing sleep time could be beneficial in this age group (Dashti, Scheer, Jacques, Lamon-Fava, & Ordovas, 2015). In addition, elderly who eat a balanced diet at traditional hours during the day e.g., breakfast, lunch, and dinner, have been shown to sleep more hours than

people who do not eat balanced meals at traditional times and people who engage in late night snacking. Elderly people specifically have been proven to have a decrease in sleep hours if their diets are high in carbohydrates, low in protein and low in fat (Dashti, Scheer, Jacques, Lamon-Fava, & Ordovas, 2015).

Eating 2 kiwi fruit or drinking an 8 oz. glass of tart cherry juice has promising evidence to support higher quality sleep and longer sleep cycles in elderly (St-Onge, Mikic, & Pietrolungo, 2016). Tart cherries have many anti-oxidant qualities that might be one of the reasons it helps improve quality sleep by decreasing oxidative stress. Kiwi fruit contains serotonin and folate; seeing that folate deficiency has been linked to poor sleep, the kiwi fruit can assist to counteract that deficiency (St-Onge, Mikic, & Pietrolungo, 2016). Eating a nutritious diet with fresh fruits and vegetables therefore can contribute to improved sleep.

There is strong evidence that diet alone can have a significant impact on sleep quantity and quality. The body of evidence might not be as discriminatory in terms of age and the older adult, however diet as a whole across the lifespan has been shown to have both negative and positive influences on sleep (St-Onge, Mikic, & Pietrolungo, 2016).

**Physical activity and sleep.** Physical activity is another hallmark intervention that is boasted to cure and improve many of life's ailments. Therefore, the investigation of physical activity and the quality of sleep in the elderly population is important to address further. There is overwhelming evidence that elderly whom participate in an organized gentle exercise program on a regular basis not only report subjective improvements in sleep quality, but also objective sleep quality improves, sleep duration lengthens, sleep latency improves, and daytime dysfunction decreases (Chen, Liu, Huang,

& Chiou, 2012). It is important that physical activity does not necessarily mean physical exercise. Being an active participant in a community program can be sufficient enough in order to induce higher quality and quantity of sleep in the elderly patient (Rawtaer, Mahendran, Hy, Fu, & Eh, 2017). Community programs can be accessed through recreation centers or senior citizen groups; programs such as Tai Chi, music therapy, art therapy and meditative practices are all activities that have shown to have a positive influence on sleep in the elderly (Rawtaer, Mahendran, Hy, Fu, & Eh, 2017; Kuck, Pantke, & Flick, 2014). The social interaction that is associated with the physical activity also works as a promoter of sleep and together they are hypothesized to reset the circadian rhythm of the elderly (Wennberg, Canham, Smith, & Spira, 2014).

For the elderly person who has mobility or transportation difficulty, Tai Chi and yoga exercises have been shown to increase sleep length, latency, quality and duration (Du et al., 2015). Yoga has also been shown to increase flexibility and decrease pain in elderly with arthritis-associated pain (Taibi, & Vitiello, 2012). Giving the elderly person the freedom to practice Tai Chi or yoga in the comfort of his or her own home proves to be a convenient intervention that is low cost and relatively low energy. Successfully being able to decrease pharmacological interventions for quality sleep and using low cost or even free alternatives is ideal for a population that is often financially limited.

**Aromatherapy and sleep.** The use of aromatherapy in medicine is not novel, as it has been around since the early 20<sup>th</sup> century often with the promise to cure everything from orthopedic to psychiatric ailments (Lakhan, Sheaffer, & Tepper, 2016). Aromatherapy however, is possibly a topic that is less explored in the scientific sense.

Aromatherapy is thought to cause a sedating or tranquilizing effect on certain receptors in the central nervous system; aromatherapy can be utilized topically on the skin or via the olfactory system with steam or vapor (Faydali, & Cetinkaya, 2018).

Lavender specifically has been shown to be widely tolerated by a large group of people and it is thought to have a sedating effect on the amygdala, which is the epicenter for emotion in the brain (Faydali, & Cetinkaya, 2018). When a drop of lavender oil was applied to the pillows of nursing home elderly, nine out of ten residents self-reported that the quality of their sleep improved (Faydali, & Cetinkaya, 2018). The Journal of Alternative and Complimentary Medicine published a systematic review of the use of aromatherapy oil and its effects on sleep in 2014. They reported mixed results, with some studies showing improved quality sleep with the use of aromatherapy and other studies not finding the same results, the oils used were lavender, peppermint and jasmine oil (Lillehei, & Halcon, 2014). The difficulty when studying aromatherapy is that the odor related to the oils makes it difficult to do randomized controlled trials (RCT) as the participants obviously are able to smell and experience the oil and its associated odor (Lillehei, & Halcon, 2014).

However, the question is then asked how important are RCT on study results if 90% of participants subjectively experience increased quality sleep, the intervention is affordable, low energy and seemingly successful. Currently there is little scientific evidence and research being done on essential oils and aromatherapy, however further research is encouraged and some is also being investigated on not only different oils and their unique properties, but on dose differences and the potential implications that can have on the human physiology (Lillehei, & Halcon 2014).

**Acu-pressure and sleep.** Acu-pressure is a traditional chinese medicine (TCM) treatment that can be done by trained lay people. It involves applying pressure to specific pressure points on the shoulders face and head several times per week for many weeks in a row (Chan et al., 2017). One large study applied acu-pressure on an elderly chinese cohort with a mean age of 76. This study found that weekly acu-pressure had a positive impact on quality sleep in elderly people (Chan et al., 2017). However, the authors hypothesize that sleep is improved because daytime dysfunction is decreased. Therefore, making the elderly more active and participatory during the day, and consequently sleeping with a higher quality at night (Chan et al., 2017). Although, it is not thought to have a primary impact on sleep, the secondary gains are promising.

In a group of institutionalized patients with Alzheimers, acu-pressure treatment was implemented over an 8-week period. The study found that patients had a significant decrease in their use of pharmacological sleep aids, a significant increase in total hours of sleep, and a reported increase in their quality of life (Simoncini et al., 2015). Acu-pressure is showing promising results by increasing quality sleep in the elderly. It is cost effective and can be done by lay-persons as long as they are properly trained. However, further research is needed in order to encourage care-takers and providers to become trained in the treatment modalities involved.

### **Practice Recommendations and Learning Points**

It is estimated that every other elderly person has poor sleep quality or quantity or both (Simoncini et al., 2014). Having poor sleep can have a domino effect of negative consequences on daily living, including increased risk of accidents, shortened life expectancy, poor cognitive function and decreased quality of life (Bu, Wang, Huo, Xu,

Li, & Li, 2018; Soh, Chee, Yuan, & Koh, 2018). Therefore, finding alternatives options of treatment in order to improve quality and quantity of sleep in the elderly population is important for clinical practice as an advanced practice nurse.

There are many areas of non-pharmacological sleep treatments being studied, with increased activity and diet interventions being two of the seemingly most popular. However, advances in health care and research are exploring new and novel ideas such as aromatherapy and acu-pressure treatment. Diet changes have been shown to have an impact on quality sleep; decreased carbohydrates, ingesting food with folate, and certain vitamins such as vitamin D and antioxidants have been shown to improve sleep (Hansen et al., 2014; Dashti, Scheer, Jacques, Lamon-Fava, & Ordovas, 2015).

Increasing activity has also been shown to be effective in improving sleep in the elderly. It is important to stress that social types of activity do show improvement in sleep, it is not the exercise component alone, but also the social aspect of daily living that appears to be beneficial to improving sleep hours and quality. Home activities can also be implemented for improved sleep, e.g., Tai Chi and Yoga (Rawtaer, Mahendran, Hy, Fu, & Eh, 2017; Kuck, Pantke, & Flick, 2014; Wennberg, Canham, Smith, & Spira, 2014). Both of which are gentle on joints, low cost and with strong scientific evidence that shows improved sleep in the elderly.

Aromatherapy and acu-pressure are two less researched areas of improving sleep in the elderly. Although, these are novel ideas this does not mean they have a low efficacy or are of less importance in the future of sleep study for the elderly patient. Patients report a high satisfaction rating with improved sleep using these modalities and future scientific research is promising (Lillehei, & Halcon, 2014; Simoncini et al., 2015).

Being aware of the dangers of poly-pharmacy in the elderly population is important for every prescriber and provider that cares for the aging patient. Being alert and wise when advising patients on effective and safe options to investigate for improving sleep quality is important, reaching for the prescription pad is not always best practice or in the best interest of our patients, especially the elderly ones.

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