Available online at www.sciencedirect.com
ScienceDirect
Nurs Outlook 63 (2015) 357–365
Nursing Outlook
www.nursingoutlook.org

Sleep quality and depression of nursing home older adults in wheelchairs after exercises

Kuei-Min Chen, RN, PhD[a,*], Hsin-Ting Huang, BS[a], Yin-Yin Cheng, RN, MS[a], Chun-Huw Li, RN, MS[b], Ya-Hui Chang, BS[a]

[a] College of Nursing, Kaohsiung Medical University, Kaohsiung, Taiwan
[b] Department of Nursing, Yuhing Junior College of Health Care and Management, Kaohsiung, Taiwan

ARTICLE INFO

Article history:
Received 20 May 2014
Revised 12 August 2014
Accepted 20 August 2014
Available online 23 August 2014

Keywords:
Cluster randomized control trial
Depression
Elastic band
Nursing home
Older adults
Sleep quality
Wheelchair exercise

ABSTRACT

Background: Sleep disturbances and depression are costly and potentially disabling conditions that affect a considerable proportion of older adults. The purpose of this study was to test the effectiveness of 6 months of elastic band exercises on sleep quality and depression of wheelchair-bound older adults in nursing homes.

Methods: One hundred twenty-seven older adults from 10 nursing homes participated in this cluster randomized controlled trial, and 114 completed the study. Participants were randomly assigned to two groups: experimental group (five nursing homes, $n = 59$) and control group (five nursing homes, $n = 55$). A 40-minute wheelchair-bound senior elastic band exercise program was implemented 3 times per week for 6 months. Sleep quality and depression of the participants were examined at baseline, after 3 months, and at the end of the 6-month study.

Discussion: Participants in the experimental group had longer sleep durations, better habitual sleep efficiencies, and less depression than the control group at 3 months of the study and maintained them throughout the rest of the 6-month study.

Conclusions: Nursing home directors could recruit volunteers to learn the program and lead the elderly residents in wheelchairs in practicing the wheelchair-bound senior elastic band exercises regularly in the facilities.

Cite this article: Chen, K.-M., Huang, H.-T., Cheng, Y.-Y., Li, C.-H., & Chang, Y.-H. (2015, JUNE). Sleep quality and depression of nursing home older adults in wheelchairs after exercises. Nursing Outlook, 63(3), 357-365. http://dx.doi.org/10.1016/j.outlook.2014.08.010.

Introduction

Sleep disturbances, such as altered sleep duration and increased sleep fragmentation, are common among older adults. In Taiwan, 69.3% of institutional older adults were reported to have poor sleep quality (Lin, Su, & Chang, 2003). The three most often reported sleep disturbances are difficulty initiating sleep, difficulty maintaining sleep, and early morning awakening (Ohayon, 2002). Sleep disturbances in older adults are ascribed to the inactive lifestyles of repetitive daily routines, lack of physical exercise, and poor sleep practices (e.g., excessive time spent in bed and sleeping

Supported by the National Science Council Taiwan (NSC99-2628-B-037-066-MY3).
* *Corresponding author:* Kuei-Min Chen, College of Nursing, Kaohsiung Medical University, 100 Shih-Chuan 1st Rd, Sanming District, Kaohsiung, Taiwan 80708.
E-mail address: kmc@kmu.edu.tw (K.-M. Chen).

http://dx.doi.org/10.1016/j.outlook.2014.08.010

during the day; Foley, Ancoli-Israel, Britz, & Walsh, 2004). Wheelchair-bound older adults in nursing homes were even more disposed to these situations.

The percentage of older adults using wheelchairs in nursing homes is over 50% of that population (Kaye, Kang, & LaPlante, 2002). Wheelchair use is one of the obstacles to physical activity (Rimmer, 2005), which might lead to further disability and mortality in older adults (Hirvensalo, Rantanen, & Heikkinen, 2000). Inactive lifestyles could further lead to tiredness, daytime drowsiness, fatigue, depression, greater anxiety, irritability, mood disturbances, immunosuppression, inability to participate in activities, and an overall poor quality of life (Buysse et al., 2008; Ouslander et al., 2006; Stenholm et al., 2010). Among these symptoms, depression is a costly and potentially disabling condition affecting a considerable proportion of older adults. Lin, Wang, and Huang (2007) reported a depression prevalence rate of 81.8% among elderly nursing home residents. Gueldner et al. (2001) claimed that older adults who live in nursing homes have a higher prevalence of depression than those living in the community.

No other daytime behavior has been associated with better nighttime sleep than exercise (Youngstedt & Kline, 2006). Lin et al. (2003) found that older adults who exercised regularly had a better sleep quality. Physically active individuals had a longer total sleep time, better stage IV of the sleep cycle, and less rapid eye movement sleep duration than sedentary individuals (Youngstedt, O'Connor, & Dishman, 1997). Moreover, older adults who participated in aerobic exercise training were associated with a decreased risk for clinical depression or anxiety (Mather et al., 2002). Physical activity is associated with a decreased state of depression and anxiety and enhanced psychological well-being of individuals (Vuillemin et al., 2005). Compared with individual exercises, group exercises resulted in higher levels of interest and exercise participation, more positive emotional effects (e.g., increased social interaction and lowered levels of depression), and less financial and time burdens (Shin, Lee, & Jang, 2007).

Among the various exercises, resistance training stems the decline of muscular strength, which is one of the most important issues related to aging in human beings (Burton & Sumukadas, 2010). Elastic band exercises have been used widely in rehabilitative medicine and health enhancement (Colado et al., 2010; Ribeiro, Teixeira, Brochado, & Oliveira, 2009). It is relatively inexpensive and provides a practical form of training that could be considered in program design for older adults with mobility limitations (Webber & Porter, 2010). Studies indicated that elastic band exercises improved maximal voluntary thigh muscle strength (Binder et al., 2005); increased isometric, isotonic, and isokinetic muscle strength (Ribeiro et al., 2009; Webber & Porter, 2010; Woo, Hong, Lau, & Lynn, 2007); improved muscle strength and flexibility (Latham & Liu, 2010; Nelson et al., 2007); promoted muscle hypertrophy (Yasuda et al., 2014); improved movement time (Webber & Porter, 2010); improved knee extension and hip extension strength (Dancewicz, Krebs, & McGibbon, 2003); and sit-to-stand performance of older adults (Chen et al., 2009b). Furthermore, elastic band resistance training improved functional ability (Topp, Boardley, Morgan, Fahlman, & McNevin, 2005), increased flexibility and range of joint motion (Sugimoto & Blanpied, 2006; Swank, Funk, Durham, & Roberts, 2003), and enhanced gait and balance of older adults (Topp, Mikesky, Dayhoff, & Holt, 1996).

Previous studies have shown the physical effectiveness of elastic band exercises; however, considerably fewer studies have emphasized their psychological benefits. In a pilot testing of a group of older adults in wheelchairs, participants self-reported having more muscle strength in their hands and legs; increased body flexibility and range of joint motion; and, more importantly, slept better and felt more energetic after 4 weeks of elastic band exercises (Chen, Tseng, Chang, Huang, & Li, 2013). Therefore, in addition to the physiological health benefits, elastic band exercises could have potential psychological health benefits. This study aimed to test the effectiveness of 6 months of elastic band exercises on sleep quality and depression of wheelchair-bound older adults in nursing homes.

Methods

Design

A cluster randomized controlled trial was used. Ten nursing homes that participated voluntarily were randomly assigned to either the experimental or control group using a black box drawing. Data were examined at three points in time: baseline, at 3 months, and at the end of the 6-month study. These time points were specifically chosen to reflect the most frequent intervention periods suggested in the literature (Chen et al., 2009a) and for the purpose of understanding the trends and changes in the 6-month period.

Setting and Participants

This study was conducted in 10 nursing homes in Kaohsiung, Southern Taiwan. These nursing homes were privately funded, government accredited, and equipped with 49 beds, which resembled the majority of nursing homes in Taiwan. Based on the nursing home registry in Kaohsiung, the principal investigator called the directors of the nursing homes to determine their willingness to participate in the study; 10 nursing home directors volunteered to participate. Inclusion criteria were as follows: (a) aged 65 and over, (b) using wheelchairs for mobility, (c) living in the facility for at least 3 months, (d) cognitively intact (Short Portable Mental Status Questionnaire score $\geq$8; Pfeiffer, 1975), and (e) heavily or moderately dependent on others to perform activities of daily living (ADLs; Barthel Index