Archives of Gerontology and Geriatrics 76 (2018) 73–79

Contents lists available at ScienceDirect

Archives of Gerontology and Geriatrics

journal homepage: www.elsevier.com/locate/archger

Locomotive function and quality of life among older people in Liaoning, China: Falls efficacy as mediator or moderator?

Li-jie Huang[a], You-feng Wen[b], Yong-chuang Liu[c], Li-na Guo[d], Wen-ting Du[e], Min-min Qin[f], Jing-jing Zhang[d], Kun Liu[a,*]

[a] College of Nursing, Jinzhou Medical University, Jinzhou, Liaoning, PR China
[b] Basic Medical College, Jinzhou Medical University, Jinzhou, Liaoning, PR China
[c] Department of Nephrology, Affiliated Hospital of Jining Medical University, Jining, Shandong, PR China
[d] Department of Neurology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, Henan, PR China
[e] Department of Cardiology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, Henan, PR China
[f] Department of Operating Theatre, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, Henan, PR China

ARTICLE INFO

Keywords:
Locomotive function
The elderly
Falls efficacy
Mediator
Moderator

ABSTRACT

Objectives: This study aimed to examine the role of falls efficacy in the relationship between the locomotive function and quality of life.

Methods: From March to May in 2016, we conducted a cross-sectional survey among 830 community residents aged ≥60 years from Jinzhou,China.GLFS-25 (25-question Geriatric Locomotive Function Scale), FES-I (International edition of Falls Efficacy Scale),and SF-12 (12-item Short Form Health Survey) were used to estimate locomotive function, falls efficacy and quality of life, respectively. The higher score of GLFS-25, the worse the locomotive function.

Results: Median age was 68.69 years (ranges 60–88). Locomotive function, falls efficacy and quality of life all presented a linear relationship within each other, locomotive function score was negatively correlated with falls efficacy score (-0.461, $P < 0.01$). locomotive function score was negatively correlated with quality of life score (-0.523, $P < 0.01$).Falls efficacy score was positively correlated with quality of life score (0.415, $P < 0.01$).Falls efficacy exerted both a mediating and moderating role between locomotive function and quality of life, and the mediation effect accounted for 45.5% of the total effect.

Conclusions: Poorer locomotive function was associated with poorer quality of life, and greater falls efficacy was associated with better quality of life. In addition, falls efficacy was demonstrated to be both a mediator and moderator variable in the linkage between locomotive function and quality of life. Aged care professional practitioners and our policy makers should strengthen the awareness of the psychological role of the elderly falls efficacy.

1. Introduction

China is a country with one of the largest numbers of aged persons in the world, largely due to the longer life expectancy, low mortality, and declining fertility. Illness, disability, functional decline and other factors had led the elder population the main crowd who need health care (Liu et al., 2017; Falvey, Gustavson, Price, Papazian., & Stevens-Lapsley, 2017). Focusing on locomotive function of the elderly is worthwhile on improving the quality of life.

The concept of locomotive syndrome (LS) was firstly proposed by the Japanese Orthopedic Association (JOA), is a condition of reduced mobility caused by impairment of locomotive organs (Iizuka et al., 2015; Seichi et al., 2012). Studies had shown that the prevalence of sarcopenia, osteoporosis, osteoarthritis, lumbar spondylosis and other degenerative diseases was increasing among the elderly, and most of them could contribute to the decrease of locomotive function (Muhlberg & Sieber, 2004; Morley et al., 2017; Ohsawa et al., 2016; Tajika et al., 2017). Progression of locomotive syndrome eventually results in limiting independence in carrying out activities of daily living, and reduction of quality of life. Kenichi Hirano (Hirano et al., 2013) had demonstrated that people who had LS, the scores of SF-36 was lower, and the difference of the scores between LS and Non-LS was statistically significant. Implying that people who had locomotive syndrome, their quality of life was worse.

* Corresponding author.
E-mail address: 3172986552@qq.com (K. Liu).

https://doi.org/10.1016/j.archger.2018.01.014
Received 21 December 2017; Received in revised form 31 January 2018; Accepted 31 January 2018
Available online 09 February 2018

Falls efficacy represents the level of confidence about simple or complex physical activities they engaged in, in case of no fall (Hauer et al., 2010). Research established by Demura, Sato, Mitsumori, and Sato (2013) demonstrated that elderly Japanese individuals with locomotive disorder had high risk of falling. People would have a strong sense of fear of falling and walking obstacles after experiencing the fall. Choi, Jeon, and Cho (2017) found that fear of falling was expected to have effects on functional decline in the elderly. The study of Greenberg, Sullivan-Marx, Sommers, Chittams, and Cacchione (2016) had shown that fear of falling was associated disability, and decreased health-related quality of life. Nevertheless, the relationship among locomotive function, falls efficacy and quality of life is unknown. We hypothesise that: falls efficacy acts as a mediator and moderator variable and can buffer and offset the effect of locomotive function on quality of life. Our objective of this study is to verify our hypothesis systematically among the Chinese community elderly.

2. Material and methods

A cross-sectional study was conducted on 830 residents aged ≥60 years in Jinzhou, Liaoning province from March to May in 2016. A multistage stratified cluster convenience sampling method was used in this investigation. According to the geographic distribution of Jinzhou, the whole city was divided into six municipal districts (i.e. three formal districts, three new districts), two counties, two county-level city. Most elder residents of this city live in these formal districts, in the new districts most are young people. In view of its demographic distribution characteristics, we set the sampling site in the three formal districts (i.e. Taihe district, Guta district, Linghe district) by convenience principle. From each district we selected one street office. The target number of participants was determined based on the criterion proposed by Kendall in 1975 (i.e. 10-fold the number of items) .The three measurement scales (GLFS-25、FES-I、SF-12) contains 14 subscales in total, 140 participants were needed. Given 20% of the sampling error of convenience sampling, the sample size was increased by 20%, the final total number of our study was 168. In total, we investigated 830 individuals in this survey.

Investigators all accepted uniform standardized training before conducting this investigation. Participants were taught systematically to make sure that everyone knew the purpose and consent of this survey, and agreed to participate in. Excluding these questionnaires that were less than 80% completed or low writing quality, finally got 790 valid questionnaires.

2.1. General questionnaire

A questionnaire incorporating the following questions were used: age (60–64 y, 65–69 y,70–74 y, 75–79 y, 80–85 y,and > 85 y), educational level (Elementary school or less, Middle school, High school or Secondary school, College, and Bachelor degree or above), number of people in family that daily live together (1,2,3,4,5,) and yearly family income (< 20 thousand yuan, 20 thousand–50 thousand yuan, 50 thousand–100 thousand yuan, 100 thousand–200 thousand yuan, and > 200 thousand yuan).

2.2. Locomotive function assessment

The 25-question Geriatric Locomotive Function Scale (GLFS-25) (Seichi et al., 2012) is a valid and reliable scale for detecting locomotive syndrome in the elderly. It has been translated into Chinese and adapted in Chinese individuals in the form of four subscales. This scale has 25 items and four subscales: (1) physical pain, (2) daily care, (3) mobility difficulties, and (4) social activity. Each item of the scale ranged between 0 and 4. The score of physical pain ranged between 0 and 16, the score of daily care ranged between 0 and 20, the score of mobility difficulties ranged between 0 and 20, the score of social activity ranged between 0 and 44. The total score of this scale ranged between 0 and 100, higher scores suggest poorer locomotive function, and the respondents would be recognized as having locomotive syndrome when they got a score of 16 or more. In this study, the Cronbach's a coefficient was 0.927.

2.3. Assessment of falls efficacy

The International edition of Falls Efficacy Scale (FES-I) (Hauer et al., 2010) is a valid and reliable scale for evaluating level of confidence about simple or complex physical activities they engaged in, in case of no fall. This scale has 16 items and two subscales (indoor physical activity, outdoor physical activity). Each item of the scale ranged between 1and 4, the total score of this scale ranged between 16 and 64. Higher score suggest stronger faith about the activities they engaged in. In this study, the Cronbach's a coefficient was 0.90.

2.4. Assessment of quality of life

12-item Short Form Health Survey (SF-12) (Ware, Kosinski, & Keler, 1995) is a valid and reliable scale for evaluating quality of life, and has been widely used in China. This scale has 12 items 8 subscales: (1) physical function, (2) body role function, (3) body pain, (4) general health, (5) vitality, (6) social function, (7) emotional function, and (8) psychological function. Each dimension ranged between 0 and 100. Add the eight dimension scores together we get the total score, which ranged between 0 and 800, and divide that total score by 8,then we get the final score (ranged between 0 and 100. Higher score suggests higher level quality of life. In this study, the Cronbach's a coefficient was 0.892.

2.5. Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institute of Jinzhou Medical University. Informed consent was obtained from all participants included in the study.

2.6. Statistical analysis

The collected data were managed and analyzed by SPSS 21.0 (IBM Corporation, Armonk, NY, USA) and AMOS 22.0 (IBM Corporation, Armonk, NY, USA).The averages were used to take place of the missing data in this study. Descriptive statistics for sociodemographic variables, scores of locomotive function, falls efficacy and quality of life were described by frequencies, percentages, means, and standard deviations. Pearson's correlation coefficients were used to analyze the relationship among the locomotive function subscales, falls efficacy subscales and quality of life subscales. Multiple linear regression was used to evaluate whether locomotive function and falls efficacy could significantly affect the outcome variable of quality of life.

2.6.1. The test of mediating role of falls efficacy

Previous studies have shown that age, sex, education level, family income are closely correlated with quality of life of the elderly (Chen, Hicks, & While, 2014), so in this study these variables (age, sex, education level, family income) were put into the Model I to control their effects firstly, then locomotive function subscales were put into the Model I. Falls efficacy subscales were put into Model II on the basis of Model I.

The relationship among locomotive function, falls efficacy and quality of life were verified by the structural equation modeling, approaching with the bootstrap method (5000 replicates) in AMOS 22.0. The hypothesized model fit the observed data or not was determined by these indices such as: χ^2 (χ^2/df), values of comparative fit index (CFI), goodness-of fit index (GFI), normed fit index (NFI), incremental fit