



Chronic pain and its association with obesity among older adults in China

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ABSTRACT

Objectives: There is a paucity of epidemiological data on chronic pain and obesity among older adults. This study attempted to present the characterization of chronic pain and its association with obesity among the Chinese elderly.

Methods: A cross-sectional survey was undertaken among 6524 elderly individuals aged ≥ 60 years in China. Chronic pain was identified by self-reports based on the definition from the International Association for the Study of Pain (IASP). Body Mass Index (BMI) was measured to assess obesity. Binary logistic regression analysis was performed to explore the association between obesity and chronic pain.

Results: The prevalence of chronic pain was 49.8%. The legs/feet (25.5%), back (23.2%), and neck/shoulder (14.6%) were the most salient locations for chronic pain. Compared with normal weight, subjects with overweight (OR = 1.234, 95%CI = 1.100–1.384) and obesity (OR = 1.715, 95%CI = 1.418–2.073) were considerably more likely to have chronic pain after adjusting for covariates ($p < .05$). Age was not significantly associated with chronic pain ($p > .05$). Further analyses revealed that the associations between chronic pain and obesity were restricted to the legs/feet and back.

Conclusion: Chronic pain is common among older adults in China. Understanding the role of obesity in chronic pain is important for preventing and treating chronic pain.

1. Introduction

According to the International Association for the Study of Pain (IASP), pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage, and it is classified as chronic pain if it persists for longer than 3 months (IASP, 1986). Surveys showed that the prevalence of chronic pain was 37.3% in developed countries and 41.1% in developing countries among the general adult population (Tsang et al., 2008). Age is often considered to be associated with chronic pain (Chen et al., 2016; Lamerato et al., 2016). A systematic review in Asian adults showed that the prevalence of chronic pain among adults aged 18 years and above varied from 7.1% to 61%, while the prevalence varied from 42% to 90.8% among the Asian geriatric population (3 studies) (Mohamed Zaki & Hairi, 2015). However, some studies showed that the prevalence of chronic pain was not associated with age in elderly people (Satghare et al., 2016; Patel, Guralnik, Dansie, & Turk, 2013).

Researchers have not reached a consistent conclusion that there is a flat or increasing prevalence of chronic pain among older adults. The age pattern of chronic pain in the elderly is not well established due to very few studies in older adults.

Since 1980, the prevalence of obesity has doubled in more than 70 countries and has continuously increased in most countries (GBD Obesity Collaborators, 2017). The disease burden related to high BMI has increased accordingly. A number of studies over the last few decades have examined the association between obesity and pain (Malta et al., 2017; Tanamas et al., 2012). A survey of 1062271 individuals in the United States showed that BMI and pain are positively correlated: the overweight group reported 20% higher rates of pain than the low-normal group, 68% higher for the obese I group, 136% higher for the obese II group, and 254% higher for the obese III group (Stone & Broderick, 2012). The association between chronic pain and obesity is important, since obesity is also associated with increased pain-related disability and reduced physical functioning (Marcus, 2004).

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Nevertheless, the association between chronic pain and obesity has not been fully studied. Data on the association between chronic pain and obesity in the elderly population is limited. Given that older adults have a different state of health, such as decreased metabolic capacity and decreased sensitivity to pain, it is necessary to clarify the association between chronic pain and obesity in the elderly population.

The increasing ratio trend of the aging population is well underway, while the overall global population is declining (Fuster, 2017). Within the context of aging, China entered the stage of population aging in 2000, and the proportion of aging increased year by year. The proportion of people aged 60 and above was 16.14% in 2015 (National Bureau of Statistics of China, 2016). Studies showed that chronic pain may have significant impacts on health and well-being, such as daily activity impairments, and on lower quality of life (Inoue et al., 2015; Takura et al., 2015). It is of great significance for healthy aging to prevent chronic pain. Therefore, the aims of this study were to investigate the following: (1) the prevalence and age pattern of chronic pain among the Chinese elderly; and (2) the associations between chronic pain and obesity.

2. Methods

2.1. Participants

This study was conducted in Ma'anshan, a municipality located in eastern Anhui Province, China. The study participants were derived from two stages. First, we investigated the rural elderly population using a cluster random sample approach. We contacted 27 rural villages in Dangtu County of Ma'anshan City in September to October 2016. Second, we investigated the urban elderly in December 2016 to March 2017. Three community health centers were randomly selected. To improve the response rate, we presented a small incentive gift to the participants. Furthermore, we provided free physical examination services for them, such as measuring blood pressure to promote participation. In addition, the Ma'anshan Centers for Disease Control also provided many forms of support for this investigation. Nearly half of the older adults were illiterate in this investigation. Thus, we explained the contents of the questionnaire to the participants with the help of graduate students and other local older adults. A total of 6881 elderly aged 60 years or above were included. Face-to-face interviews and physical examinations were conducted. After the completion of the questionnaire, the investigators needed to check the integrity and logic of the questionnaire. Eventually, 6524 older adults were successfully interviewed. The overall response rate was 94.8%. Three weeks later, 200 elderly people were selected to retest the content of the questionnaire. The Ethical approval was granted by the ethics committee of Anhui Medical University.

2.2. Measures

2.2.1. Chronic pain

In the present study, chronic pain was defined using the IASP definition. First, subjects were asked "Did you have pain in the past 6 months lasting ≥ 3 months in duration?" If yes, 8 locations (head, face, neck and shoulder, back, arms and hands, legs and feet, chest, and abdomen and pelvis) were given (McCarthy, Bigal, Katz, Derby, & Lipton, 2009). One or more locations could be selected according to the actual condition. Subjects were then asked to rate their pain intensity. Pain intensity was assessed using a numerical rating scale (NRS) score (Gianni et al., 2010). It is scored between 0 (no pain) and 10 (worst possible pain). The total pain intensity was identified as the highest pain intensity of the locations.

2.2.2. Obesity

Weight and height were measured during the face-to-face interview. BMI is calculated as $\text{weight (kg)/[height (m)]}^2$. It is categorized into

four groups: underweight ($< 18.5 \text{ kg/m}^2$), normal weight ($18.5\text{--}24.0 \text{ kg/m}^2$), overweight ($24.0\text{--}28.0 \text{ kg/m}^2$) and obese ($\geq 28.0 \text{ kg/m}^2$), based on Chinese standards of BMI (Zhou, 2002).

2.2.3. Socio-demographic (or other) variables

The following socio-demographic variables were included in this survey: sex (men, women), age (60–69, 70–79, ≥ 80 years), education (illiterate, primary, secondary or above), marital status (single, including never married, divorced, widowed; married), living alone (no, yes), monthly income (< 200 RMB, $200\text{--}1000$ RMB, > 1000 RMB), area (rural, urban), current smoking (no, yes), current alcohol consumption (no, yes), chronic diseases (no; yes, including hypertension, diabetes mellitus, coronary heart disease, arrhythmia, stroke, chronic lung diseases, chronic stomach diseases, cancer, cataract, glaucoma, cholecystitis, and nephritis based on final diagnosis from medical institutions).

Activity of Daily Living (ADL) was measured using a 14-item scale (Physical Self-Maintenance Scale and Instrumental Activity of Daily Living). The sum scores ranged from 4 to 64. It was classified into three categories: normal function (sum score < 16), decline in function (sum score: $16\text{--}21$), and significant dysfunction (sum score ≥ 22 or two or more items scores greater than three) (Su et al., 2011). Depression was measured by the GDS-15 (15-item Geriatric Depression Scale). This scale contains 15 items (score: $0\text{--}15$), with higher scores indicating poorer depressive symptoms. A cutoff score of ≥ 8 is defined as depression (Woo et al., 1994). Cognitive assessment was performed by Mini-Mental State Examination (MMSE), which is widely used to assess cognitive function (Folstein, Folstein, & McHugh, 1975). It contains 30 items, with scores ranging from 0 to 30. A higher score corresponds to a better cognitive state.

2.3. Statistical analysis

All statistical analyses for this study were conducted using SPSS 16.0 (SPSS for Windows, Version 16.0, Chicago, SPSS Inc.). A p -value $< .05$ was designated as showing a significant difference. The differences between chronic pain and characteristics of the elderly were examined using χ^2 tests and t -tests. The differences between chronic pain locations and BMI and age were compared using χ^2 tests. Binary logistic regression analyses were applied to assess the associations between chronic pain and obesity. The dependent variable was chronic pain (no = 0, yes = 1).

3. Results

3.1. General characteristics of subjects

The study population consisted of 3685 women (56.5%) and 2839 men (43.5%). Participants were on average 71.09 ± 6.73 years of age, and 44.3% of them were 60–69 years. Nearly half of them (48.0%) were illiterate. Most participants were married (76.6%) and living with a spouse or other family members (84.1%). A total of 3048 (46.7%) older adults came from rural areas, and 3476 (53.3%) older adults came from urban areas. Table 1 shows the descriptive statistics of the older adults.

3.2. Characteristics of chronic pain

The retest reliability of chronic pain was 0.89. The prevalence of chronic pain was 49.8% (3250) among the older adults in this sample. Compared with the population with no pain, the population with chronic pain had a higher proportion of women, older individuals, those with lower levels of education, those who were single in terms of marital status, those who had lower incomes, and those who lived in rural areas ($p < .05$). Among all the chronic pain participants, a total of 1963 (60.4%) participants reported pain in one location, and 1287 (39.6%) participants reported pain in two or more locations. The

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