Brazilian Journal of Physical Therapy 2017;xxx(xx):xxx–xxx

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Associação Brasileira de Pesquisa e Pós-Graduação em Fisioterapia

Brazilian Journal of Physical Therapy

https://www.journals.elsevier.com/brazilian-journal-of-physical-therapy

ORIGINAL RESEARCH

Prevalence and factors associated with neck pain: a population-based study

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Received 15 April 2016; received in revised form 1 July 2016; accepted 26 September 2016

KEYWORDS
Neck pain;
Epidemiology;
Risk factors;
Physical therapy

Abstract
Background: Neck pain is a musculoskeletal condition with high prevalence that may affect the physical, social, and psychological aspects of the individual, contributing to the increase in costs in society and business.
Objective: To determine the prevalence of neck pain and associated factors in a population-based sample of adults aged 20 and more.
Methods: Cross-sectional study based on a population survey. A total number of 600 individuals were interviewed in their homes, and the following data were collected: (1) participant characteristics (demographic, socioeconomic, and work-related aspects) using a pre-coded questionnaire; (2) physical activity level using the IPAQ; and (3) musculoskeletal symptoms using the Nordic questionnaire. Descriptive, bivariate, and Poisson regression analyses were performed.
Results: The prevalence of neck pain was 20.3% (95% CI 17.3–23.7). The adjusted analyses showed that individuals who were widowers or separated (PR = 2.26; 1.42–5.88), had a low income (PR = 1.32; 1.22–6.27) or low educational level (PR = 1.83; 1.02–5.26), worked while sitting and leaning (PR = 1.55; 1.08–2.40), and who reported having two or more diseases (PR = 1.71; 1.55–6.31) remained associated with neck pain.
Conclusion: This study reveals the high prevalence of neck pain and remarkable association with widowed/separated people who have low income and low educational level, who perform their occupational activities in sitting and leaning positions, and who reported having two or more diseases. Knowledge of these risk factors will contribute to the development of forms of assistance in which neck pain can be prevented and better managed.

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http://dx.doi.org/10.1016/j.bjpt.2017.05.005
1413-3555/

Please cite this article in press as: Genebra CV, et al. Prevalence and factors associated with neck pain: a population-based study. *Braz J Phys Ther.* 2017, http://dx.doi.org/10.1016/j.bjpt.2017.05.005

Introduction

Neck pain is one of the major musculoskeletal disorders in the adult population[1]; its prevalence in the world ranges from 16.7% to 75.1%.[2] This condition has a complex etiology, including a number of factors: ergonomic (strenuous physical activity, use of force and vibration, inadequate posture, repetitive movement), individual (age, body mass index, genome, musculoskeletal pain history), behavioral (smoking and level of physical activity), and psychosocial (job satisfaction, stress level, anxiety, and depression).[3,4]

Some studies show the relationship between neck pain and associated factors. In China, it was observed that individuals who reported neck pain[5] were the ones who performed manual activities above shoulder level, utilized vibrating tools, and remained in the sitting or standing position with bent necks. In the United States,[6] neck pain was associated with women, married and separated people who suffered from some morbidity (respiratory, cardiovascular, and gastrointestinal diseases, among others) and psychological alterations (depression, difficulty falling asleep, and insomnia), whereas high educational level[6] and regular physical activities were considered protective factors.[7]

Neck pain is a major cause of morbidity and disability in everyday life and at work in many countries. It can have an impact on the individual's physical, social, and psychological well-being, contributing to increasing costs to society and businesses. In addition, with the increasing aging population of medium- and low-income countries, the prevalence of neck pain will grow significantly in the coming decades,[8] requiring knowledge of the risk factors and forms of preventive and/or curative interventions (for example, global postural re-education, segmental stretching,[9] dry needling, and percutaneous electrical nerve stimulation,[10] among others). It is also important to highlight that, in Brazil, population-based studies regarding pain have been frequently related to lumbar or general pain,[11] while neck pain needs further research.

The present study aimed to verify the prevalence of neck pain in a population-based sample of adults aged 20 and older and to analyze the associations of neck pain with the demographic, socioeconomic and ergonomic aspects that are related to the aforementioned lifestyle and morbidity.

Methods

This cross-sectional design study was conducted in the urban area of Bauru, a city located in the central western region of the State of São Paulo (Brazil) has a population of approximately 337,094 inhabitants – of which 207,021 are aged over 20. The project was approved by the Human Research Ethics Committee of Universidade do Sagrado Coração, Bauru, SP, Brazil (approval no. 957481). The participants signed a consent form, as recommended by Resolution 196 of the National Health Council.

The age and gender groups (called sample domains) were firstly defined with a minimum number of individuals per sample, in order to allow further analysis. Six sample domains were determined: 20–35-year-old men; 20–35-year-old women; 36–59-year-old men; 36–59-year-old women; 60-year-old and older men; and 60-year-old and older women.

The sample size calculation was based on the following premises: an estimated proportion of 50% of the population subgroups, since this is the maximum variability that leads to obtaining conservative sample sizes; a 95% confidence level in the estimation of confidence intervals; a 10% sampling error, indicating that the amplitude between the estimated sample and the population parameter should not exceed this value; and a design effect (deff) equal to 2. Therefore, the sample size for each group was at least 200 individuals (100 male and 100 female), totaling 600 participants.

Sampling was drawn from a two-stage cluster. The primary sampling units (PSUs) were the census tracts, and the secondary sampling units were the residences. The PSUs were drawn by systematic sampling with a probability proportional to their sizes.[12] The sampling units were obtained from the National Survey of Household Samples from 2011,[13] which produced an address list of private homes for each census tract. A total of 50 urban census tracts were drawn from the 476 identified ones.

The number of households to be drawn from each sampling domain[12] was determined, and the ratio between the average number of individuals and the number of households was then calculated. Therefore, it was decided that around 12 households should be visited for every census tract. These households were systematically drawn and all individuals residing in them were considered eligible for the interviews. A new household was randomly selected in case of refusal.

The individuals who were not located after four visits (of which at least one at night and one on the weekend), including those who were traveling, were considered as loss. The individuals who refused to answer the questionnaire by personal choice were considered as refusals.

Individuals who were living in institutions such as nursing homes and prisons and those who were unable to answer the questionnaire were excluded from the study. The elderly underwent the Mini-Mental State Examination at the beginning of the interview, so their cognitive state, as well as the reliability of their answers, could be assessed. Participants who scored less than 27 points[14] are considered to have cognitive loss and, therefore, were excluded.

Interviews were conducted by 10 senior physical therapy students. All have undergone theoretical and practical training, which included home approach, interviewing techniques, and issues related to the research tool. A pilot study was performed as part of the training, and the fieldwork was supervised by the researchers involved in the study.

Data was collected from February to June 2012. After the interviews, the questionnaires were coded by the interviewers and revised by the researcher in charge. The supervisors also conducted quality control, which consisted of administering reduced questionnaires to 10% of the respondents.

The variable ''neck pain'' was observed using the Nordic questionnaire, which was validated and adapted to the Brazilian culture.[15] Neck pain was defined as pain, ache, or discomfort in the area between the occiput and the third thoracic vertebra and between the medial borders of the scapulae.[16] In the interview, individuals were asked the following question: ''Did you have any pain or discomfort in the neck in the past year?'' In addition to the verbal questionnaire, an image of the spinal regions in different

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