NECK PAIN IN ADULTS: IMPACT ON QUALITY OF LIFE

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ABSTRACT: Objective: To evaluate the impact of neck pain on quality of life in a population sample of adults aged 20 years or older. Method: Randomized cross-sectional study based on a population survey. A total of 600 individuals were interviewed and the following data were collected: 1. Characteristics of participants (pre-coded questionnaire); 2. Quality of life (SF-36); 3.Musculoskeletal symptoms (Nordic questionnaire); 4. Level of physical activity (IPAC).Results:20.3% of the individuals (CI 17.3 to 23.7) had reported neck pain at least once in the 12 months preceding the interview. From these, 18.0% (CI 14.0 to 22.7) were men and 22.7% (CI 18.2 to 27.7) were women; subjects with neck pain had significantly worse (lower) scores on all SF-36 subscales than did subjects without pain; females had lower scores as compared to males. Conclusion: Neck pain has a high prevalence in the city of Bauru and the neck pain had a significant association to quality of life.

KEY WORDS: Epidemiology; Musculoskeletal pain; Population.

DOR CERVICAL EM ADULTOS: IMPACTO NA QUALIDADE DE VIDA

RESUMO: Objetivo: Avaliar o impacto da dor cervical na qualidade de vida em uma amostra populacional de adultos com 20 anos ou mais. Método: Estudo transversal randomizado, com base em pesquisa populacional. Foram entrevistados 600 indivíduos e os seguintes dados foram coletados: 1. Características dos participantes (questionário pré-codificado); 2. Qualidade de vida (SF-36); 3. Sintomas musculoesqueléticos (questionário nórdico); 4. Nível de atividade física (IPAC). Resultados: 20,3% dos indivíduos (IC 17,3 a 23,7) relataram dor cervical pelo menos uma vez nos 12 meses anteriores à entrevista, sendo que destes, 18,0% (IC 14,0 a 22,7) eram homens e 22,7% (IC 18,2 a 27,7) eram mulheres. Os indivíduos com dor cervical tiveram pontuações significativamente piores (mais baixas) em todas as subescalas do SF-36 do que indivíduos sem dor e as mulheres tiveram pontuações mais baixas em comparação aos homens. Conclusão: A dor cervical teve alta prevalência no município de Bauru e associação significativa com a qualidade de vida.

PALAVRAS-CHAVE: Dor musculoesquelética; Epidemiologia; População.

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INTRODUCTION

Neck pain is a common condition in contemporary society which affects the population in general and constantly can become chronic or recurrent[1]. Its prevalence in the world ranges from 16.7% to 75.1%[2]. Some cross-sectional population-based studies have highlighted such prevalence, such as those performed in the Iran (15.3%)[3], Russia (29.1%)[4], Malaysia (41.0%)[5], and south-west of Brazil (%)[6].

Neck disorders bring a high economic burden that includes costs of treatment and payment of sickness benefit[1]. Neck pain is second only to low back pain in the annual wage costs of United States workers[7], there low back and neck pain had the largest amount of health care spending, with an estimated US$134,5 billion in public insurance, private insurance or direct payments[7]. In Brazil, the public health system spent approximately US$ 714 million on diseases of the spine and patient costs represented 58% of the total direct costs, of that total approximately US$ 7,6 million on cervical spine disorders[8].

The impact of neck pain in the general population has been associated with its influence on health-related quality of life (HRQoL) indicators. This implies the aspects most directly associated with diseases or health interventions[9], as it can be said that it is a subjective and multidimensional construct that evaluates an individual's perception of their own condition of well-being in the spheres of work, culture, and values, including their personal goals, expectations, and interests[9].

The influence of neck pain on general health and HRQoL is described in some studies, such as those performed in Turkey[10], Sweden[11], and Australia[12], these studies indicated lower mean values for the components physical and mental summaries of SF-36 in participants who reported neck pain.

There currently is a growing recognition of the importance of generating data related to health and HRQoL, mainly since in Brazil there is a lack of studies on this subject conducted among adults of the general population[13].

Studies on neck pain in the population are important because they generate social and economic consequences for both the state and individuals. The injury resulting from this pain implies the individual's inability, absenteeism, greater vulnerability to comorbidities, and quality of life impairment; for the State, it brings expenses with treatment and rehabilitation[1]. In addition to that, with the advanced aging of the population in low and middle-income countries, the prevalence of neck pain will increase significantly in the coming decades, requiring professionals to be aware of risk factors and forms of preventive and/or curative interventions, in order to avoid greater damage to these countries' population and economy in the medium and long terms[14].

Considering these points, the aim of the present study was to evaluate the impact of neck pain on quality of life in a population sample of adults aged 20 years or older.

METHODOLOGY

These is randomized cross-sectional study based on a population survey. The 2000 Census states that the population of Bauru was 316,064 inhabitants, with 207.021 inhabitants over 20 years of age. The age and gender groups (called sample domains) were firstly defined with a minimum number of individuals per sample, to allow further analysis. Six sample domains were determined: 20- to 35-year-old men; 20- to 35-year-old women; 36- to 59-year-old men; 36- to 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[15].

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. The sampling units

were obtained from the National Survey of Household Samples from 2011, 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 tracts.

The number of households to be drawn from each sampling domain 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 was at night and one on the weekend), including those who were not found, due to traveling, were considered as a loss. The individuals who refused to answer the questionnaire through 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 below 27 points[16]were considered as presenting cognitive loss and, therefore, excluded.

Interviews were conducted by 10 interviewers, senior Physical Therapy students. All interviewers underwent 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 were collected from February to June 2012. After the interviews, the questionnaires were coded by the interviewers and reviewed by the researcher in charge. The supervisors also conducted a quality control procedure, which consisted of administering reduced questionnaires to10% of the respondents.

The variable "neck pain" was observed using the Nordic questionnaire, which was validated and adapted to the Brazilian culture. Neck pain was defined as pain,

suffering or discomfort in the area between the occipital bone and the third thoracic vertebra, and between the medial border of the scapula[17]. 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 colors was also presented, so the interviewees could better specify the neck region where the pain was[17].

Individual factors include sex, age (20-35, 36-59, >60 years), body mass index (< 18.5, ≥ 18.5- < 25, or ≥ 25 kg/m2), marital status (single, married, and widowed/ separated), education (0-4 years old, 5-8, 9-11, and 12 or over), race (white, black, brown), income (low: up to 3 times the minimum wages (MW); middle: from 4 to 9 MW; and high: 10 or more MW)[2, 18].

Smokers were those who reported smoking daily (at least one cigarette per day) or occasionally (less than one cigarette per day) or former smokers who had stopped smoking for at least six months prior to the interview[11]. Physical activity level of the subjects was assessed by The International Physical Activity Questionnaire (IPAQ), which contains questions regarding weekly frequency and duration in minutes per day of vigorous, moderate and walking physical activity. The questionnaire was duly validated for the Brazilian population obtaining coefficient of validation for the short version of $r = 0.75$. A cut-off point of 150min per week was used for classifying the participants as active (150min/wk or more) or insufficiently active (below 150min/wk)[19].

To evaluate quality of life, we used the questionnaire *Medical Outcomes Study 36 – Item Short-Form Health Survey* (SF-36). This tool addresses both physical and mental / emotional concepts, including scales spanning eight domains: *physical functioning – PF; role limitations due to physical problems – RPP; pain ; general health perception - GHP; role limitations due to social problems – RLS; limitations due to emotional problems - RLE; mental health - MH.* Each of these domains, analyzed individually, received a score of zero to one hundred, with zero indicating the worst possible HRQL level and one hundred the best condition. They were also calculated the summaries of the physical (PCS) and mental components (MCS). The instrument was chosen because it is validated for the Brazilian culture, is simple to interpret, with direct

questions, easy administration and understanding, and excellent reliability, presenting a Cronbach's α of 0.90[20].

DATA ANALYSIS

The analyzes were performed in the SPSS program, version 10.0 (SPSS, Chicago, United States). Absolute and relative frequency distributions were performed for categorical variables and confidence interval (CI).

The SF-36 domains were analyzed separately and consolidated with their respective syntax. The summary variables - PCS and MCS - constitute a sum of the weighted scores of the domains' scores. To facilitate interpretation, these scores were standardized with the mean values of the sample evaluated, 77.4 ± 20.8 for PCS and 80.1 ± 15.8 for MCS. We performed absolute and relative frequency distributions for categorical variables and bivariate analysis using the Pearson Chi-square test for comparison between individuals with and without pain in relation to sex. The prevalence of the presence and severity of neck pain were estimated by points and intervals with 95% confidence.

For the comparison between the non-painless and painless individuals within each age group and sex, Student's t-test was used. The comparisons between the age groups for the presence of pain and sex were performed using Analysis of Variance (a classification criterion), using the Tukey test for the paired comparisons.

Summaries of the physical and mental components were analyzed and compared between individuals with and without pain using Student's test. Then, regression analyzes were performed considering a level of significance of 5%, with calculation of the adjusted odds ratios and confidence intervals.

Summaries of the physical and mental components were used for logistic regression analysis in which the cut-off point was the mean values of the sample divided into two groups: individuals with values equal or higher than the average and individuals who scored below average. For this interpretation, these scores were standardized to the normative mean values of the Brazilian population[13].

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The project was approved by the Ethics Committee in Research with Human Beings, of the Universidade do Sagrado Coração, Bauru, São Paulo, Brazil, under document No. 957,481. The participants signed the Consent Form, as recommendations of Resolution nº 466 of the National Health Council, December 12, 2012. No experiments were performed involving humans, all methods were performed in accordance with the relevant guidelines and regulations.

RESULTS

In the drawn residences, there were 641 eligible subjects, among whom only 600 were effectively interviewed. The main reasons for loss (n= 41) were: "absent residents" and "scheduled with the interviewer but did not attend". Refusals were: "does not respond to interviews" and "too long, it will take a long time to respond".

Table 1 shows that, for both sexes, there is a predominance of individuals with 9 to 11 years of schooling, white ethnicity, married, low income, nonsmokers and sedentary.

Table 1. Distribution of frequencies of sociodemographic characteristics, level of physical activity, reported diseases, body mass index, and smoking of the sample of individuals aged over 20 living in the city of Bauru

(Continuation)

Variables		n (%) of subjects
Years of schooling		
	0 to 4	122 (20.4)
	5 to 8	129 (21.5)
	9 to 11	244 (40.6)
	12 or higher education	105 (17.5)
Ethnicity		
	White	480 (80.0)
	Black	38 (6.3)
	Mulatto	82 (13.6)
Marital Status		

	(Conclusion)
Variables	n (%) of subjects
Married	345 (57.5)
Single	150 (25.0)
Widowed/separated	105 (17.5)
Income	
Low	389 (64.8)
Middle	140 (23.3)
High	71 (11.9)
Smoking	
Non-Smoker	363 (60.5)
Ex-smoker	128 (21.3)
Smoker	109 (18.2)
Physical Activity Level	
Active	210 (35.0)
Sedentary	390 (65.0)

20.3% of the individuals (CI 17.3 to 23.7) had reported feeling neck pain at least once in the 12 months preceding the interview. From these, 18.0% (CI 14.0 to 22.7) were men and 22.7% (CI 18.2 to 27.7) were women.

The mean scores for the SF-36 items are shown in Table 2. Subjects with neck pain had significantly worse (lower) scores on all SF-36 subscales than did subjects without neck pain after adjusting for age, sex and BMI in both genders. Among those with neck pain, women had worse SF-36 scores in all categories except for general health perception and social functioning in comparison to men.

Table 2. Mean SF-36 scores by neck pain status.

Scale	All		Men		Women	
	No pain ‡	Pain ‡	No pain §	Pain §	No pain §	Pain §
Physical functioning	84,8	70,5*	89,1	74,0*	80,3	67,6*†
Physical role	85,6	65,8*	88,6	65,7*	82,4	65,8*†
Bodily pain	79,1	59,7*	83,2	61,3*	74,8	58,4*†
General health perception	72,5	65,0*	72,5	63,1*	72,6	66,5*
Mental health	79,6	71,3*	85,6	73,2*	73,3	69,9†*
Emotional role	89,7	73,8*	93,9	82,7*	85,3	66,7†*
Vitality	65,7	62,0*	67,7	62,5*	63,5	61,5*
Social functioning	93,2	82,7*	95,6	81,3*ᴬ	90,7	83,8*†
Physical component score	80,5	65,3*	83,4	66,1*	77,6	64,6*†
Mental component score	82,2	72,6*	85,8	75,0*	78,3	70,6*†

*P < 0.05, Significant difference between subjects with neck pain and subjects without neck pain; †P < 0.05, Significant difference between men with neck pain and women with neck pain; ‡ adjusted for age, sex and BMI; § adjusted for age and BMI.

All subjects of both genders with neck pain had a significant association scores on all SF-36 subscales than did subjects without neck pain after adjusting for age, sex, and BMI in both genders (Table 3).

Table 3. Prevalence ratio (95% confidence interval) for SF-36 scores by neck pain status

Scale	PR (95% CI)		
	Neck pain vs no neck pain*	Men with neck pain vs men without neck pain§	Women with neck pain vs women without neck pain§
Physical functioning	2.23 (1.35 – 3.67)	2.17 (1.01 –4.65)	2.26 (1.41 – 4.48)
Physical role	2.48 (1.53 – 4.02)	3.04 (1.44 – 6.44)	2.03 (1.06 – 3.87)
Bodilypain	2.66 (1.73 – 4.13)	2.89 (1.48 – 5.63)	2.36 (1.32 – 4.21)
General health perception	1.94 (1.22 – 3.11)	1.87 (0.86 – 4.05)	2.00 (1.11 – 3.62)
Mental health	2.27 (1.43 – 3.57)	4.99 (2.37 – 10.49)	1.37 (0.77 – 2.43)
Emotional role	2.96 (1.85 – 4.75)	2.04 (0.90 – 4.62)	3.52 (1.94 – 6.37)
Vitality	1.61 (1.02 – 2.54)	3.08 (1.52 – 6.24)	1.04 (0.56 – 1.90)
Social functioning	2.72 (1.65 – 4.48)	4.47 (1.98 – 10.08)	2.01 (1.06 – 2.80)
Physical component score	3.57 (2.32 – 5.55)	2,94 (1.66 – 5.26)	4.54 (2.32 – 9.09)
Mental component score	3.84 (2.22 – 5.88)	2.70 (1.49 – 4.76)	5,88 (2.63 – 14.28)

*P < 0.05, Significant difference between subjects with neck pain and subjects without neck pain; ‡adjusted for age, sex and BMI; §adjusted for age and BMI.

DISCUSSION

The main results of this study indicated that neck pain was significantly associated with the scores of all subscales of the SF-36, like other investigations[10-12,21]. It can be assumed that individuals who presented neck pain are more likely to have lower averages, due to the context that the physical and mental domains of the SF-36 represent.

Issues assessed in the physical domain of the instrument, such as limitations related to daily physical ability, pain, work ability, and overall health, may be associated with how the individual can perform physical activities without limitations due to pain or intercurrences in the organism functioning[22]. Neck pain may interfere with activities, causing movement and disability restrictions, and the greater the severity, the greater the impact on quality of life, as indicated by the results sof the present study.

As with physical health, SF-36 mental domains are assessed as a condition in which the subject enjoys feelings of psychological well-being and can perform their daily, social, and work life activities without the interference of health problems. Regarding the impact of pain in the mental domain, some studies confirm the association between pain and tension in this aspect, restricting their participation in society[23].

Also, it was reported there was significant difference in quality of life among males and females. Females had lower PCS and MCS scores as compared to males which depicted quality of life was significantly more impaired in females as compared to males, like other studies [20, 24, 25].

Trying to explain this phenomenon, some causes are pointed out: women are more disabled, probably associated with the fact that they have a higher prevalence of non-fatal disabling conditions and, with this, a greater survival, becoming more susceptible to the outcome, that is, it has a limitation on its capacity for an autonomous daily life and amplifies the need for institutionalization; women have been socialized in order to internalize distress, which contributes to disorders associated with depression, anxiety and suicidal ideation[26].

The results of the present study should be interpreted in its own context of limitations, i.e., the data were based entirely on interviews, so an inaccurate estimation of data and memory bias is inevitable, since factors such as the person's mood, time and place at the moment of collection may contribute to the sub-subject or overestimate the factors that originate the HRQoL. However, this data collection method may not pose a problem, because it is a way of collecting subjective information about various domains of health status perception.

Some good points can be highlighted in this study:

firstly, the scarcity of studies on HRQoL conducted among adults of the general population, non-institutionalized and without any specific pathology, which may contribute as a reference for other epidemiological investigations, for systematic reviews and meta-analyses; in addition to that, there is the adequate methodology to calculate the sample size, taking the variation of the scores obtained in the pilot study into account, the lottery of the households with probability proportional to the size of the UPAs, the indicated method for population surveys, as well as the use of structured methods for the collection and interpretation of results. All these characteristics contributed to the internal validity of the conclusions. Also, the possibility of reproducing the present study and making use of statistical analysis brings even more reliability and inferences.

CONCLUSION

In summary, this study revealed a moderate prevalence of neck pain in the population of Bauru and subjects with neck pain had significantly worse (lower) scores on all SF-36 subscales than did subjects without neck pain. Also, females had lower PCS and MCS scores as compared to males which depicted quality of life was significantly more impaired in females as compared to males.

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