

Factors associated with neck/shoulder pain in young adults.

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Abstract

This study was conducted to identify the factors associated with Neck/Shoulder Pain (NSP) in Korean young adults. A self-administered questionnaire including the presence of NSP and demographic, behavioral, and psychological factors was given to 212 young adults. The data were analysed by mean, standard deviation, chi-squared test, and logistic regression. The prevalence of NSP was 81.6%. The factors associated with NSP were gender ($p=0.031$), self-assessed physical condition ($p=0.011$), cell phone use ($p=0.003$), stress ($p=0.00$), and depression ($p=0.00$). The logistic regression analysis revealed that the predictor of NSP was psychological stress ($B=-0.187$, $p=0.038$). These findings suggest that active efforts to prevent or treat NSP are needed, with a consideration of the risk factors.

Keywords: Factors, Neck/shoulder pain, Adults.

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Introduction

Neck/Shoulder Pain (NSP) is a common musculoskeletal disorder worldwide that leads to significant disability. In the general population, the 12-month prevalence of neck pain is 30-50%, and the 12-month prevalence of activity-limiting neck pain is 1.7-11.5% [1]. In a global burden-of-disease report including 291 countries worldwide, neck pain was ranked as the fourth greatest contributor to global disability [2]. The 12-month prevalence of shoulder pain is 7-67%, and the point prevalence is 7-26% [3].

NSP is a pain in the neck or shoulder, which means that the pain with or without pain in one or both upper limbs lasts for at least one day [2]. NSP is not easy to improve over time, and 37% is reported to remain, 23% to recur, and 10% to deteriorate within 12 months [4]. Therefore, it is necessary to find out the risk factors of NSP and to pay attention to them to prevent the occurrence of neck pain.

A cohort study conducted on adults reported that depressed mood, poor muscle endurance, and impaired endogenous pain inhibition are the risk factors of NSP [5]. A longitudinal study conducted on 429 adolescents showed that high body mass index, work-related factors, low control, and low social support are associated with NSP [6]. In a study conducted on 1,232 Korean high school students, the factors associated with NSP varied depending on the gender. In the female students, the higher the grade, the shorter the TV watching time, the longer the time sitting on a chair for study, and the higher the stress and depression were, the greater the NSP. In the male students, most of those who reported NSP were in the first grade, and

the higher the stress and the worse the self-health awareness were, the greater the NSP [7]. A study conducted on 8,990 Norwegian adolescents who used healthcare services reported that the symptoms of depression and screen-based activities increase the prevalence of NSP while physical activities prevent NSP [8].

As the use of computers and cell phones is rapidly increasing among the Korean young adults, and as they sit on a chair for a long time in the same position for job preparation, the prevalence of NSP is expected to be high. There have been few studies to date, however, that sought to identify the risk factors of NSP in the Korean young adults. Therefore, this study aimed to provide basic data for the development of a program for NSP prevention by evaluating such condition's various risk factors in young adults.

Materials and Methods

The study subjects were 212 students who were attending colleges located in the metropolitan area and in Gangwon province in South Korea. The sample size required for regression analysis was 135 persons when estimating with a 0.05 significance level, a 0.15 effect size, 0.08 statistical power, and 14 predictors using the G* Power version 3.1.9.2 program. The 212 persons who participated in the research, however, were all included in the analysis. This study was conducted after obtaining approval from the Institutional Review Board (IRB) of Kangwon National University.

The study instrument consisted of the subjects' general characteristics, the presence of NSP and the NSP

characteristics, lifestyle, height, weight, self-health awareness, and stress and depression scales. For the presence of NSP, whether neck pain was present in the past 6 months was determined, and for the NSP characteristics, the duration, frequency, and intensity of the pain were assessed [9]. For the subjects' daily habits, smoking, drinking, weekly exercise hours, average computer hours per day, average cell phone use hours per day, average electronic-game hours per day, and average time sitting on a chair for study after school per day were assessed. The stress was measured using BEPSI-K, the Korean version of Brief Encounter Psychosocial Instruments (BEPSI), which has been translated into Korean by Bae et al. [10] and whose reliability and validity have been verified. According to the score obtained, the participants were divided into three groups: the low-stress group with scores below 2.0, the moderate-stress group with 2.0-2.6 scores, and the high-stress group with scores over 2.6 [11]. The degree of depression was measured using the Korean version of Beck Depression Inventory (BDI), whose reliability had been verified by Park et al. [12]. According to the score obtained, the participants with a score of 21 or higher were classified into the depression group, and the participants with a score below 21 were classified into the non-depression group [7].

With regard to the data analysis, for the prevalence and characteristics of NSP, the descriptive statistics were obtained. To compare the differences between the groups with NSP and without NSP in the general characteristics, daily habits, self-health awareness, and degrees of stress and depression, chi-squared tests were conducted. By including the variables that showed a significant difference between the groups with NSP and without NSP in the results of the univariate analyses as predictors, multiple logistic regression was performed to assess if the predictors were independently associated with NSP. All the statistical analyses were conducted using the IBM SPSS 20.0 program (IBM Corp., Armonk, NY, USA) and the statistical significance level was set to 0.05.

Results

The participants' ages ranged from 20.3 ± 1.81 y, their heights ranged from 166.7 ± 8.60 cm, and their weights ranged from 60.7 ± 12.27 kg. In the past 6 months, 173 persons (81.6%) had NSP, and its characteristics are presented in Table 1. The factors associated with NSP included gender ($p=0.031$), self-assessed physical condition ($p=0.011$), cell phone use ($p=0.003$), stress ($p=0.00$), and depression ($p=0.00$) (Table 2). The factor affecting the NSP of the young adults was stress ($B=-0.187$, $p=0.038$) (Table 3).

Table 1. Characteristics of neck shoulder pain.

Variables	No (%)
Neck shoulder pain	
Yes	173 (81.6)
No	39 (18.4)
Duration	

Shorter than one day	55 (25.9)
1 d~1 w	69 (32.5)
1 w~1 month	22 (10.3)
1~3 months	6 (2.8)
Longer than 3 months	21 (9.9)
Frequency	
Less than once a month	53 (25.0)
1~3 times a month	61 (28.8)
1~3 times a week	40 (18.9)
More than 4 times a week	19 (9.0)
Intensity	
Mild	6 (2.8)
Moderate	100 (47.2)
Severe	67 (31.6)

Table 2. Neck shoulder pain according to demographic, behavioral, and psychological characteristics ($n=202$).

Variables	Yes	No	P value
	N (%)	N (%)	
Gender			
Male	61 (74.4)	21 (25.6)	0.031
Female	112 (86.2)	18 (13.8)	
Grade			
Freshman	32 (72.7)	12 (27.3)	0.259
Sophomore	77 (84.6)	14 (15.4)	
Junior	45 (80.4)	11 (19.6)	
Senior	19 (90.5)	2 (9.5)	
Self-assessed physical condition			
Good	45 (71.4)	18 (28.6)	0.011
Moderate	109 (83.8)	21 (16.2)	
Poor	19 (100.0)	0 (0.0)	
Smoking			
Yes	17 (73.9)	6 (26.1)	0.313
No	156 (82.5)	33 (17.5)	
Alcohol drinking			
Yes	122 (80.3)	30 (19.7)	0.423
No	51 (85.0)	9 (15.0)	
Body mass index (kg/m²)			
<18.5	20 (87.0)	3 (13.0)	0.542
18.5~22.9	108 (80.6)	26 (19.4)	

23.0~24.9	21 (75.0)	7 (25.0)	
≥ 25.0	23 (88.5)	3 (11.5)	
Physical activity (h/w)			
0	39 (86.7)	6 (13.3)	0.297
0.1~1.0	55 (85.9)	9 (14.1)	
1.1~3.0	42 (79.2)	11 (20.8)	
>3.0	37 (74.0)	13 (26.0)	
Using a computer (h/d)			
<1.0	45 (84.9)	8 (15.1)	0.065
1.0~1.9	48 (72.7)	18 (27.3)	
2.0~2.9	42 (80.8)	10 (19.2)	
≥ 3.0	38 (92.7)	3 (7.3)	
Using cellular phone (h/d)			
<2.0	11 (68.8)	5 (31.3)	0.003
2.0~3.9	58 (71.6)	23 (28.4)	
4.0~5.9	71 (88.8)	9 (11.3)	
≥ 6.0	33 (94.3)	2 (5.7)	
Playing an electronic game (h/d)			
0	90 (84.1)	17 (15.9)	0.225
0.1~1.0	45 (76.3)	14 (23.7)	
1.1~2.0	21 (75.0)	7 (25.0)	
>2.0	17 (94.4)	1 (5.6)	
Sitting in chair after the school (h/d)			
<2.0	43 (79.6)	11 (20.4)	0.133
2.0~3.9	70 (76.9)	21 (23.1)	
4.0~5.9	18 (81.8)	4 (18.2)	
≥6.0	42 (93.3)	3 (6.7)	
Stress			
<2.0	70 (70.0)	30 (30.0)	0
2.0~2.6	62 (91.2)	6 (8.8)	
>2.6	41 (93.2)	3 (6.8)	
Depression			
<21	61 (70.1)	26 (29.9)	0
≥ 21	112 (89.6)	13 (10.4)	

Table 3. Factors influencing on neck shoulder pain (n=202).

Variables	B	SE	Sig.	Exp (B)	95% C.I
Constant	1.959	0.766	0.011	7.09	
Gender	-0.596	0.415	0.151	0.551	0.244~1.243
Self-assessed condition	physical -0.293	0.358	0.414	0.746	0.370~1.506

Using cellular phone	-0.131	0.112	0.243	0.878	0.705~1.093
Stress	-0.187	0.09	0.038	0.83	0.695~0.990
Depression	-0.017	0.033	0.602	0.983	0.920~1.049

Discussion

In this study that was conducted on Korean young adults enrolled in colleges, 81.6% experienced NSP, and the prevalence of the significant NSP occurring more than once a week was 27.9%. This is similar to the 28.0% of Finland's young adults aged 22 to 25 y [13], which is higher than the 21.0% of the cohort study of healthy office workers in the United States [5]. According to various previous studies, the incidence of neck and shoulder pain that does not interfere with the daily life of the general population is 30-50% [14-16], and the incidence of neck and shoulder pain that restricts and obstructs daily life is about 11-23% [17,18].

The prevalence of NSP was higher in women than in men. These phenomena also appeared in previous studies on children [19], adolescents [9] and adults [20]. This is thought to be closely related to the difference in muscle mass between women and men. Therefore, physical activity that increases muscle mass should be actively encouraged to prevent and treat NSP [21,22]. As the time spent sitting on a chair for computer/cell phone use, gaming, and study after school is increasing in adolescents and young adults, many studies have been conducted to identify the associations between the time spent sitting for the aforementioned purposes and musculoskeletal disorders. There has been no agreement, however, on the associations. In this study, there were no statistically significant associations between NSP and the time spent sitting on a chair for computer use, gaming, and study after school, but NSP was statistically significantly associated with the cell phone use hours. Park et al. reported that using a cell phone continuously for more than 20 min may cause pain by increasing the muscle activity and fatigue in the neck and shoulder muscles [23]. Shan et al. reported that the use of digital products is associated with the prevalence of NSP [24]. Lee et al. also reported that muscle fatigue may increase according to the angle of cervical flexion when using a cell phone [25]. To integrate these various study results, further studies are required to clarify the relationship between static activities and NSP by performing meta-analysis, etc. in the future.

As in previous studies [7,9,26], NSP was associated with mental factors, especially in self-awareness and depression. In health awareness, NSP was high in the participants who answered that they had poor health. In the depression, depressed group showed more symptoms of NSP than non-depressed group. In previous studies, NSP has been reported to have a deeper correlation with psychological factors such as depression and anxiety than physical or personal variables such as age, gender, and education level [27]. In particular, the quality of life and pain of the subjects with NSP were significantly affected by depression [28,29].

In the present study, logistic regression analysis revealed that psychological stress was an independent predictor causing neck and shoulder pain. This is similar to the study of nursing staff in Japan [30]. Zhang et al. [31] reported that stress was a predictor of NSP in the study of non-physical factors of neck and shoulder pain in Chinese adolescents. Iizuka et al. [32] also reported that stress was associated with neck and shoulder pain, back pain, and low back pain in the Japanese general population. In general, it is known that the prevalence of NSP increases with age [33]. The results of this study show that the prevalence of lower prevalence in Korean adolescents [7] is related to psychological stress. According to Jung et al. [7], 75.6% of the adolescents experienced moderate stress, while only 52.9% of the young adults experienced moderate stress in this study. Viikari-Juntura et al. [34] found that mental stress was dose-dependently involved in increasing neck pain in a study that repeated follow-up measurements over three years to find factors affecting radiating neck pain. Similarly, Harkness et al. [35] reported that mental stress was the strongest predictor of shoulder pain in a cohort study to find psychosocial factors of newly occurring shoulder pain. Therefore, it would be necessary to develop active interventions that can reduce stress-induced muscle tension to prevent and treat NSP.

This study had several limitations. First, as it was a cross-sectional study, it was difficult to clearly explain the causal relationship between NSP and the evaluated factors, although the associations between them could have been identified. Second, as the presence and intensity of NSP were assessed only with a questionnaire, there was a limit in objective NSP assessment. Despite these limitations, however, this study was worthwhile because it was the first study that evaluated the prevalence of NSP and related factors in Korean young adults.

Conclusion

The prevalence of NSP was very high in Korean young adults enrolled in colleges, especially in women. The factors associated with NSP included gender, self-assessed physical condition, cell phone use, physical stress, and depression. These results imply that it is necessary to find ways to prevent the occurrence of NSP in young adults, such as musculoskeletal disorder prevention exercise, education on the proper use of the cell phone, stress management, and emotion regulation program.

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Conflict of Interest

The authors report no conflicts of interest related to this study. The author does not have any financial interest in the companies whose materials are included in the article.

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