Relationship Between Brassiere Cup Size and Shoulder-Neck Pain in Women

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Abstract: There are very few reports in regard to relationship between breast size and shoulder-neck pain. The purpose of this study is to examine the correlations among breast size, brassiere cup size, and moment-in-time reporting of shoulder-neck pain in a group of adult women. Three hundred thirty nine female volunteers from the hospital staff answered the questionnaire. Breast size, brassiere cup size, and shoulder-neck pain were self-reported by each participant. The relationship among breast size, brassiere cup size and shoulder-neck pain was investigated. Spearman's test showed no significant relationship between shoulder-neck pain and brassiere cup size. However, after participants were classified into two groups (small brassiere cup size and large brassiere cup size with 219 and 120 participants, respectively), there was a significant positive correlation between shoulder-neck pain and large brassiere cup size ($p<0.05$). There was no significant relationship between shoulder-neck pain and breast size. In conclusion, large brassiere cup size is an important cause of shoulder-neck pain.

Keywords: Breast size, brassiere cup size, female, neck pain, questionnaire survey, shoulder pain.

INTRODUCTION

Shoulder-neck pain, including upper back pain, is one of the most common presenting symptoms in our orthopedic practice. According to the Comprehensive Survey of Living Conditions of the Japanese People conducted in 2010, 13.0% of women and 6.0% of men complain of shoulder-neck pain [1, 2]. Shoulder-neck pain is felt anywhere in the posterior aspect of the thoracic cage, in the region between the first rib and the first thoracic vertebra superiorly and between the seventh vertebra and the ribs inferiorly (inferior angle of the scapula), as well as in the periscapular areas.

Women with large breasts usually have a number of complaints relating to the skeletal system, and complaints such as neck strain, headache, aching shoulders, heavy anterior chest, and paresthesiae of the little fingers disappear after reduction mammoplasty [3, 4]. This finding suggests a cause and effect relationship between breast size and shoulder-neck pain. However, only one study has investigated this relationship, and the authors concluded that shoulder-neck pain appeared to be unrelated to breast size [5].

The present study was undertaken to examine the correlations among breast size, brassiere cup size, and moment-in-time reporting of shoulder-neck pain in a group of adult women. Clarification of potential relationships may contribute to the care of women presenting with shoulder-neck pain.

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METHODS

A total of 339 women, volunteers from the hospital staff (nurses, pharmacy, and kitchen staff of two hospitals), were enrolled. All participants gave their informed consent before answering the questionnaire. The study protocol was approved by the ethics committee of our institution. The questions were as follows: 1) Presence of operation and/or injury of the spine and/or shoulder (Yes/No); 2) Past history and present illness; 3) Top breast size (cm); 4) Brassiere cup size (A or less, B, C, D, E or more); and 5) Shoulder-neck pain at present (Yes (visual analogue scale (VAS) score)/No). Breast size, brassiere cup size, and shoulder-neck pain were self-reported by each participant.

Women with breast pathology, injury, systemic or vertebral diseases, history of spinal surgery, or who were using any medication related to musculoskeletal or non-musculoskeletal pain were excluded from the data analysis. The age range of the participants was 18 to 77 years (average 44.5 years).

The VAS score was used for pain assessment. Operationally, the VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The VAS score is determined by measuring the distance from the left hand end of the line to the point the patient has marked. A VAS score <50 was defined as indicating "mild pain" and a VAS ≥50 was defined as indicating "severe pain". As for brassiere cup size self-reported by each participant, A, B, and C, were defined as "small", and D and E or more were defined as "large". Student's *t*-test, Spearman's test, and the chi-square test were used for statistical analysis. Statistical significance was set at $p < 0.05$.

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RESULTS

Regarding shoulder-neck pain, 203 participants reported no pain, 83 had mild pain, and 53 had severe pain. Brassiere cup size was A or less in 73, B in 70, C in 61, D in 72, and E or more in 63 participants (Table **1**). There were no significant differences in age among the three pain groups (no pain, mild pain, and severe pain).

Table 1. Relationship Between Shoulder-Neck Pain and Brassiere Cup Size

	A or Less	B	C	D	E or More	Total
No pain	47	44	40	37	35	203
Mild pain	18	19	11	21	14	83
Severe pain	8	7	10	14	14	53
Total	73	70	61	72	63	339

Spearman's test showed no significant relationship between shoulder-neck pain and brassiere cup size. However, after participants were classified into two groups (small brassiere cup size and large brassiere cup size with 219 and 120 participants, respectively), there was a significant positive correlation between shoulder-neck pain and large brassiere cup size ($p < 0.05$). Regarding the relationship between shoulder-neck pain and breast size, the mean breast size was 82.4 ± 8.2 cm (mean ± SD) for the no pain, 83.7 ± 9.3 cm for the mild pain, and 83.9 ± 10.6 cm for the severe pain groups. There was no significant relationship between shoulder-neck pain and breast size.

DISCUSSION

Breast-related shoulder-neck pain is thought to result from changes in the centre of gravity, and large or heavy breasts may lead to continuous tension on the middle and lower fibers of the trapezius muscle and on associated muscle groups [6]. Some authors have postulated that the anatomic mechanisms of postural aberrations are heavy breasts and related pain symptoms [7, 8]. Cervical spondylosis can cause local neck pain. Abnormal conditions involving the spinal cord, heart, lungs, and some abdominal organs can also cause neck and shoulder pain. Other possible correlates of shoulder-neck pain, such as prolonged bending postures, emotional stress, daily habits, sport activity, and long hours spent slouched in front of a computer, can also cause shoulder-neck pain. After eliminating a visceral or spinal cause, and other possible causes, the remaining cases are considered to be due to unknown causes.

Large breasts are generally associated with physical symptoms such as chronic neck, shoulder, and back pain, as well as stiff neck, painful brasserie strap grooving, and persistent intertrigo in the inframammary folds. Many of the above mentioned studies have also suggested that reduction mammoplasty could improve these symptoms [3, 4, 9-11]. Ryan *et al*., [12] proposed that elevation of the breasts in a brassiere increased downward forces on the outer scapula. He suggested that the posterior straps of a brassiere act as pulleys over the shoulders, doubling the total downward pull on both shoulders. Associated neck, shoulder, and back pain could then be at least partially attributed to fatigue of the muscles that reverse scapular depression (e.g., trapezius, serratus anterior). Researchers in Turkey found that large breasts can cause upper back pain by altering the curvature of the spine. They noted that women with breast cups size D and above (large brassiere cup size) tended to have greater curvatures of the spine than small-breasted women. They also found that breast size has an important impact on posture [8].

Wood *et al*., [5] found that, in 26 young, nulliparous women (aged 18 – 26 years) with different breast cup sizes, total pain was unrelated to breast size. Nevertheless, the small sample size and limited age range of the participants were the weak points of their research. They also concluded that breast size correlated strongly and negatively with brassiere cup size, and moderately with brassiere fit, but was not highly correlated with pain severity. However, the results of the present study showed that brassiere cup size D and above was correlated with shoulder-neck pain, but there was no significant relationship between shoulder-neck pain and breast size. In general, overweight women tend to have large breasts, but brassiere cup size, that is, the weight of the breasts, is more important than breast size in regard to shoulder-neck pain.

Since many of ladies are normally very nervous about their body/style, this type of research is really difficult to conduct, and therefore, the present study had some limitations. First, the data were collected using a self-reporting system about brassiere cup size, breast size, and shoulder-neck pain. And we did not measure the weight of breasts. Secondly, some possible correlates of shoulder-neck pain, such as prolonged bending postures, daily habits, sport activities, and emotional stress of participants, were not considered. Thirdly, no X-rays of the sagittal cervico-thoracic spine, for example, were taken in this study. Further research and clinical interventions are necessary to confirm the present findings. In conclusion, large brassiere cup size is an important cause of shoulder-neck pain.

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Declared none.

CONFLICT OF INTERESTS

The authors declare no conflict of interest. The manuscript submitted does not contain information about medical device(s)/drug(s). No funds were received in support of this work. No benefits in any form have been or will be received from a commercial party related directly to the subject of this manuscript. We certify that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during the course of this study.

REFERENCES

[1] Health and Welare Statistics Association. Annual Statistical Report of National Health Conditions 2010/2011; pp 72-3, (Japanese).

[2] Nakamura M, Nishiwaki Y, Ushida T, *et al.* Prevalence and characteristics of chronic musculoskeletal pain in Japan. J Orthop Sci 2011; 16: 424-32.

[3] Gonzalez F, Walton RL, Shafer B, *et al.* Reduction mammaplasty improves symptoms of macromastia. Plast Reconstr Surg 1993; 91(7): 1270-76.

[4] Bruhlmann Y, Tschopp H. Breast reduction improves symptoms of macromastia and has a long-lasting effect. Ann Plast Surg 1998; 41(3): 240-5.
[5] Wood K, Cameron M, Fitzgerald K. Breast size, bra fit and thoracic pain in young women: a correlational study. Chiropr Osteopat 2008; 16: 1.
[6] Letterman G, Schurter M. The effects of mammary hypertrophy of the skeletal system. Ann Plast Surg 1980; 5(6): 425-31.
[7] Netscher DT, Meade RA, Goodman CM, *et al.* Physical and psychological symptom among 88 volunteer subjects compared with patients seeking plastic surgery procedures to the breast. Plast Reconstr Surg 2000; 105(7): 2366-73.
[8] Findikcioglu K, Findikcioglu F, Ozmen S, *et al.* The impact of breast size on the vertebral column: a radiologic study. Aesthetic Plast Surg 2007; 31(1): 23-7.
[9] Foreman KB, Dibble LE, Droge J, *et al.* The impact of breast reduction surgery on low-back compressive forces and function in individuals with macromastia. Plast Reconstr Surg 2009; 124(5): 1393-9
[10] Schnur PL, Schnur DP, Petty PM, *et al.* Reduction mammaplasty: an outcome study. Plast Reconstr Surg 1997; 100(4): 875-83.
[11] Atterhem H, Holmner S, Janson PE. Reduction mammaplasty: symptoms, complications, and late results. A retrospective study on 242 patients. Scand J Plast Reconstr Surg Hand Surg 1998; 32(3): 281-6.
[12] Ryan EL. Breast weight and industrial fatigue. Med J Aust 1987; 147(5): 261.

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