

Original article:

Study of relationship between brassiere cup size and shoulder neck pain in Indian women

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ABSTRACT

INTRODUCTION: Shoulder neck pain mainly in the upper trapezius is one of the most common symptoms that are seen in orthopedics. Women with large breasts have complaints such as neck strain, headache, aching shoulders, heavy anterior chest and associated pain caused by bra straps due to the weight of the breast exerting a pull through the straps.

METHOD: One hundred and eleven nulliparous women aged between 18-25 were taken with a brassiere cup size of 34A and above who had no history of any kind of breast pathology or under any medication for pain.

The brassiere sizes were divided into four groups according to the cup size A, B, C and D. The subjects were asked to fill a questionnaire reporting of moment-in-time shoulder and neck pain. If pain is present the subject marks the level of pain on the Visual Analogue Pain (VAS) scale.

RESULT: From results, it is seen that there is a positive correlation between shoulder-neck pain (mild and severe level) and brassiere cup size. It is also seen that there is a negative correlation between brassiere cup size and no pain level hence it is evident that brassiere cup size is a major factor that causes shoulder-neck pain.

CONCLUSION: Considering the small amount of available literature, the small sample size, the value of evidence, inconsistency of results in peer-reviewed publications, it was found that there is considerable evidence to support the hypothesis that the size of the breasts affects the painfulness of the musculoskeletal system particularly the shoulder-neck pain. However, based on the above review, it can be concluded that there is considerable evidence to support the hypothesis that the size of the bust has a relationship with shoulder neck pain.

INTRODUCTION

Shoulder neck pain mainly in the upper trapezius is one of the most common symptoms that is seen in orthopedics. The pain is felt in the posterior region of the thoracic cage between the first rib and the first thoracic vertebra superiorly and between the seventh vertebra and the ribs inferiorly (inferior angle of the scapula). The study of effects of having large breasts on vertebral movements and muscle activation traits are not widely conducted and often ignored.

Women with large breasts have complaints such as neck strain, headache, aching shoulders, heavy anterior chest and associated pain caused by bra straps due to the weight of the breast exerting a pull through the straps. Macromastia is the condition of having disproportionately large breasts. Some women with macromastia report with breast pain and other symptoms such as neck pain, shoulder pain, breast pain and grooving associated pain caused by bra straps, intertrigo (inflammation of skinfolds) and ulnar nerve paraesthesia. The above-mentioned

ailments leads to increased thoracic kyphosis in women with large breasts and have also been identified as a prognostic factor of neck and shoulder pain.

Though these symptoms are widely reported, there is an uncertainty of the relationship between breast size and symptoms. Most studies have proven that reduction mammoplasties play an important role in the relief of symptoms associated with macromastia. Letterman and Scheuter suggested that large or heavy breasts can lead to continuous tension on the middle and lower fibres of the trapezius muscle and associated muscle groups.

Women have been continuously wearing brassieres on a daily basis ever since their teenage years. In most brassieres, the straps are parallel that go over the shoulders from front to back. The weight of the breasts causes the straps to cut into the outer shoulder and lengthen the UT muscle, which causes pain. Studies suggest that excessive upper trapezius muscle activation results from continuous weight on the upper trapezius region and generates trigger points that cause pressure pain. One study suggests that wearing a brassiere may be a cause contributing to upper trapezius region pain due to the weight of the breasts. However, it has not been scientifically proven yet. (Kyu Nam Park, et al.,)

It has also come to the notice that there has been a varying gender difference on the shoulder kinematics mainly scapular motion during arm elevation. Various factors such as muscle strength, generalized hyper laxity and posture may play a role in this difference, but the point that women wear brassieres on a daily basis have been taken into account because the structure of the brassiere such as the straps and band change the shoulder kinematics by tightening the scapula, clavicle and thorax. It is estimated that 70% of women wear bras that are of incorrect sizes or are poorly fitted. A study proposed that the breast elevation in a bra applied downward force on the outer scapula and the posterior straps of a bra act as pulleys over the shoulders, which increased the total downward pull on both shoulders. Small busted women with tight bra straps may also experience considerable downward pressure on their shoulders. Bras play a significant role in providing external support to the breasts, but the straps are the main component that contribute to the musculoskeletal pains experienced by women with large breasts. Due to prolonged durations of bra wear, the weight of the large breasts is exerted on the superior aspect of shoulder through the bra straps and it creates deep furrows and also leads to soft tissue damage at the bra strap-shoulder interface. Breast size and breast mass vary throughout life and it is mainly influenced by hormonal changes, body fat composition, stage of reproductive cycle, and breast pathology. When fitted according to industry standards, bra size may be used as an estimate of breast size. Bra size has not been a consistent measure of breast mass, but among women who have never been pregnant or experienced any kind of breast pathology, bra size is likely to be a consistent measure.

Bra-sizing and fitting are learned skills and most women are not trained in bra-sizing so they make bra purchasing decisions unassisted. Women, particularly larger busted women, may experience feelings of embarrassment and self-consciousness during bra sizing, tempting women to avoid appointments on guided bra-sizing and attempt to size and fit their own bras.

Though it is perceived that bra sizing varies between different manufacturers, sizing is in fact remarkably consistent because all manufacturers work to similar anthropometry, although not identical. For marketing and branding reasons, 'fit' varies between styles even within one manufacturer's output and certainly between manufacturers in the same way as shoe manufacturers have the same sizes, but vastly different fits.

An arising concern is also that the prevalence of this unique women's health problem is likely to escalate because the average size of the bra cup has increased over the last two decades from a small bra cup size to a one size large bra cup size. ⁽²³⁾

According to studies, prolonged sitting is common in a workplace setting and many people working in areas that require them to sit for prolonged periods in front of the computer experience various health problems including musculoskeletal pain of the upper arm, neck and shoulder. Hence, we have excluded those who spend hours sitting in of the computer.

In this study we examined the relations between brassiere cup size and moment -in-time reporting of shoulder neck pain in a group of 100 nulliparous young women aged between 18-25 years in order to begin exploring the questions: Do larger breasted women experience more shoulder neck pain than small breasted women? Could an incorrectly fitted or sized bra contribute to women's shoulder neck pain? Clarification of these relationships may aid in the care of women presenting with shoulder-neck pain.

METHODOLOGY:

INCLUSION CRITERIA

- Women aged between 18-25.
- Brassiere cup size between 34A-40B
- Nulliparous.

EXCLUSION CRITERIA

- Women with breast pathology.
- Any injury, systemic or vertebral diseases, history of spinal surgery.
- Under medication related to musculoskeletal pain.
- Cervical spondylosis.
- Women with active sports activities.
- Women who spend hours in front of a computer.
- Lactating mothers, pregnant, overweight or multiparous women.

INSTRUMENTATION

- Self- reporting questionnaire
- VAS scale 100mm
- Bra size chart (Clovia)

PROCEDURE

Subjects

Women aged between 18-25 year with a brassiere cup size of 34A and above who had no history of any kind of breast pathology or under any medication for pain were selected.

All subjects signed an informed consent before the study. Then, they were asked to fill their personal data which included their name, age, and other details etc.

To carry out the following study the following parameters were taken in all subjects:

AGE: self-reported by subjects (age limit 18-25 years)

Brassiere cup size: Only those with a cup size of A, B, C, D and band of 34, 36, 38 and 40.

PROCEDURE:

The subjects are asked to fill a questionnaire reporting of moment-in-time shoulder and neck pain.

If pain is present the subject marks the level of pain on the Visual Analogue Pain (VAS) scale.

The VAS scale is 100mm in length in which there are markings between 1-10.



Then pain was divided into three pain groups namely no pain, mild pain and severe pain.

Those with no pain reported a VAS score of 0. Those with mild to moderate pain reported a VAS score of <50mm and those with severe pain reported a VAS score of >50mm.

The brassiere size was also self-reported by the participants according to their preferred size by selecting the option in the bra size chart provided to them.

Any medical history was taken as a preventive measure as it might contradict with the exclusion criteria and hypothesis.

The sizes were divided into four groups according to the cup size A, B, C and D.

SIZE	(In inches)	CUP A	CUP B	CUP C	CUP D	CUP E	CUP F
28	23-24	28-29	29-30	30-31	31-32		
30	25-26	30-31	31-32	32-33	33-34		
32	27-28	32-33	33-34	34-35	35-36	36-37	37-38
34	29-30	34-35	35-36	36-37	37-38	38-39	39-40
36	31-32	36-37	37-38	38-39	39-40	40-41	41-42
38	33-34	38-39	39-40	40-41	41-42	42-43	43-44
40	35-36	40-41	41-42	42-43	43-44	44-45	45-46
42	37-38	42-43	43-44	44-45	45-46	46-47	47-48

Fig. Referred bra size chart of Clovia India

RESULT

Regarding shoulder neck pain, out of 111 subjects, 30 subjects reported no pain, 45 reported of mild pain and 36 reported of severe pain.

Brassiere cup size was A in 29, B in 31, C in 20 and D in 31 participants (Table 1). There was no significant difference in age among the participants varying only between 18-25 with a mean age of 21.13.

Table 5.1. Total no of people with different cup sizes reporting of three levels of pain.

	No pain	Mild pain	Severe pain
Mean±SD	7.5±4.5	11.25±1.78	9±4.52

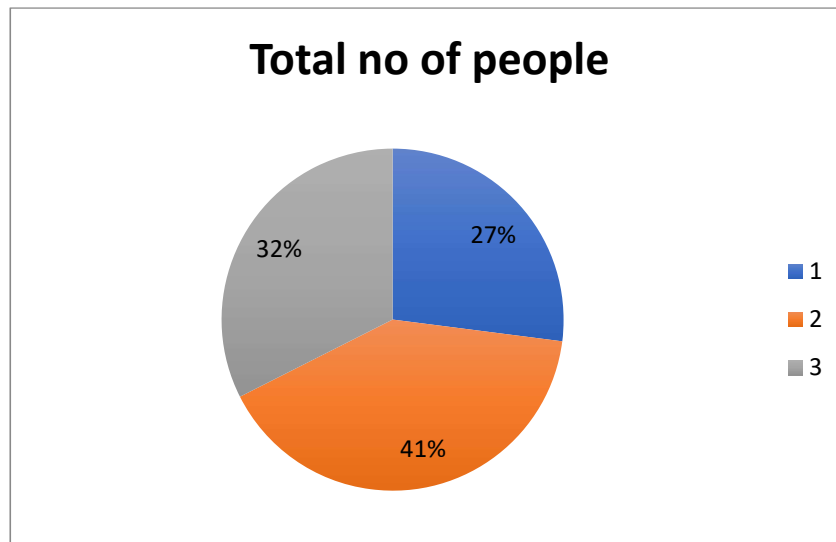


Fig 5.1 Pie chart showing the distribution of people according to their pain level as 1) No pain 2) Mild pain 3) Severe pain

Table 5.2. Mean and standard deviation for the pain groups.

	A	B	C	D	TOTAL
No pain	15	7	4	4	30
Mild pain	9	14	11	11	45
Severe pain	5	10	5	16	36

Mean and standard deviation for the pain groups

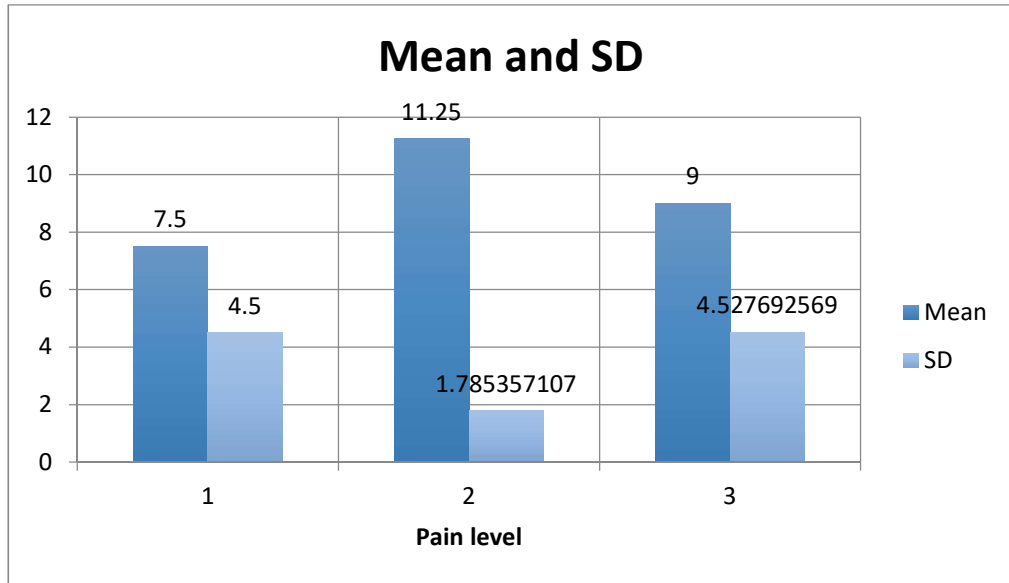


Fig. 5.2 Graph showing the mean and standard deviation of different pain levels as 1) No pain 2) Mild pain 3) Severe pain

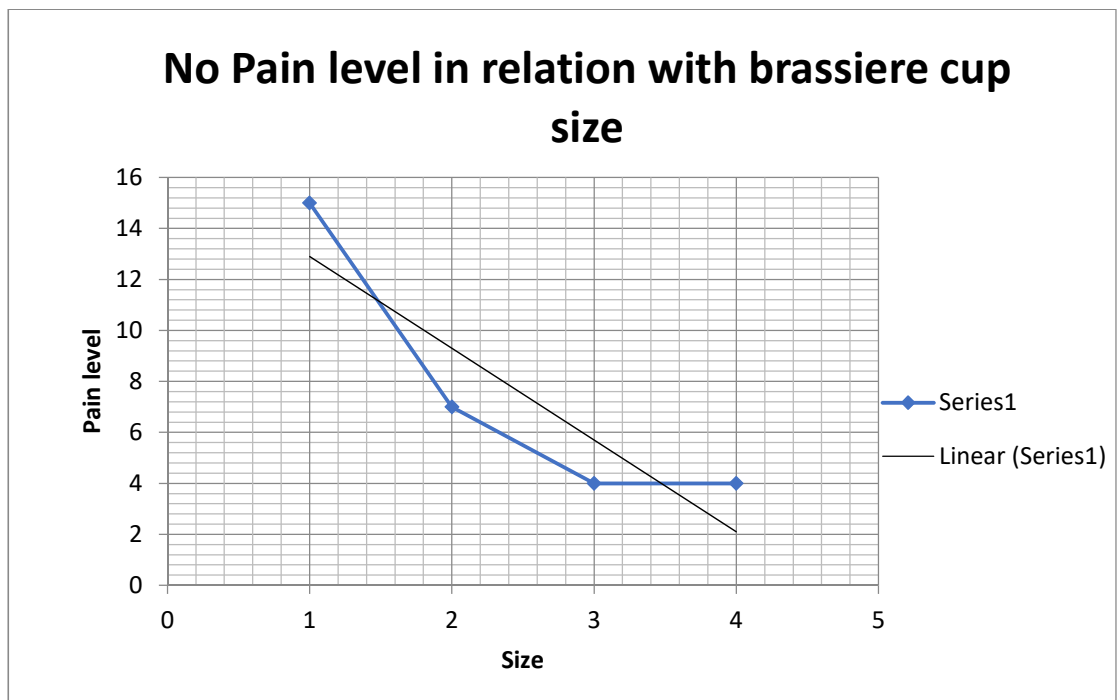


Fig 5.3 Graph showing the correlation between Brassiere cup size and no pain level

Table 5.3 Correlation value of brassiere cup size and no pain level

Correlation		R
Brassiere Cup Size	No pain level	-0.894427191

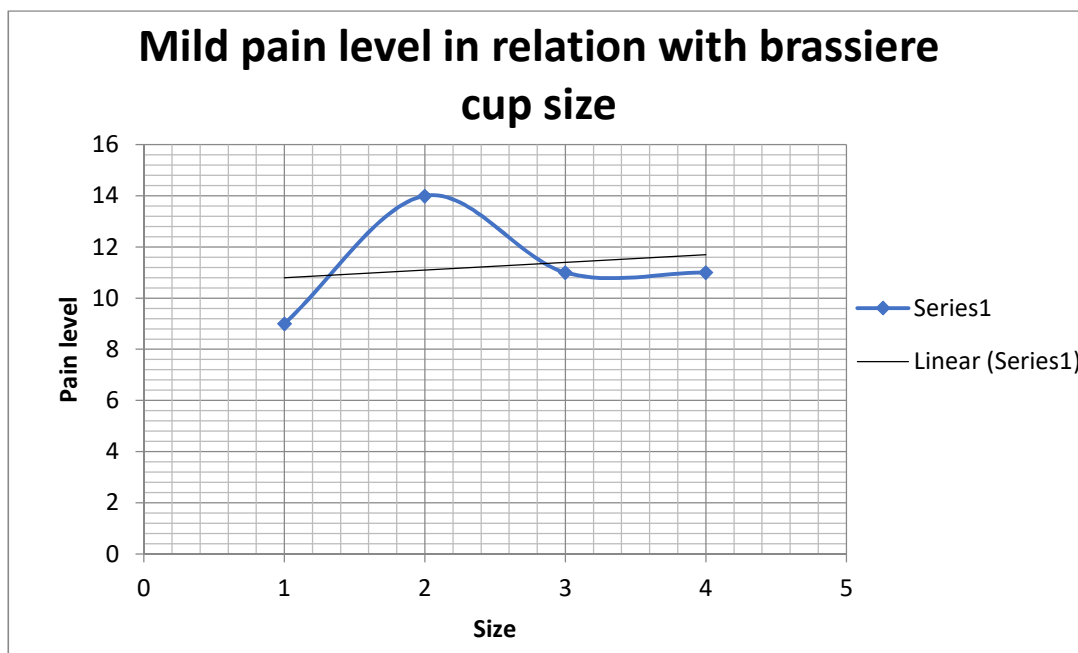


Fig 5.4 Graph showing the correlation between brassiere cup size and mild

Correlation		R
Brassiere Cup Size	Mild pain level	0.187867287

pain level

Table 5.4 Correlation value of Brassiere cup size and mild pain level

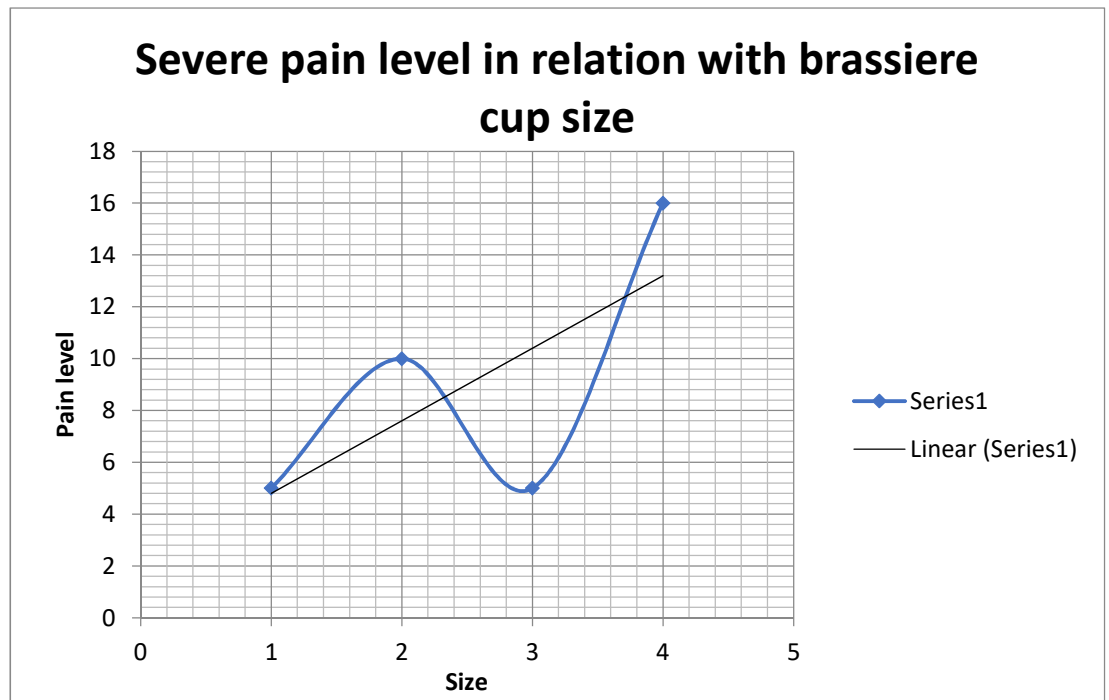


Fig. 5.5 Graph showing the correlation between brassiere cup size and severe pain level

Table 5.5 Correlation value of brassiere cup size and severe pain

Correlation		R
Brassiere Cup Size	Severe pain level	0.691410718

From the above results, it is seen that there is a positive correlation between shoulder-neck pain and brassiere cup size. It is also seen that there is a negative correlation between brassiere cup size and no pain hence it is evident that brassiere cup size is a major factor that causes shoulder-neck pain.

DISCUSSION-

Many studies have shown that large and heavy breasts lead to tension in the middle and lower fibers of the trapezius muscle and other muscle groups. Cervical spondylosis is a major cause of localized neck pain and other abnormal health conditions involving the spinal cord, heart, lungs, and abdominal organs may also cause neck and shoulder pain. Other activities such as prolonged bending postures; emotional stress, daily habits, sport activity, and long hours spent in front of a computer can also cause shoulder-neck pain. After eliminating all such cause, and other possible causes, the remaining cases are considered to occur due to unknown causes.

A handful of researches have been done to prove that shoulder and neck pain is related to the size of the breasts as well as the cup size of the brassiere that a woman wears. Women wear brassieres on a daily basis but they have never thought about the brassiere size that they are ‘comfortable’ with, can have a negative impact on their body particularly the shoulder, neck and back. Women with large breasts often experience physical symptoms such as chronic neck, shoulder, and back pain, along with stiff neck, brassiere strap grooving and persistent intertrigo in the inframammary folds. Several studies mentioned that reduction mammoplasty could improve these symptoms.

Strombeck²⁷ reviewed the relief of chronic breast and back pain by reduction mammoplasty and concluded that symptoms in 73% of patients with breast pain and 83% of patients with back pain were diminished by this treatment procedure. It was also found that symptom improvement with reduction mammoplasty was independent of height and weight⁵.

Wood, et al., found that pain was unrelated to breast size in 26 young nulliparous women but the small sample size and limited age range of the participants were the shortcomings of this research. They concluded that a brassiere cup size D and above was correlated with shoulder-neck pain. Generally, overweight women tend to have large breasts, but brassiere cup size, which is the weight of the breasts, is more important than breast size regarding shoulder-neck pain.

In the reviewed studies, it was proved that the size of the breasts is associated with pain of the musculoskeletal system. The size of the breast is associated with changed postures, which in the long-term may cause pathological changes leading to pain. Barbosa et al., noted the changes in the posture of women with large sized breasts who examined women with breast hypertrophy compared to healthy women. Findikcioglu et al. specified that there were significant statistical differences between the groups of bra cups A and D in terms of thoracic kyphosis and lordosis angles, and between groups of bra cups B and D in terms of the angle of lumbar lordosis. Nowotny et al. proved that a change in body posture combined with non-ergonomic work affects the emergence of pain. The results of these studies also seem to be confirmed in three studies proving that the size of the breasts is associated with pain of the musculoskeletal system.

The result of this study showed that there was a positive correlation between pain and the brassiere size, it is evident to us that brassiere size is an important factor that causes localized pain in the musculoskeletal system of our body. The sizes that were taken in this study is regarded as average brassiere size in India according to Clovia India, hence it is rightful to say that there is a relation between all the cup sizes and pain in Indian women.

Through the entire research we have studied and learned about the effects of a wearing brassiere that is incorrectly fitted, which can be too tight and this it can cause deep grooves on both shoulders. If we apply direct downward pressure on the area it can reproduce symptoms such as tenderness and pain. Movements of the shoulder and neck are free however the movements of the shoulder can be slightly painful due to osteoarthritis. No possible muscle wasting or weakness is seen. Paraesthesia is not common but when present they involve the thumb and fingers and sometimes the whole limb.

The only way to treat this problem is by identifying the correct bra size through thorough information and help from experts for the long run. The primary treatment can be elimination of symptoms by wearing strapless brassieres or brassieres with broad straps with a pad threaded on the straps. This can help to distribute the downward force exerted by the straps. One should be careful by making sure that the straps are not tight as tighter straps causes higher strap pressures and more strap discomfort. Most women preferred the vertical bra strap orientation as compared to the cross-back orientation by reporting that the vertical orientation did not “dig in” or create pressure or tension in the trapezius muscle.

The following study does not contain any information about the use of medical devices or drugs. It is certified that all institutional and governmental regulations that concerns with ethical value of human participation were followed during this course of study.

The assessed work had many limitations, considering no visual imaging evaluation of the possible pathological masses that the patients could have had and the small sample size. In addition, the articles that were referred had differences in the exclusion criteria that could have affect the result. Research by Myint Oo et al did not investigate the size of the breasts, but the size of the bra cup which was self-reported by the participants. Similarly in this study, the same approach was undertaken. Since many ladies are very nervous about their body or style, this type of research is very difficult to conduct and also due to the ignorance of the society in general and the medical field in particular on such areas of study.

Limitations of the study:

- A small sample size was taken for the study
- The data was self-reported by the subjects
- Questionnaire was very brief
- Participants with brassiere cup size of 40C and above were not found during the data collection

Clinical relevance:

Results suggested that there was a positive correlation between shoulder- neck pain and brassiere cup size.

Future scope of the study:

Study can be conducted to confirm the present findings and to find out the correlation between different cup sizes with shoulder-neck pain or other musculoskeletal, cardiovascular, neurological systems of the body as there is significant evidence that the brassiere straps and cup have adverse effects on the body. Further studies can be done with a larger sample size and broad age limit.

COCLUSION:

Considering the small amount of available literature, the small sample size, the value of evidence, inconsistency of results in peer-reviewed publications, it was found that there is considerable evidence to support the hypothesis that the size of the breasts affects the painfulness of the musculoskeletal system particularly the shoulder-neck pain. However, based on the above review, it can be concluded that there is considerable evidence to support the hypothesis that the size of the bust has a relationship with shoulder neck pain.

In this research, it was proved that there is a relationship between shoulder neck pain and brassiere cup size. We can now conclude that brassiere cup size that is the weight of the breasts is a factor that contributes to shoulder-neck pain in women aged between 18-25 years.

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Author Declaration: Source of support: Nil, Conflict of interest: Nil

Was informed consent obtained from the subjects involved in the study? YES

For any images presented appropriate consent has been obtained from the subjects: NA

Plagiarism Checked: Urkund Software

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DOI: 10.36848/IJBAMR/2020/29215.55880

