

Prevalence of Head and Shoulder Abnormalities in Two Age Groups of Healthy Women

Abstract

Background: The forward head tilt and round holding of shoulder are the two postural problems, being observed not infrequently in young and middle age people. The present study is aimed at investigating such postural abnormalities in two-age groups of women.

Methods: In a relatively randomized sampling, 500 women in two age groups were tested to investigate the incidence of "Forward head" and "Round shoulder" abnormalities. 400 women between the ages of 19-25 (mean 19) years and 100 between 35-50 (mean 40) years were examined for mild, moderate and severe abnormalities. Evaluation of posture was carried out by plumb line. The kyphosis was also documented by a kyphosis goniometer. The subjects were also asked about their back pain, and then correlated with the postures and jobs and sporting activities.

Results: There was significant difference between variables of "age" and "round shoulder" ($p < 0.05$), but the relationship between "age" and "forward head" was not significant. ($P > 0.05$). Also, a significant correlation was noticed between jobs that are position-dependent and abnormalities and severity of pain with job ($p < 0.05$). The kyphosis angle was higher in older age group. There was also a correlation between the kyphosis angle and pain in inter-scapular region". ($r = 0.4$, $p = 0.0001$)

Conclusion: The postural abnormalities of "head tilt" and "round shoulder" are seen in both young and middle-age women. The individuals who do regular exercises have less complaint of pain relative to their postural anomalies. Age and Job are effective elements on incidence of most mentioned postural abnormalities in older subjects.

Keywords: Kyphosis, Posture, Head, Women, Pain

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Introduction

Proper posture refers to a condition where the balance between the muscles is maintained and the body has the least strain and tension. With this in mind, it can be concluded that if the posture is not normal, there will be issues such as disorganization of the skeletal, muscular, and abnormal pressures⁽¹⁾. Posture is the perfect activity, with minimal energy consumption and maximum efficiency. Naturally, when there is a disruption, such as pressure on the joint, stretching of the ligament, permanent muscle contraction, or problems with the circulatory system, the body will eventually gain a new posture, and these new postures can lead to unchanged posture. Causing injury, motor restriction and malformations⁽²⁾. In a variety of activities, balance plays a key role in maintaining good posture. When the balance is impaired due to fatigue, injury, illness or extreme activity, the body's performance drops. In fact, it is said that the physical laws in our body that control the body's mechanism only work if the posture is normal. Even the mental and mental health of the posture is affected.

Our senses and emotions are also often reflected in our posture. Posture is a generic term used to describe body posture, the order in which a physical activity is designed to perform a specific activity, including the characteristics of each individual's body^(2, 3). Posture is a combination of the positions of the body's joints at any given moment⁽¹⁻⁴⁾.

The most common abnormality that occurs in the cervical spine is the forward position of the head. This anomaly increases the arch of the upper back region, thereby increasing the arch of the lower cervical vertebrae and increasing the backward bending of the upper neck. Increased backward curvature in the upper part of the neck is a consequence of adaptation of the body to maintain eyes in transverse. Temporomandibular joint dysfunction and jaw retraction may be seen. These abnormalities cause stress to the soft tissues and cause pain⁽³⁾.

Research results (Braun et.al) in the study in coronal-sagittal plane range of motion revealed that the head and shoulder range of motion was generally higher in men than in women. Overall coronal-sagittal plane range of motion was lower in females due to a lack of flexibility. Forward head posture was higher in men. Compared to healthy women and women with craniofacial pain, women with Round Shoulder showed more pain. Forward head abnormalities were more prevalent among affected women. Overall, the range of motion of head and neck of affected women was less than healthy women⁽⁴⁾. (Itoi et.al) conducted a study evaluating the effect of resistance exercise on the posterior extensor muscles. The overall result was that increased back muscle strength in healthy women would help to reduce kyphosis⁽⁵⁾.

A clear relationship between posture and health in women with "dysmenorrhea and backache" has been proposed by (Miller et.al). Statistics show that out of every 1000 women who refer to a gynaecologist for back pain, the main problem is 18% of gynaecological and in 72% of cases is due to posture.

A study on menstrual pain found that 21.7% of women had good postures and 78.3% had poor postures, while another group consisted of women with painless menstruation; 73.9% good and 26.1% had abnormal postures⁽⁶⁾.

There is ample evidence that postural abnormalities are associated with muscular, articular, skeletal, neurological, organic, gastrointestinal, and other disorders and disorders⁽²⁻¹⁵⁾. Round Shoulder showed more in normal condition than men. There was no difference between men and women in the

maximal shoulder protraction. Women showed less shoulder retraction than men⁽⁷⁾.

The aim of this study was to investigate the prevalence of head and shoulder anomalies in healthy women in two age groups and the relationship between these abnormalities and different skeletal disorders. In this study, two age groups 17-25 and 35-50 years of age were used.

Methods

The prevalence of shoulder and head abnormalities was assessed by posture evaluation using the plumb line (Kendall and McCreary method)⁽¹²⁻¹⁶⁾ and back arch measurement using a "kyphometer". Then the collected data were analyzed by appropriate statistical methods. A plumb line is a rope that is attached to the end of the plumb bob and is used to represent the mental image of the line of gravity on the outer surface of the body and static posture analysis. In examining such a posture, the plumb line should be hung in a state where a fixed point can be considered. The only fixed point in the posture is the base of support where the feet are in contact with the ground.

Subjects were selected from healthy women in two age groups using simple relative random sampling method and there was no restriction on the type of job. Eligible individuals were selected and tested after participation.

Excluding factors consist of diseases related to neck and shoulder, history of fracture and surgery in the spine and shoulder girdle, skeletal abnormalities such as "scoliosis" or "leg length discrepancy", systemic diseases such as rheumatoid arthritis or cancer (as a cause of pain), and central nervous system Diseases, symptoms of inter-vertebral disc herniation in the neck and back.

Based on the pre-test, the prevalence of these abnormalities was estimated in the two age groups and the minimum number of subjects was 500 people; 400 in 17 to 25 years age group and 100 in 35 to 50 years age group.

According to the objectives of the study, "Chi-square, Kruskal-Wallis-One-way ANOVA and Man-Whitney" tests were used for statistical analysis in SPSS 21.

By explaining how the measurement was performed, the subject stood at a distance of 25 cm from the plumb line (the outer edge of the foot from the plumb) hanging from the ceiling, and the distance land marks from the plumb line to the lateral view was measured by the ruler.

According to Kendall and McCreary theory, in a normal posture, plumb line should pass through land marks: the earlobe, the seventh cervical vertebra, the acromion process, the greater trochanter, slightly ahead of the knee joint midline, and slightly ahead of Lateral Malleolus. On the lateral view in head assessment, land mark (the ear lobe) was considered to evaluate the forward head posture. In shoulder assessment, attention was paid to the forward movement of the land mark (acromion process).

The severity of these abnormalities is divided into 3 degrees:

- 1-Center of landmark on the plumb line or by 1cm front (normal)
- 2-Back margin of landmark on plumb line (medium)
- 3-Displacement 1 cm or more than 1 cm back margin of land mark forward the plumb line(sever)

The evaluation was done from both the left and right sides of the head, which is done in order to be aware of the possible rotation of the head ⁽⁵⁾ (figure 1).



Figure 1: Normal, Moderate &sever position of head

A kyphometer was used to evaluate Kyphosis. Generally, evaluations were assessed by two examiners. In order to ensure a minimum error, the first 50 subjects in the pre-test were jointly evaluated by two examiners with no differences between measurements (figure 2).



Figure 2: evaluate Kyphosis by kyphometer

Results

The present study was performed on 500 healthy women in two age groups: 400 in the age group of 17-25 years (mean age of 19 years) and 100 in the age group of 35-50 years (mean age 40 years) (Table 1).

The head and shoulder abnormality in each group was evaluated and is presented in (Table 2).

Table 2 shows that in both groups the most severe abnormalities were seen in severe type. In the first group the prevalence of malformations was 47% and in the second group 56%, but there is no statistically significant difference between "head abnormalities" and "age" ($P > 0.05$).

According to Table 3, most of the subjects had occupations that were independent of the specific position of the neck and shoulders, were right-handed, did not exercise regularly, and have no restrictions on shoulder and neck movements.

As Table 4 shows, right shoulder abnormalities were more common in the target population. "P" showed a significant relationship between age and right and left shoulder abnormalities ($p < 0.05$). That is, in older people, this anomaly is more common.

Mean kyphosis in the 17-25 years group was 44.14 degree, between 31-60 degree ($SD=5.9$) and in the 35-50 years group 47.2 degree between 32-68 degree ($SD=7.3$).

| Table 1: Distribution of the subjects according to the variables of age, weight, height & age group | | | | | | |
|---|--------------------------------|--------------------------------|-----------|-----------|-----------|-----------|
| Variable | Mean/ Standard deviation 17-25 | Mean/ Standard deviation 35-50 | Min 17-25 | Max 17-25 | Min 35-50 | Max 35-50 |
| Age | 19-2.23 | 4-4.36 | 17 | 25 | 35 | 50 |
| Height | 160.77-5.59 | 157.85-6.9 | 144 | 175 | 138 | 175 |
| Weight | 56.66-7.61 | 62.68-8.5 | 48 | 89 | 45 | 83 |

| Table 2. Distribution of head abnormality by age groups | | | |
|---|---------------------------------|---------------------------------|---------------------------------|
| Age group/ abnormality | Type 1 (Normal) Number/ Percent | Type 2 (Medium) Number/ Percent | Type 3 (severe) Number/ Percent |
| 17-25 | 99(24%) | 113(28%) | 188(47%) |
| 35-50 | 17(17%) | 27(27%) | 56(56%) |

| Table 3. Distribution of subjects according to occupational variables, dominant hand, exercise, shoulder and neck movement limitation | | | |
|---|--|------------|------------|
| Variable / Group | | 17-25years | 35-50years |
| Job | Dependent to Specific neck and shoulder position | 11 | 33 |
| | Independent to Specific neck and shoulder position | 389 | 67 |
| The dominant hand | Right | 369 | 92 |
| | Left | 31 | 8 |
| Exercise | Doing | 57 | 4 |
| | Not doing | 343 | 96 |
| limitation in Neck movements | There is | 3 | 2 |
| | Does not exist | 397 | 98 |
| limitation in shoulder movements | There is | 2 | 2 |
| | Does not exist | 398 | 98 |

| Table 4. Distribution of "Right Round Shoulder " and "Left Round Shoulder " Abnormalities by Age Groups | | | | | | |
|---|--------------------------------|----------------------------------|-------------------------------|--------------------------------|----------------------------------|-------------------------------|
| Group/abnormality | Right Round shoulder | | | left Round shoulder | | |
| | Type 1 (normal) Number/percent | Type 2 (moderate) Number/percent | Type 3 (sever) Number/percent | Type 1 (normal) Number/percent | Type 2 (moderate) Number/percent | Type 3 (sever) Number/percent |
| 17-25years | 227-73% | 84-22% | 17-4.5% | 290-77% | 70-18% | 16-4.2% |
| 35-50years | 45-48% | 34-36% | 14-15% | 46-49% | 36-38% | 11-11% |
| $\chi^2 = 29.88$ | | | $P = 0.001$ | $\chi^2 = 26.8$ | | |
| | | | | $P = 0.001$ | | |

Discussion

According to the results, there is a high prevalence of head and shoulder abnormalities in the study population (76 % Forward head, 31% right round shoulder and 28% left round shoulder), which there was the most prevalence of the above abnormalities in the higher age group, and a statistically significant difference was observed between age and shoulder abnormalities.

Due to age-related erosive factors, as well as longer-term employment associated with neck and shoulder-specific position than younger people (17–25 years), a higher prevalence of malformations in the older age group can be justified. Although there was no statistically significant difference in neck, our data showed a higher rate of neck malformations in older group than younger group, which may require more extensive research in older people, as well as in other age groups. Similar to our study, the prevalence of these abnormalities was reported in both age groups⁽⁸⁾. This may be due to differences in the number of subjects. However, to get more reliable results, there is a need for more extensive research across different age groups.

In the study of the association between pain and anomalies, although subjects without abnormalities also complained of pain in the targeted areas, however, using the Kruskal-Wallis One-Way Anova test, there was a significant relationship between neck and shoulder abnormalities and pain.

In the neck area, it is directly related to the severity of head abnormalities and pain. In severe head abnormalities, the severity of pain in the right and left shoulders increases. This may be argued that the muscles in the back of neck may become more active, the greater severity of the abnormality, the greater the muscle activity and cause painful effects, but in shoulder has not been confirmed, perhaps because of this hypothesis. Include:

- Despite the pain of one shoulder, a person uses the other hand to compensate.
- Shoulder abnormalities involve fewer parts than the neck abnormalities, as well as

neuromuscular issues in the neck area.

-The person's attention is more on the pain in neck area and it seems to be more important to him because the pain is perceptually influenced so the same attention to the neck can cause more pain in the area.

According to studies the relationship between abnormalities and painful areas was also confirmed, but no association was found between the severity of the anomalies and the severity of the pain^(8, 9). However, it seems that because each person's perception of pain is different, people's response to pain intensity is not a completely reliable source for measuring and comparing pain intensity. Significant difference was observed in the relationship between head abnormality and headache frequency (in four situations)

($P = 0.001$)

The other results showed that the frequency of headache was higher in subjects with more severe abnormalities. The results also showed a relationship between two variables of head abnormalities and headache⁽⁷⁻¹⁰⁾.

Relationship between headache and forward head may be due to: pressure and stretching of the cervical ligaments and muscles and subsequent involvement of the neural-vascular network of the head or narrowing of the intervertebral foramen in the upper part of cervical, thereby creates the favourable conditions for more pain.

There was a significant difference between occupation and head and shoulder abnormalities. By comparing the two occupational conditions, it is observed that the prevalence of type 3 abnormalities in the group dependent to the specific position of the neck and shoulder is higher than other group. This means that occupations dependent to the specific position of the neck and shoulder affect the neck and shoulder posture.

Our results show that occupation and pain are related in the areas concerned, and also the higher prevalence of such pain in older people who, according to the results, are more likely to be in related occupations and have long been associated with the position they use.

Much research has been done in this area, which shows the relationship between these

two variables. Including the results which confirmed the existence of this relationship⁽¹²⁻¹⁷⁾. Comparative measurement of the "kyphosis angle" represents larger angles in the older age group, which may be related to skeletal changes as a result of aging and by fixing the curved posture as a result of repetitive inappropriate activity, irrespective of hereditary physical characteristics.

A strong correlation coefficient was observed between kyphosis angle and pain between two scapulae ($r = 0.4$). It can indicate the effects that this abnormality has on the back muscles, which can lead to pain.

In the study subjects, athletes with head and shoulder abnormalities were also observed. Statistical results also showed no significant difference between the two variables of exercise and abnormality ($P > 0.05$). It seems that exercise must be done in a specific way to affect posture, meaning that each type of exercise has its own effects on the dominant posture in that sport, which requires a wider study to examine the relationship between specialized exercise and postural changes. However, athletes clearly had less complaints of pain, and statistical analysis confirmed this relationship ($P < 0.05$). Perhaps the reason for this is good postural flexibility and muscle strength. Posture is influenced by many factors, one of which is psychological issues, and athletes may complain less pain due to better mental health.

Since the majority of right-handed individuals were selected in the present study, the association between right-handed or left-handedness with round shoulder abnormalities cannot be studied. More research is needed to prove this.

The prevalence of round shoulder abnormalities is higher in older people. The severity of head abnormalities is associated with the severity of pain in the area concerned.

Due to the prevalence of the discussed abnormalities in the population and the relationship between the abnormalities and related pain and occupational effects, optimal conditions can be prevented, even if possible. The use of more accurate posture assessment methods in the clinic in order to better understand skeletal, muscular, and

neurological and other problems seems obvious.

Posture education should be considered from the beginning and at any age; if children are to be encouraged to play appropriate activities to properly utilize physical mechanisms in adolescents with a focus on exercise and physical activity modification and in adults with improve working conditions and daily activities⁽²⁻⁹⁾.

The treatment of each branch of medicine must be precisely based on the underlying cause in order to be successful and it should be kept in mind that exercise is not always a poor posture response, but should be considered appropriate if the exercise is used. In order to uprightness position, there must be enough muscle balance between the antagonist muscle groups. So the exercises need to be adjusted for this. Exercise trainings should not only focus on the specific function of a muscle or muscle groups and its unique strengthening, but also on the function of other muscles in order to build overall fitness for the individual. An overall exercise integrate in order to increase muscle balances and to achieve natural strength and flexibility. In the treatment of muscular imbalance, specific treatments should be taken to strengthen the weak muscles and reduce tension of stiff muscles, taking the necessary time and correcting the mal alignment to reduce stress on muscles, which may play a important role in the treatment. Supportive devices tried to improve it. A proper exercise training program will gradually improve the body's defective mechanism. Finally, one should strive to maintain the proper alignment of the body in each situation⁽¹⁰⁻¹⁷⁾.

According to researchers if we consciously attempt to maintain a proper posture for a short time, the postural reflexes function to maintain this posture should gradually increase for maintaining a proper posture requires no attention⁽⁹⁻¹⁷⁾.

Conclusion

For postural problems that appear to be related to a job or habit and whether removing the occupational factors alone

would attenuate painful symptoms, depends primarily on whether the condition has attained a fixed pattern in the person or has resulted in muscle stiffness and weakness. Suggestions for more researches: comparative prevalence of this abnormalities in male and females, The effects of variable sports on posture, The effects of variable jobs on posture, utilizing more reliable devices and methods to accurate investigation malalignments.

Conflict of interests

There is no Conflict of interests.

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