



RESEARCH

Evaluation of the anthropometric indices, posture, and body image of nursing students

Hemşirelik öğrencilerinin antropometrik endeksleri, postür ve vücut imajının değerlendirilmesi

Sema Polat¹, Emir İbrahim Işık², Evşen Nazik³, Sevban Arslan⁴

¹Cukurova University, Adana, Türkiye

Abstract

Purpose: The study aims to evaluate the anthropometric indices, posture and body image of nursing students.

Materials and Methods: The study consisted of 193 nursing students. It was conducted to determine the through comparative tests the effect of anthropometric indices and somatotype features of New York Rating Scale and Body-Cathexis Scale (BCS). Additionally, anthropometric measurements and indices were calculated.

Results: The mean age, height, and weight of the students were 19.55 ± 1.19 years, 164.31 ± 4.51 cm, and 56.91 ± 7.41 kg. The average of the Body mass index (BMI) was 21.09 ± 2.73 kg/m². According to the New York Posture Rating Chart, the mean points of the students were calculated as 56.47 ± 6.72 points, respectively. Moreover, the BCS means of subjects were 147.64 ± 24.61 points. According to the Category Chart Key which performed to determine the somatotype characteristics of Nursing Students, the most prevalent somatotype category is endomorphic mesomorph, In contrast, the least seen types were ectomorphic endomorph, Balanced ectomorph, and Endomorphic ectomorph.

Conclusion: This study showed that BMI, posture, body image perceptions and anthropometric parameters of nursing students can be considered normal. The evaluation of anthropometric indices, posture, and body image of nursing students is vital for understanding their physical health and well-being. The result of this study presents important findings in terms of raising awareness for nursing students in terms of maintaining the existing posture and preventing possible injuries.

Keywords: Posture, body image, somatotype analysis, new york posture analysis, nursing student

Öz

Amaç: Çalışmanın amacı hemşirelik öğrencilerinin antropometrik indekslerini, postürlerini ve vücut imajlarını değerlendirmektir.

Gereç ve Yöntem: Çalışmanın örneklemini 193 hemşirelik öğrencisinden oluşmuştur. Çalışma, New York Derecelendirme Ölçeği ve Beden Algısı Ölçeği'nin antropometrik indeksleri ve somatotip özelliklerinin etkisini karşılaştırmalı testler yoluyla belirlemek amacıyla yürütülmüştür. Ayrıca antropometrik ölçümler ve indeksler hesaplanmıştır.

Bulgular: Öğrencilerin ortalama yaş, boy ve vücut ağırlıkları sırasıyla $19,55 \pm 1,19$ yıl, $164,31 \pm 4,51$ cm ve $56,91 \pm 7,41$ kg idi. Vücut kitle indeksi (BMI) ortalaması $21,09 \pm 2,73$ kg/m² idi. New York Postür Değerlendirme Çizelgesine göre öğrencilerin puan ortalamaları sırasıyla $56,47 \pm 6,72$ puan olarak hesaplanmıştır. Ayrıca, öğrencilerin Beden Algısı Ölçeği puan ortalamaları $147,64 \pm 24,61$ puan olarak hesaplanmıştır. Hemşirelik öğrencilerinin somatotip özelliklerini belirlemek için yapılan Kategori Tablosu Anahtarına göre, en yaygın somatotip kategorisi endomorfik mezomorf iken, en az görülen tipler ektomorfik endomorf, Dengeli ektomorf ve Endomorfik ektomorfur.

Sonuç: Bu çalışma, hemşirelik öğrencilerinin BMI, postür, beden imajı algıları ve antropometrik parametrelerinin normal olarak kabul edilebileceğini göstermiştir. Hemşirelik öğrencilerinin antropometrik endekslerinin, postürünün ve beden imajının değerlendirilmesi, fiziksel sağlıklarını ve iyilik hallerini anlamak için hayati önem taşımaktadır. Bu çalışmanın sonucu, hemşirelik öğrencilerinin mevcut postürünü sürdürme ve olası yaralanmaları önleme konusunda farkındalık yaratma açısından önemli bulgular sunmaktadır.

Anahtar kelimeler: Postür, beden imajı, somatotip analizi, new york postür analizi, hemşirelik öğrencisi

Address for Correspondence: Sema Polat, Cukurova University Faculty of Medicine, Department of Anatomy, Adana, Türkiye E-mail address: sezaoz@hotmail.com
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INTRODUCTION

Today, the physical health and well-being of healthcare workers are of great importance for their professional performance and quality of life. Since nursing students are faced with intensive work schedules, long hours of patient care, and continuous learning processes, it is necessary to pay special attention to their physical health status. In this context, evaluating anthropometric measurements, posture and body image of nursing students is an important step to understanding their physical well-being¹⁻³.

The anthropometric index is an important measurement tool that categorizes the physical characteristics of the body according to certain dimensions and structural features, providing information about body types and proportions. Also, the height, weight, waist, and hip circumference measurements are used to calculate values such as body mass index (BMI), waist-to-hip ratio (WHR), and waist-to-height ratio (WHtR). Also, there was an association between body fat and age, gender, race, and geography^{1,4}. However, BMI is extensively used in assessing obesity, it does not give as much information as other anthropometric index measurements such as waist circumference (WC) and WHR respectively, to estimate the distribution of abdominal adipose tissue⁵. Additionally, BMI values increase especially obesity or overweight affects cardiovascular disease, cerebrovascular diseases, dementia, sleep pattern and infertility, menstrual cycle, and endometrial carcinoma^{1,6,7}.

Body composition evaluation plays a critical role in assessing general health and is a valuable method in clinical practice. The somatotype was used first in 1940 for the characterization and measurement of the morphological shape and body composition. There are three types of somatotypes. Endomorph states a rounded, soft structure and is connected with a share of adipose tissue, the mesomorph expresses a structure with developed muscle and robust skeleton relating to muscle mass and the ectomorph has a structure with a fragile and delicate build, together with a long-line structure and in relationship to body weight and height. Moreover, somatotype is frequently used to provide information about three different components including endomorph, mesomorph, and ectomorph expressed in relationship to body weight and height. A somatotype

rating involves a combination of an anthropometric rating as described by Carter and Heath was used⁸⁻¹². The prevalence of stress and pain in nursing students who are in close contact with patients is increasing. Nurses are exposed to some overload during the practice profession or daily routine, e.g. moving, repositioning, and transferring of patients. These are physically demanding tasks and may be carried out in poor posture or a postural deviation can develop¹³⁻¹⁵.

Acquired bad postural habits due to work activities may lead to body changes that are reflected by musculoskeletal pain. There are many findings of nurses or nursing students about pain in the lower or upper limb or back pain such as the cervical region, wrist, shoulder, or knee^{2,3,16-21}. A relation between postural deviations or imbalances and different types of pain or musculoskeletal disorders such as knee osteoarthritis, ankle instability, and low back pain are reported. Furthermore, there is an increased risk of musculoskeletal diseases in the vertebral column, and upper limb in health professionals who have poor posture^{2,3,20}. Also, the decline in postural alignment may lead to many physical, physiological, and psychological problems²². Posture analysis is applied. Postural changes were evaluated head, neck, shoulder, back, waist, hips, feet, and arches by posteriorly and laterally with the NYPRS to reveal whether is there any musculoskeletal problems and to determine these problems as early as possible. In addition to having a multidimensional and subjective structure, body image is the feelings, thoughts, and perceptions of the individual's own body²³.

It is very important for professional nurse candidates to grow up as individuals who can establish healthy relationships in their professional lives, accept themselves and at the same time be accepted by the environment, have high self-confidence and self-esteem levels. In addition, it is aimed to protect themselves from injuries by performing somatotype analyses in order to recognise their postures and avoid injuries when they are new to the profession. Feeling good both physically and mentally will cause them to achieve success in the profession and feel individual satisfaction. The hypothesis of this study is to investigate whether nursing students have different somatotype characteristics. What are the existing postural disorders? Do body image perceptions affect posture?

The study aimed to assess the anthropometric indices, posture, and body image of nursing students

and conducted to determine through comparative tests the effect of anthropometric indices and somatotype features of the New York Rating Scale and BCS in nursing students.

MATERIALS AND METHODS

Sample

This descriptive and cross-sectional study was conducted in Nursing Department students of Cukurova University in Turkey in 2024 with 193 nursing students, who agreed to participate in the study (participation rate 42.88%). Students who were absent when the study was conducted ($n = 157$), and who refused to participate ($n = 325$), were excluded from the study. Additionally, the study also included subjects with no genetic or acquired disease of the spinal cord/vertebral column and no history of spinal cord/vertebral column trauma, rheumatoid arthritis, and musculoskeletal disorders. Subjects with a history of neuromuscular disease or those with a history of a tumor affecting the spinal cord and brain were excluded from the study. Nursing students who agreed to participate in the study and met the inclusion criteria were included.

Measures

The Student Information Form (SIF) was used to obtain study data, the Body-Cathexis Scale (BCS), and the New York Posture Rating Chart.

Body-Cathexis Scale (BCS)

The BCS is about sociodemographic features including age, gender, city, and whether to choose the nursing occupation voluntarily or not. Also, the demographic features such as weight, height, and BMI that might affect the somatotype features and posture were generated. The BCS developed by Secord and Jourad (1953), aims to measure subjects' satisfaction level with their body functions and various parts of their bodies²⁴. The scale of Turkish validity and reliability was put into practice by Hovardaoğlu (1993)²⁵. There are 40 items in the scale, the points between 1 and 5 were used for scoring answers for each item. Additionally, completely agree or always or 76-100" were given a five-point and completely disagree or never or 0-24" were given one point. Also, the other definition used is below. The subjects were asked to answer a suitable option filling the questionnaire: Strongly disagree, disagree, indecisive, agree, and strongly agree (from 1

to 5). The lowest and highest scores obtained from the scale are 40 and 200, respectively. An increase in the score notes a more positive body perception. In our study group, the Cronbach Alpha value was calculated as 0.944.

New York Posture Rating Scale (NYPRS)

The scale is used for the posture alignment evaluation. Also, this scale was originally published in 1958 known as the New York Physical Fitness Test and after modified by Howley and Franks. This scale presents a quantitative approach to evaluate alignment of 13 body segments for the subject in the anatomic position by posterior and lateral views. In this original version, each body segment was scored 5 (correct posture), 3 (slight deviation-fair posture), or 1 (pronounced deviation- poor posture)²². Moreover, values of 45 and above indicate good posture, while values of 19 and below indicate deteriorated posture. The value of total score changes from 13 (bad posture) to 65 (good posture) points. The Cronbach Alpha value was calculated as 0.827 for the validity and reliability of the scale in our study.

Data collection

Students were informed both written and verbal about the study and measurements. The purpose and method of the study were explained to the students, and it was also explained to them that they could leave the study voluntarily at any stage of the study. The study was performed in two laboratories. The Student Information Form and BCS were applied in the Nursing classroom in the Faculty of Health Sciences and this stage took 20 minutes. After completing these forms, the students were taken one by one to the Nursing laboratory in the Faculty of Health Sciences for evaluations including height, weight, measurements about somatotype analysis, posture analysis, etc. Additionally, the NYPRS, anthropometric measurements, and demographic data which were evaluated by the same researchers took 80 minutes (SP; EII). Moreover, the anthropometric measurements were as follows:

The height and body weight were measured using a stadiometer the nearest 0.1 centimeters in bare, and a digital scale 0.1 kg. calibrate with precision, respectively. BMI was calculated as weight in kilograms divided by the square of the height in meters (kg/m^2) value. Hip and waist circumference were measured in centimeters with an inelastic measuring tape. WH_R was calculated by dividing the

waist circumference by the hip circumference. Additionally, $WHtR$ was obtained by dividing the waist circumference by the height. Digital vernier caliper (Mitutoyo brand) with 0.01 mm precision was used for diameter measurements, nonelastic tape measure for the circumference measurements

skinfold caliper (Lafayette brand 9069), and subcutaneous adipose tissue thickness (Table 1-2).

Heath Carter Somatotype Analyze Method was used for the somatotype analysis ^{9,11,26} and the values are shown below (Table 1-2).

Table 1. Demographic data of nursing students

Demographic Data	N	Mean	Standard Deviation (SD)	Minimum (Min.)	Maximum (Max.)
Age (year)	193	19.55	1.19	18.00	21.00
Height (cm)	193	164.31	4.51	155.00	175.00
Weight (kg)	193	56.91	7.41	46.00	70.00
BMI (kg/m ²)	193	21.09	2.73	16.26	29.14
Hip circumference (cm)	193	96.93	9.67	70.00	124.00
Waist circumference (cm)	193	70.26	8.37	19.00	97.00
The ratio of waist to hip	193	0.19	1.27	0.078	0.73
Biceps skinfold thickness	193	9.32	3.82	3.00	20.00
Biceps circumference measurements	193	25.82	3.64	14.00	36.00
Triceps skinfold thickness	193	13.37	5.31	4.00	26.00
Subscapular skinfold thickness	193	14.94	5.40	6.00	30.00
Suprailiac skinfold thickness	193	15.19	5.68	6.00	35.00
Thigh skinfold thickness	193	19.98	6.43	10.00	40.00
Thigh circumference measurement	193	52.83	5.95	40.00	73.00
Humerus epicondylus diameter	193	87.62	10.78	66.00	120.00
Femur epicondylus diameter	193	115.19	15.87	74.00	157.00

N: participation number; SD: Standard Deviation; Min.: Minimum; Max.: Maximum; cm: centimeter; kg: kilogram; BMI: Body mass index;

Table 2. Somatotype characteristic values of nursing students

Somatotype characteristics	N	Mean	SD	Min.	Max.
Endomorphy	193	7.33	3.04	2.85	12.85
Mezomorphy	193	7.80	2.43	1.66	12.24
RPI values	193	42.80	2.25	36.75	47.66
Ectomorphy classification	193	2.63	1.29	1.38	6.31
Body Cathexis Scale (point)	193	147.64	24.61	67.00	195.00
New York Posture Rating Chart (point)	193	56.47	6.72	33.00	66.00

N: participation number; SD: Standard Deviation; Min.: Minimum; Max.: Maximum; RPI: reciprocal ponderal index

Endomorphy: $0,1451x - 0,00068x^2 + 0,0000014x^3 - 0,7182$ (x =triceps brachii+subscapularis+suprailiac subcutaneous fat thickness) Mesomorphy; $0,858$ (Humerus width- medial, and lateral epicondyle) $+0,601$ (Femur width-lateral and medial condyle) $+0,188$ [(Biceps brachii circumference)- triceps brachii skinfold/10] $+0,161$ [(Calf circumference)- (calf skinfold/10)] $-0,131$ (Height) $+4,5$. The calculation of Ectomorphy. The Ponderal index is calculated by dividing height by the cubic root of weight $RPI = \text{Height} / \sqrt[3]{\text{weight}}$. Ectomorph is calculated according to the Ponderal index by using

one of the formulas below. If $RPI \geq 40,75$, Ectomorph = $0,732 \times RPI - 28,58$. If $38,25 < RPI < 40,75$, Ectomorph = $0,463 \times RPI - 17,63$. If $RPI \leq 38,25$, Ectomorph = $0,1$ (27). Measurements of Skinfold Thickness were carried out on triceps brachii, subscapularis, suprailiac, supraspinatus, biceps brachii, and thigh. In skinfold thickness measurement, subcutaneous fat layer thickness between the thumb and index finger was pulled lightly upwards to separate it from muscle tissue. The subcutaneous fat layer thickness was measured with a caliper placed 1cm away from the fingers and stated

as mm^{27,28}. Also, the estimation of circumference was performed on wrist, biceps brachii muscle on flexion and thigh. Humerus and femur epicondyle which were measured for diameter estimation as elbow and knee in 90° between lateral and medial epicondyle with 0.1 cm. accuracy rate²⁸.

The study was performed in conformity with the Helsinki Declaration principles. Institution authorizations and approval from Non-Invasive Clinical Research Ethics Committee were obtained (Number: 2023/129-46). Information about the study objective, the voluntary nature of participation, they can withdraw from the study at any time and the participation to the study and the results of the study would not affect the course assessments were informed to subjects.

Statistical analysis

Statistical analysis was performed using the SPSS 22.0 software package (SPSS Inc, Chicago, IL). The normality assumption was decided to Shapiro Wilk test. According to this test, parametric test which name was Independent T Test were chosen for comparison. Descriptive statistics and frequency analysis were used to analyze the demographic characteristics. From these measurements, means, standard deviations (SD), minimum and maximum values were calculated. Significance level was considered as $p < 0.05$. Moreover, Chi Square was used to assess the New York Posture Rating Chart of Nursing Student, and Body Cathexis Scale distribution.

RESULTS

The mean age, height, and weight of the students were 19.55 ± 1.19 years, 164.31 ± 4.51 cm, and 56.91 ± 7.41 kg. The average of the Body mass index (BMI) was 21.09 ± 2.73 kg/m² (Table 1). The 57.51% of students have been studying and living in Adana and the others have been living in South and South eastern region of Turkey. The majority of the nursing students chose the department willingly (60.4%), as their first choice (54.6%), and 57.4% were satisfied with their department. Also, the demographic data of nursing students including hip circumference, waist circumference, the ratio of waist to hip, biceps skinfold thickness, biceps circumference, triceps skinfold thickness, suprailiac skinfold thickness, thigh skinfold thickness and circumference, humerus and femur epicondylus diameters were shown in Table 1.

The ratio of the waist to hip was defined as normal if the ratio is ≤ 0.8 while the ratio is calculated as high, if the ratio is > 0.8 . According to these findings, the normal WHR was found in 178 nursing subjects followed by high (15 subjects) The range changed from 0.62 to 1.27. The second ratio is obtained by dividing the waist circumference by the subject's height (WHtR). According to the this result, 179 nursing subjects was evaluated as normal WHtR and 14 subjects had high WHtR (the ratio > 0.5 ; the range from 0.04 to 0.63) (Table 1).

In New York Posture Rating Scale in Nursing Students, subjects with pronounced deviation obtained 1 point, slight deviation, 2 point, while subjects with correct posture obtained 3 point. Moreover, the mean (SD), minimum and maximum total score of the New York Posture Rating Scale were calculated as 56.47 (6.72), 33.00 and 65.00, respectively (Table 2). The mean points of this scale items changed from 4.15 (abdomen position) to 4.63 (hips position). According to the BCS results, the mean (SD), minimum and maximum values were reported as 147.64 (24.61), 67.00 and 195.00, respectively. The minimum and maximum values of the score obtained from each of the 40 items were between 3.06 and 4.42 out of 5 points (Table 2).

The somatotype characteristics of Nursing Students such as endomorphy, mesomorphy, ectomorphy and ectomorphy classification calculated according to Health Carter analyzing scale was shown in Table 2. The mean values of these characteristics were 17.62, 10.28, 42.80 and 2.64, respectively. After calculating the somatotypes, somatotype profile is determined according to the Category Chart Key. This chart key consists of 13 somatotypes. The most prevalent somatotype category is endomorphic mesomorph (77 subjects; 39.90%), whereas the least seen types were ectomorphic endomorph (1 subjects; 0.52%), Balanced ectomorph (1 subjects; 0.52%) and Endomorphic ectomorph (1 subjects; 0.52%). There are 3 subjects in the endomorphic ectomorph category, 14 subjects in balanced mesomorph, 50 subjects in mesomorphic endomorph; 20 subjects in mesomorph endomorph, 7 subjects in balanced endomorph, 2 subjects in ectomorphic mesomorph, 4 subjects in mesomorph ectomorph, 3 subjects in mesomorphic ectomorphy, 10 subjects in central category.

DISCUSSION

This paper was carried out to evaluate the nursing students's working posture, menstrual cycle status, and anthropometric indices to determine the musculoskeletal problems that may develop and to reduce the injuries by making some suggestions. It is necessary to avoid the musculoskeletal disorder or any injury which might happen. For this reason, these problems must be determined by taking precautions or decreasing the associated risks previously. There are many ergonomic solutions for nursing professionals, who perform routine daily living activities, lifting heavy loads, transferring patients, or assisting patients to walk. The exercise-oriented posture or proper activities distribution, safe lifting and carrying, or regular sport are recommended.

Posture is an important factor in evaluating the subjects' health unsuitable posture or any deviation of posture may lead to several problems. The correct postural alignment allows for a decrease in fatigue, work to high productivity or performance, and less pressure on the body. This is because the more correct a person's posture is or the more ergonomically appropriate it is, the more likely it is that musculoskeletal balance will be achieved. Also, improper posture leads to the development of chronic injuries or pain, muscle fatigue or shortening, and bone deformation. Besides all this, age, gender, and BMI play a critical role in postural changes²¹. It has been known that some factors including age, weight, body mass index sedentary lifestyle, or health profession such as nursing, are inclined to an appropriate posture²⁹⁻³¹. In a study performed with Iranian rural females, obese and overweight females were prone to improper posture, especially forward head posture. An interesting finding is that pes cavus is common in normal weights. Moreover, females suffer from many postural changes according to males due to anatomical, biomechanical, and physiological differences²¹. The studies related to somatotypes which is important knowledge are performed in medicine, physical anthropology, and sports science. Especially, this evaluation technique plays a critical role in defining body shapes, and physiological functions, some diseases, and in predicting of potential movements of the young. This method evaluates the body form and composition or the physique. Currently, the most commonly preferred technique for estimating physiques is the Heath-Carter anthropometric somatotype^{11,32}. The somatotype is the morphological characteristic of the

body built which is a phenotypic entity capable of changes with aging, growth, exercise, and nutrition³³. Also, endomorphy states that body fatness, mesomorphy, musculoskeletal development, and ectomorphy are about the linearity or slenderness of a physique³². A study performed with 429 Chinese population (207 males, 222 females) aged 20 years and over, the mean somatotype of subjects was 5.6, 4.2, 1.8 in males and 6.7, 4.2, 1.6 in females. Both genders showed a mesomorphic endomorphy (endomorph is dominant, and mesomorphy is greater than ectomorphy) profile. The three somatotype components of all ages are dominated by endomorphy. In all ages, endomorphy is dominant. This means that the body fat content is high, the body linearity decreases, and the musculature is not very developed. It signs the overweight and obesity and concludes a serious public health issue,^{32,34,35} such as a high-calorie diet and reduction of physical activity,³⁶ leading to a drop in the mesomorphic component and tendency to an increase in the endomorphic component, mainly in older females and males. This high adiposity may lead to increasing the probability for the population to suffer from chronic diseases^{32,37}. Some factors such as genetic, race-related differences, economic-cultural level, geography and climate, lifestyle, eating habits, and anthropometric parameters affect the somatotype characteristic. The endomorphic component showed distinct differences between ages/genders, respectively³².

Adhikari and Sinha researched a study to evaluate the growth and development of somatotype characteristics of Nepali male children aged between 6 and 11 years. When we analyzed the literature performed with children aged between 6-11 years, the endomorphy, mesomorphy, and ectomorphy were reported as 2.0, 4.0, and 3.7, respectively in Estonia children aged 11 years. The same parameters were 3.62-4.69-2.49 in Portugal children aged 10.8 years, respectively. In Chile child aged 11 years, the corresponding values were calculated as 5.0 - 4.8 -1.8, respectively. Moreover, In Nepal Children aged 11 years and Nigerian subjects aged between 7-10 years, the same values were reported as 2.7-3.7-3.2 and 1.02-2.2-2.29, respectively³².

The postural habits performed at work an important in terms of injuries, musculoskeletal pain, or ergonomic risks. Preventing injuries or pathologies in performing Daily living and work activities is difficult and needs the balance between all body structures^{30,31,38}. The nursing profession focuses on

the care of communities to maintain and provide optimal health and quality of life. This job requires a physically and psychologically demanding profession and the rates of musculoskeletal complaints are high³⁹. Moreover, nursing professionals are inclined to stress and pain complaints because of the experience of body overload during routine tasks they perform in their daily routine, such as moving, repositioning, and transferring patients. For this reason, they are exposed to physical effort and motion performed with inappropriate postures^{13-15,30,31}. Moreover, postural deviation poor postural habits, or inappropriate posture accompany many undesirable conditions such as musculoskeletal disorders (inflammatory and degenerative process), pain in especially lumbal and cervical region, shoulders, and knees (osteoarthritis), wrists, and ankle instability and this leads to negative work performance. This negative condition affects many structures such as the muscles, tendons, ligaments, joints, and spine. Finally, it leads to chronic postural and work-related musculoskeletal disorders in nursing subjects^{31,39}. If the musculoskeletal pain and discomfort continue due to overwork, the nursing Professional may experience low back pain which will affect the work performance or may change the work⁴⁰. If the total score is ≤ 19 , the posture is accepted as severe. Also, the score is between 20 and 29, weak; the score is 30 and 39, tolerable: 40-44; good; If the total score is ≥ 45 , the posture is very good⁴¹. In the present paper, we performed NYPRS, and the values of the mean (SD), min., and max. were calculated as 56.47 (6.72), 33.00, and 65.00 points, respectively in all participants. The obtained maximum score from this chart was reported as 65 points. These 13 items of nursing students' percentage range from 58% (112 subjects) to 81.3% (157 subjects) who have correct posture (5 points). This score might be accepted as good however, the main goal must be to keep or maintain the proper posture.

Physical appearance is a significant parameter of social interactions. The physical image meaning is to obtain a distinct place in the social environment^{42,43}. Additionally, it refers positive, or negative attitude towards a particular object, namely, the self, and makes the person feel that he is a person of worth. Body image which indicates the subject's awareness of the aesthetics and sexual attractiveness of their physique, is one of the important parameters of an individual's self that gives both a healthy physical and great extend to mental state. Additionally, many

expert areas such as psychology, medicine, psychiatry, psycho-analysis, and cultural studies are related to body image and this is closely associated with self-esteem^{42,43}. In a study performed by Pop with 160 female students aged between 19-21 years, a prevalence of body dissatisfaction was declared as 79% of girls who are displeased with their physical appearance. Moreover, there was a negative association between self-esteem and body dissatisfaction. BMI was significant correlated with body dissatisfaction⁴³. Body-Cathexis Scale (BCS) mean (SD), minimum, and maximum values were reported as 147.64 (24.61), 67.00, and 195.00, respectively. Also, the increase in the obtained score from this scale showed a positive situation. The total score was reported as 200 points [(40*5 (strongly agree)]. According to these results, it can be said our values were high.

One limitation of this study was restricted to a single center, which might affect the generalizability of the results. On the other hand, our study also has some strengths, such as the extensive use of validated measurement tools and the focus on a critical but under-explored population. Also, this is a valuable study because it is the first study in the field in which somatypes of nursing students were investigated and posture analyses were performed.

Healthcare workers are exposed to abnormal postures in their working environment. If abnormal anthropometric parameters of the subjects are added to this situation, the situation gets worse and the person loses his workforce. The findings of our study showed that BMI, posture, body BCS perceptions, and anthropometric parameters of nursing students who have just started working life can be considered normal. In addition, showing the body type as a result of the somatotype analysis obtained from the anthropometric parameters added originality to this study. The result of this study presents important findings in terms of raising awareness for nursing students in terms of maintaining the existing posture and preventing possible injuries. Moreover, somatotype analysis may be an important parameter in determining of subject's exercise type, effective weight loss shape, or maintaining to well posture and perhaps eliminating the future possibility of injury. To determine the somatotype of healthcare workers nurses at an early stage may lead them to do their job with less injury and be more successful. The importance of considering the body structure of the person when choosing the nursing profession or

performing this profession most successfully also emerges. Also, It is very important for professional nurse candidates to grow up as individuals who can establish healthy relationships in their professional lives, who accept themselves and are also accepted by their environment, who have high levels of self-confidence and self-esteem, and to know their physical competencies. In addition, it is aimed at protecting themselves from injuries by performing somatotype analyses for them to recognize their posture and avoid injuries when they are new to the profession. Although the data of this study was collected in nursing, we think that this study's measurements will guide individuals to avoid work-related injuries that they may encounter in their professional lives and to perform their professions smoothly. It is thought that this study will contribute to the current scientific accumulation and production in terms of being a comprehensive source where findings and results can be easily accessed and evaluated for future research on this and similar subjects and filling the gap in this field.

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