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DOES BODY COMPOSITION REFLECT EATING ATTITUDES?

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Abstract

Background: The objective of the study is to examine and identify the relationship between eating attitudes and body composition among university students in nutrition majors versus non-nutrition majors.

Methods: A cross-sectional was conducted among female students at Life University in the United States. Sixty female adult students were recruited from three groups in the following degree programs: the nutrition field, the Doctor of Chiropractic (DC) program, and non-health related majors. Tendency to Diet Scale (TDS) and Eating Attitudes Test 26 (EAT-26) were used to assess eating attitudes. All students were measured (weight, height, % fat mass, and waist circumference (WC)), and body mass index (BMI) and waist-hip ratio (WHR) were calculated.

Results: Although no statistically significant association was found, the prevalence was 10% of nutrition students and 5% of DC students depicting a tendency for EDs, as compared to the students of non-health related programs, who did not depict any occurrence of EDs. First- and second-year students in the DC program and graduate nutrition students were at significantly higher risk of developing EDs (p = 0.038; p = 0.002 respectively). There was a statistically significant association between TDS score, BMI (p = 0.026), and WC (p = 0.027).

Conclusion: There is a relationship between body composition and eating attitudes. Nutrition students had greater prevalence of EDs; graduate nutrition students had significantly higher mean of EAT-26 scores, and healthier body composition than undergraduate nutrition students.

Keywords: Body composition, Eating disorder, Nutrition students.

1. Introduction

Eating Disorders (EDs) are a group of mental and physical illnesses that can influence individuals from every age, gender, ethnicity, and socioeconomic group, and that result in altered consumption or absorption of food, such as anorexia and bulimia nervosa (Erskine, *et al.,* 2016). However, disorder behavior eating (DBE) represents a range of irregular and abnormal eating behaviors that do not warrant a diagnosis of particular EDs (Academy of Nutrition and Dietetics, 2018). DBE, such as binge eating and restrictive eating, emotional eating, overeating, strict eating, and controlling body weight and shape through inappropriate compensatory behaviors are all risk factors for EDs (Quick, *et al.,* 2013). Abnormal eating behavior using unhealthy weight control methods, such as eating very little food, skipping meals, and taking diet pills, has increased among students in universities (Rouzitalab, *et al.,* 2015). A higher prevalence of EDs is noted in females than in males. According to Yu, et al., (2016), female college students had a higher prevalence of EDs: 11.6 %compared to male college students at 5.7%.

The prevalence of restrictive eating has been demonstrated in dietetic students from various countries, such as Brazil, Portugal, Germany, and South Africa (Korinth, *et al.*, 2010; Bo et al., 2014; Poínhos et al., 2015; Kassier *et al.*, 2014). Research evaluating the relationship between eating attitudes and body composition measures in dietetic students in the United States is limited (Geitz, 2016). Studies that did assess eating attitudes found that dietetic students are more likely to have higher prevalence of EDs in comparison to other non-dietetic majors (Poínhos, *et al.*, 2015; Kassier, *et al.*, 2014). Another study also showed undergraduate dietetic students had low mean of body mass index (BMI) and higher prevalence of eating concerns than non-dietetic undergraduate students. It suggests that increased risks for dietetic students may be because of their knowledge of food, weight control, or obsessions related to body image (Ozenoglu, *et al.*, 2015). However, increasing nutrition knowledge in dietetic students may have a positive influence on eating attitudes and body composition (Kassier *et al.*, 2014). Students in the nutrition programs had higher physical activity, dietary fiber intake, and lower total fat and saturated fat intake than students in non-health programs (Mealha, *et al.*, 2013).

Therefore, evaluating eating attitudes and body composition in dietetic students versus non-dietetic students using simple and valid scales will provide insight into early detection between these components, which may be useful in preventing the developing of EDs in this population.

Primary Scientific Research Questions

•What is the prevalence of EDs among university students?

•Do nutrition students have a high risk of EDs in comparison to students in other departments?

•Do graduate nutrition students have a high risk of EDs in comparison to undergraduate nutrition students?

•Is there a relationship between eating attitudes and body compositions?

•What is the difference in body composition between students in nutrition majors versus the other majors?

Method

A cross-sectional study was carried out during the fall quarter of 2018 at Life University in the United States that aimed to identify the relationship between eating attitudes and body composition among students in both undergraduate and graduate nutrition majors versus non-nutrition majors.

Participants

The study included 60 female adult students (20 students in each group) who were age 18 and over were recruited from three groups in the following degree programs: the nutrition field, the DC program, and non-health related majors (e.g., business, biology, and psychology programs). Students younger than 18 years, male students, students from other mentioned programs, and students who were pregnant were excluded from the study.

Instruments and Procedures

Students were asked to complete a demographic questionnaire to obtain information about age, study year or level, and study major. Students were asked also to complete the following validate questionnaires to assess their eating attitudes: Tendency to Diet Scale (TDS) and Eating Attitudes Test 26 (EAT-26) questionnaires.

Tendency to Diet Scale (TDS). TDS is a self-report, self-assessment, and descriptive term for 15 attitude and behavior questions. The TDS is related to attitudes and behaviors that are particularly related to dieting. The higher scores indicate a greater tendency to diet. The TDS is considered a valid and reliable scale (Cronbach's alpha= .79) (Jeor, 1997). TDS used commonly among group of Ohio State University researchers, and used with a study that assessed the eating attitudes and body composition with dietetic students at Ohio State University (Geitz, 2016).

Eating Attitudes Test 26 (EAT-26). The EAT-26 scale measure to determine EDs, but it is not designed to make a diagnosis of EDs. The EAT-26 scale has three subscales with 26 questions: Dieting, Bulimia and Food Preoccupation, and Oral Control. Each question has six choices with a corresponding point value: always (3), usually (2), often (1), sometimes (0), rarely (0), and never (0). The total score of EAT-26 equals the sum of scores for the 26 items. A score of equal to or more than 20 is defined as being characteristic of EDs (Garner, *et al.*, 1982). EAT-26 scale used in different studies to assess EDs (Kassier, *et al.*, 2014; Barnard, 2016; Saleh, *et al.*, 2018).

Body composition was assessed by using a calibrated scale for the measurement of weight to the nearest 0.1 kg and measuring tape to measure waist and hip circumferences. Waist-hip ratio (WHR) was calculated, and bioeleectrical impdance analyzer was used to assess fat percentage. Height without shoes was measured using a wall-mounted stadiometer to the nearest 0.5 cm. BMI was calculated as kg/m2.

Ethical Approval

This study was approved by IRB. Participants signed an informed consent form after being informed of the nature and scope of the study. Students were asked to complete the questionnaires EAT-26 and TDS to assess their eating attitudes.

Statistical Analysis

The quantitative variables were described by mean, median, mode, deviation standard, minimum and maximum; absolute and relative frequencies were calculated for the qualitative variables. Associations between categorical independent variables were performed by Chi-square test, Pearson correlation t test and Coefficients regression analysis to facilitate comparison between the groups. All analyses were performed using SPSS and Microsoft Office Excel. $p < 0.05$ considered statistically significant.

Results

The mean of demographic data and anthropometric measurements of participants among 60 female students in three different programs (DC, nutrition, and non-health related programs) are reported in Table 1. The students had normal mean of BMI, no risk of WC, low risk of WHR, and average fat mass percentages. Nutrition students had the lowest mean of body weight (129.5 ±22.5) and BMI (23.2 ± 3.29) according to world health organization criteria, which outlines that a person's normal BMI should be between 18.5-24.9 kg/m2, compared to the other programs.

Table 1

Mean of Demographic Data and Anthropometric Measurements of Students in Three Programs

Program	Number of Participants	**Mean ± Standard deviation**						
		Age	Weight (lb)	Height (Inch)	BMI	WC	WHR	Fat%
DC	20	26.3 ±6.89	151 ±28.0	65.3 ±4.68	24.7 ±5.15	32.4 ±0.65	0.78 ±0.06	25.1 ±6.70
Nutrition	20	28.7 ±6.70	129.5 ±22.5	63.1 ±4.08	23.2 ±3.29	30.3 ±3.53	0.78 ±0.07	26.1 ±0.14
Non- Health Related	20	21.2 ± 4.10	143 ± 25.6	65.4 ±2.76	24.2 ±3.98	29.7 ±3.80	0.76 ±0.07	25.1 ±6.10
Total	60	25.4 ±6.64	141 ±26.6	64.6 ±3.96	24.1 ±4.19	30.8 ±4.12	0.78 ±0.07	25.4 ±6.22

Values are reported as mean±SD. Abbreviations: BMI: Body Mass Index, DC: Doctor of Chiropractic, WC: Waist Circumference, WHR: Waist-Hip Ratio

The comparison of EAT-26, TDS, and body composition measurements between the three programs is depicted in Table 2. Nutrition students had a little lower mean of EAT-26 score (6.85) and a lower mean of BMI (23.2), along with a little higher mean of fat mass percentage (26.1) than DC and non-health program students. DC students had a little higher mean of TDS than nutrition and non-health program students, but non-health program students showed a little lower mean of WC (29.7) and WHR (0.76). However, there were no statistically significant differences in the comparison of EAT-26, TDS, and body composition measurements between students in the three groups of degrees.

The prevalence of EDs among students that were randomly selected from three different majors is reported in Table 3. Although there were no statistically significant differences between students in the three groups of degrees and the EAT-26 total score ($p = 0.349$), 5% of students were identified with EDs from the three programs. Five percent were identified with EDs in DC students, 10% of nutrition students indicated with EDs, and no students were identified with EDs in non-health related majors. Comparison of EAT-26 and TDS scores between the three groups of different majors are reported in Table 8. There was a highly statistically significant association between EAT-26 and TDS ($p = 0.000$), which is < 0.01. The results indicate students in all groups had much greater tendency to diet. Moreover, the correlation between EAT-26 and total TDS scores are depicted in Table 9. The domain of correlation helps to define the statistical relationship between two variables. The result found that there was a negative correlation between EAT-26 and TDS scores, which indicated there is an inverse association between two variables, EAT-26 scores decrease, TDS scores increase. The result was not statistically significant association exist between the features of EAT-26 and TDS scores.

Table 2

Comparison of EAT-26, TDS, and Body Composition Measurements between the Three Programs

Variable		N	Mean±Std. Deviation	Std. Error	*p*- Value
EAT-26 Score	DC	20	7.25±8.78	1.96	NS(0.962)
	Nutrition	20	6.85±9.24	2.06	
	Non-Health Program	20	7.55±5.18	1.16	
	Total	60	7.22±7.81	1.01	
TDS	DC	20	32.4±3.39	0.75	NS(0.144)
	Nutrition	20	31.5±3.06	0.68	
	Non-Health Program	20	30.3±3.49	0.78	
	Total	60	31.4±3.38	0.43	
BMI of Student	DC	20	24.7±5.15	1.15	NS(0.472)
	Nutrition	20	23.2±3.28	0.73	
	Non-Health Program	20	24.2±3.97	0.89	
	Total	60	24.1±4.19	0.54	
WC of Student	DC	20	32.4±4.65	1.04	NS(0.088)
	Nutrition	20	30.3±3.52	0.78	
	Non-Health Program	20	29.7±3.79	0.85	
	Total	60	30.8±4.12	0.53	
WHR of Student	DC	20	0.77±0.06	0.01	NS(0.716)
	Nutrition	20	0.78±0.07	0.02	
	Non-Health Program	20	0.76±0.07	0.02	
	Total	60	0.77±0.06	0.01	
Fat %	DC	20	25.1±6.69	1.49	NS(0.816)
	Nutrition	20	26.1±6.14	1.37	
	Non-Health Program	20	25.1±6.07	1.35	
	Total	60	25.4±6.22	0.80	

Values are reported as mean±SD and analyzed by chi-square test. Abbreviations: BMI: Body Mass Index, DC: Doctor of Chiropractic, EAT-26: Eating Attitudes Test 26,NS; Not Statistically Significant (*p*= >0.05),TDS: Tendency to Diet Scale, WC: Waist Circumference, WHR: Waist-Hip Ratio

Table 3

Prevalence of Eating Disorders (EDs) between Students in the Three Majors

EAT-26 Score	DC %(n)	Nutrition %(n)	Non-Health Programs %(n)	Total %(n)	*p*- Value
EAT < 19 (Normal)	95%(19)	90%(18)	100%(20)	95%(57)	0.349(NS)
EAT ≥ 20 (Eating disorder)	5.0%(1)	10%(2)	0.0%(0)	5.0%(3)	
Total	100%(20)	100%(20)	100%(20)	100%(60)	

Values are analyzed by chi-square test. Abbreviations: DC: Doctor of Chiropractic, EAT-26: Eating Attitudes Test 26, NS; Not Statistically Significant (p= >0.05).

Further analysis of EAT-26 and TDS comparisons between students in different years are reported in Table 4. The mean of EAT-26 score in the first- and second-year DC students was significantly higher than third- and fourth-year students ($p = 0.038$) . However, the mean of TDS scores in the DC students in different years was not significant. In the nutrition students, the mean of graduate students was highly significant compared to undergraduate students ($p = 0.002$) , while the TDS did not show significant differences between the nutrition students. The mean of EAT-26 and TDS scores in non-health related major students in different years did not show statistical significance.

The comparison of BMI categories between the three majors (DC, nutrition, and non-health related majors) is illustrated in Table 5. Nutrition students had 75% of normal BMI and no obesity was identified, compared to 65% of normal BMI and 15% obesity in DC students and students in non-health related programs. However, there was no statistical significance found between the groups ($p = 0.501$).

Most of the students (68.3%) in the three groups were in the normal category of BMI, and only 15% of the students were obese. The cardio-metabolic risk according to waist circumference (WC) in the various degree programs is reported in Table 6. The majority of students (63.3%) were not at risk. Among the groups, 65% of students in nutrition and non-health related programs and 60% of DC students were not at risk. The results showed no statistical significance between the groups ($p = 0.931$). Further analyses about the comparison of the body composition measurements between students in different majors are explained. The classifications and comparisons of WHR among the three majors are illustrated in Table 7. The results show that there was no statistical significance found between the groups ($p = 0.908$). The majority of students (65%) in the groups were in the low category of WHR. Non-health related program students were the majority that had the lowest category (70%), followed by nutrition students at 65% and DC students at 60%. Fifteen percent of nutrition students had high WHR compared to 10% of students from DC and non-health related majors. The comparison of fat mass percentage between the three programs is illustrated in Table 8. Around half of the students in the three programs had ≤24% fat mass, which indicated that 51.7% students were fitness participants. Among the groups, 50% of nutrition and non-health related major students had ≤24% fat mass, compared to 55% of

DC students. Obese students who had ≥32% of fat mass were observed more in non-health related majors (25%), in contrast to DC and nutrition students, which were 15% . No significant differences were found in fat mass percentages among the three groups (p = 0.890).

The correlation between body composition measurement, EAT-26, and TDS scores between the participants in the three groups are illustrated in Table 9. Although there was no significant correlation between EAT-26 and body composition measurements, there were small correlations found in BMI (0.13; p = 0.924), WC (32; p = 0.811), and WHR (0.118; p = 0.367). The results showed a significant correlation between TDS and BMI (0.287; p = 0.026), and in WC (0.286; p =0.027). TDS showed a small correlation in fat mass percentage (0.199), but the correlation was not significant (p = 0.127)

Comparisons of body composition between the groups of students in different years are estimated. Comparisons of body composition between DC students in different years are reported in Table 10. The first- and second-year group and the third- and fourth-year group of DC students had a significant association in BMI (p = 0.049) and in WC (p = 0.05).

The BMI of third- and fourth-year DC students were normal (22.3) and lower in WC (30.6) compared to first- and second-year of DC students, which were overweight (=26.4) and higher in WC (33.6). The comparison of body composition between undergraduate and graduate nutrition students are illustrated in Table 11. The graduate students had a lower mean of BMI (22), WC (29), and fat percentage (24) than undergraduate students. However, the results of nutrition students did not show any significant association in body composition measurements between undergraduate and graduate students. The last group of body composition comparisons between students in different years is non-health related majors (see Table 12). There was a significant association between BMI and the first- and second-year and third and fourth-year students from non-health related majors (p=0.033). The third- and fourth-year students from non-health related majors had a lower mean of BMI (23.2) and fat (23%) than the first- and second-year students. Although there no statistical significance was found, first- and second-year students had a lower mean of WC (29.4) and WHR (0.75) than third- and fourth-year students in non-health related majors.

Table 4

Comparison of EAT-26 and TDS between Students in Different Years

Program	Variable	Year	N	Mean±Std. Deviation	*p*- Value
DC	EAT-26 Score	Year 1 and 2	12	9.08±10.8	*S(0.038)
		Year 3 and 4	8	4.50±3.25	
	TDS Score	Year 1 and 2	12	32.0±3.74	NS(0.863)
		Year 3 and 4	8	33.0±2.92	
Nutrition	EAT-26 Score	Undergraduate	9	1.89±1.69	**HS(0.002)
		Graduate	11	10.9±10.9	
	TDS Score	Undergraduate	9	30.0±3.46	NS(0.414)
		Graduate	11	32.7±2.14	
Non-health	EAT-26 Score	Year 1 and 2	16	7.19±5.20	NS(0.0660)
		Year 3 and 4	4	9.00±5.59	
	TDS Score	Year 1 and 2	16	30.8±3.46	NS(0.514)
		Year 3 and 4	4	28.0±2.94	

Values are reported as mean±SD and analyzed by chi-square test. Abbreviations; DC: Doctor of Chiropractic, EAT-26: Eating Attitude Test 26, **HS: Highly statistically significant ($p = < 0.01$), * statistically significant ($p = < 0.05$), TDS: Tendency to Diet Scal

Table 5

Classification and Comparison of BMI

BMI Category	DC %(n)	Nutrition %(n)	Non-Health Programs %(n)	Total %(n)	*p*- Value
Normal	65%(13)	75%(15)	65%(13)	68.3%(41)	0.501(NS)
Overweight	20%(4)	25%(5)	20%(4)	21.7%(13)	
Obese	15%(3)	0%	15%(3)	10%(6)	
Total	100%(20)	100%(20)	100%(20)	100%(60)	

Values are analyzed by chi-square test. Abbreviations: BMI: Body Mass Index, DC: Doctor of Chiropractic, NS; Not Statistically Significant (*p*= >0.05).

Table 6

Cardio-Metabolic Risk According to Waist Circumference in the Various Degrees

Waist circumference	DC %(n)	Nutrition %(n)	Non Health Programs %(n)	Total %(n)	*p*- Value
No Risk	60.0%(12)	65%(13)	65%(13)	63.3%(38)	0.931(NS)
Risk	40.0%(8)	35.0%(7)	35.0%(7)	36.7%(22)	
Total	100%(20)	100%(20)	100%(20)	100%(60)	

Values are analyzed by chi-square test. Abbreviations: DC: Doctor of Chiropractic, NS; Not Statistically Significant (*p*= >0.05).

Table 7

Cardio-Metabolic Risk According to Waist-Hip Ratio in the Various Degrees

Waist-Hip Ratio	DC %(n)	Nutrition %(n)	Non-Health Programs %(n)	Total %(n)	*p*- value
Low	60%(12)	65.0%(13)	70%(14)	65%(39)	0.908(NS)
Moderate	30%(6)	20%(4)	20%(4)	23.3%(14)	
High	10%(2)	15.0%(3)	10.0%(2)	11.7%(7)	
Total	100%(20)	100%(20)	100%(20)	100%(60)	

Values are analyzed by chi-square test. Abbreviations: DC: Doctor of Chiropractic, NS; Not Statistically Significant (p= >0.05).

Table 8

Classification and Comparison of Fat Mass Percentages

Fat%	DC %(n)	Nutrition %(n)	Non-Health Programs %(n)	Total %(n)	*p*- value
≤24%	55%(11)	50%(10)	50%(10)	51.7%(31)	0. 890 (NS)
25-31%	30%(6)	35%(7)	25%(5)	30%(18)	
≥32%	15%(3)	15%(3)	25%(5)	18.3%(11)	
Total	100%(20)	100%(20)	100%(20)	100%(60)	

Values are analyzed by chi-square test. Abbreviations: DC: Doctor of Chiropractic, NS; Not Statistically Significant (p= >0.05).

Table 9

Correlation between Body Composition Measurements, EAT-26, and TDS Scores

	EAT-26	*p*-value	TDS	*p*-value
BMI	0.13	NS (0.924)	0.287	*S(0.026)
WC	0.32	NS (0.811)	0.286	*S(0.027)
WHR	0.118	NS (0.367)	0.085	NS (0.520)
Fat %	-0.028	NS (0.834)	0.199	NS (0.127)

Values are analyzed by Pearson Correlation. Abbreviations: BMI: Body Mass Index, EAT-26: Eating Attitudes Test 26,NS; Not Statistically Significant (p= >0.05), * Statistically significant (p= < 0.05), TDS: Tendency to Diet Scale, WC: Waist Circumference, WHR: Waist-Hip Ratio.

Table 10

Comparison of Body Composition between DC Students in Different Years

DC	Year	N	Mean±Std. Deviation	*p*- Value
BMI of Student	Year 1 and 2	12	26.4± 5.77	*S(0.049)
	Year 3 and 4	8	22.3± 2.84	
WC of Student	Year 1 and 2	12	33.6±5.22	*S(0.05)
	Year 3 and 4	8	30.6±3.06	
WHR of Student	Year 1 and 2	12	0.79±0.07	NS(0.187)
	Year 3 and 4	8	0.75±0.04	
Fat %	Year 1 and 2	12	26.6±7.43	NS(0.303)
	Year 3 and 4	8	22.6±4.88	

Values are reported as mean±SD and analyzed by chi-square test. Abbreviations: BMI: Body Mass Index, DC: Doctor of Chiropractic, NS; Not Statistically Significant (p= >0.05), * Statistically significant (p= < 0.05), WC: Waist Circumference, WHR: Waist-Hip Ratio.

Table 11

Comparison of Body Composition between Undergraduate and Graduate Nutrition Students

Nutrition	Program levels	N	Mean±Std. Deviation	*p*- Value
BMI of Student	Undergraduate	9	24.4±3.59	NS(0.373)
	Graduate	11	22.1±2.71	
WC of Student	Undergraduate	9	31.5±4.30	NS(0.204)
	Graduate	11	29.3±2.50	
WHR of Student	Undergraduate	9	0.76±0.08	NS(0.479)
	Graduate	11	0.79±0.06	
Fat %	Undergraduate	9	28.5±7.20	NS(0.361)
	Graduate	11	24.2±4.59	

Values are reported as mean±SD and analyzed by chi-square test. Abbreviations: BMI: Body Mass Index, NS; Not Statistically Significant (*p*= >0.05), WC: Waist Circumference, WHR: Waist-Hip Ratio.

Table 12

Comparison of Body Composition between Non-Health Related Programs Students in Different Years

Non-health	Program levels	N	Mean± Std. Deviation	*p*-Value
BMI of Student	Year 1 and 2	16	24.4± 4.36	*S(0.033)
	Year 3 and 4	4	23.2± 1.82	
WC of Student	Year 1 and 2	16	29.4± 4.10	NS(0.112)
	Year 3 and 4	4	31.0± 2.16	
WHR of Student	Year 1 and 2	16	0.75± 0.07	NS(0.362)
	Year 3 and 4	4	0.81± 0.03	
Fat %	Year 1 and 2	16	25.6±6.23	NS(0.764)
	Year 3 and 4	4	23.0±5.62	

Values are reported as mean±SD and analyzed by chi-square test. Abbreviations: BMI: Body Mass Index, NS; Not Statistically Significant (*p*= >0.05), * Statistically significant (*p*= < 0.05), WC: Waist Circumference, WHR: Waist-Hip Ratio.

Disscution

The research study compared the prevalence of EDs among the students from three different fields: the DC program, non-health related programs, and nutrition programs. The results depicted that there were no statistically significant differences among EDs of the students from the three programs. However, 10% of nutrition students and 5% of DC students depicted the tendency of EDs, as compared to the students in non-health related programs, who did not depict any occurrence of EDs. Kassier, *et al.,* (2014) provides justification of lower-occurrence of EDs among students in non-nutrition programs, who are less conscious about their body mass and weight. They found 33% of dietetic students had EDs compared to 16% of non-dietetic students.

The research study also compared the EAT-26 and TDS of the students from the first to the fourth year of the DC and non-health related, and undergraduate and graduate nutrition programs. EAT-26 score of the nutrition program students is more highly significant ($p=0.002$) than that of the DC program students ($p=0.038$). Moreover, the mean score of EAT-26 in the first- and second-year students of the DC program was higher and statistically was significant as compared to the third- and fourth-year students ($p=0.038$). In the case of nutrition students, the mean of EAT-26 score of graduate students was higher and highly statistically significant as compared to that of undergraduate students ($p=0.002$). Rocks, *et al.,* (2016) provided the insight that students enrolled in nutrition programs experience a change, which is usually positive, in their eating attitudes and diet tendencies, which is the main reason for the highly significant score depicted by nutrition students. The research also supported the point of view that nutrition programs help students to amend their eating attitudes and diet tendencies as they learn about nutritional needs, keeping in balance nutritional intakes, maintaining BMI, and developing a healthy body image.

Another aspect explored by the research study was the comparison of the BMI score .The results revealed that the nutrition students had 75% normal BMI, as compared to students of the other two groups. On the other hand, the nutrition students did not

reveal any tendency of obesity, which was found at a lower rate (15%) among the students of non-health related and DC programs.

The overall comparison of students of three different programs in the BMI category was not statistically significant. Kolka, *et al.*, (2012) supported the study in that it also revealed the majority numbers of normal BMI score were found among the nutrition students; however, it also revealed the satisfaction of the students with that, as they wanted to become leaner. This also provides insight about the lack of obesity among nutrition students, as they are more concerned about their image and health compared to the students in other programs.

For fat mass percentage, 25% of students belonging to the non-health related programs were obese, compared to 15% of the students in other programs. Yahia, *et, al.*, (2016) highlighted the point that knowledge about nutrition and diet decreases the tendency of health issues, such as fat mass among the students of dietetic programs. On the other hand, the fat mass percentage among non-health related students is higher as they do not have advanced knowledge about the matter and show less concern about their health, in comparison to nutrition students.

The research study also compared the body composition and. The research study compared the correlation of body composition measurement along with EAT-26 and TDS scores, which highlighted that the correlation between EAT-26 and body composition measurement was not statistically significant; however, it was statistically significant in the case of TDS score with BMI and WC. Rouzitalab, *et al.*, (2015) studied the relationship between disordered eating attitudes and body composition indices in college students. They noted some body composition measurements such as BMI and central obesity indices were correlated with the increase of disordered eating attitude.

The research study conducted the comparison of undergraduate and graduate students in nutrition programs. Graduate students had a lower mean of the body composition measurements than undergraduate students. However, the results highlighted not

statistically significant association between BMI, WS, WHR, and fat percentage. Kassier, *et al.*, (2014) supported the point that dietetic students become more concerned about their eating attitudes, health, and body mass index as they get to know the concepts in detail and try to apply them to their lives. The DC program students highlighted that third- and fourth-year students had lower mean of BMI and WC and were statistically significant in BMI (p=0.049) and WS (p=0.05).

Also, the mean fat percentages of the third- and fourth-year students were lower as compared to those of first- and second-year students, but there was no statistical significance found. The mean of BMI of third- and fourth-year students in non health programs were lower than first- and second-year students and were statistically significant (p=0.033). However, there were no statistically significant differences found in WC, WHR, and fat mass percentages among the students. Vadeboncoeur *et al.*, (2015) supported that first-year college students are at high risk of gaining fat mass. The transition from high school to college is a critical period for establishing health-related behaviors, such as unhealthy eating and poor physical activity.

The strength of this study is including graduate nutrition students that have advanced knowledge about food and nutrition. Also, this study included DC students that are part of health-related program, and they focus more on healthy diet and healthy lifestyles than on using medications. This study has limitations that need to be mentioned. The descriptive nature of cross sectional study is a clear limitation. The study included small sample sizes and recruited only female participants because there were not enough male students in nutrition programs. These results may not reflect eating attitudes among students since the participants were recruited from one university. The measurement of bioelectrical impedance is affected by body hydration status. Also, the scales used in this study to assess EDs cannot provide an accurate diagnosis, and the lack of experts in mental health assessment made the study valuable only as an initial screening method.

Conclusions

There is a relationship between body composition and eating attitudes. Nutrition students showed a high prevalence EDs compared to students from other degree programs. The graduate nutrition students had significantly higher mean of EAT-26 scores and healthier body composition than undergraduate nutrition students, which may be related to the effect of advanced knowledge about diet and health that graduate students had. First- and second-year DC students had had significantly higher mean of EAT-26 scores and higher body composition than third- and fourth-year DC students. The research study provided the insight that the students in the DC program and nutrition programs are more concerned about their nutrition and body composition as compared to the students in the non-health related programs. Moreover, the DC program and nutrition program students had the chance to improve their knowledge, becoming more aware of the impact of nutrition on body composition and health. Future research is needed to assess eating attitudes and body composition in nutrition students versus non-nutrition majors includes genders, marital status, and ethnicity across the country in different universities and in other countries.

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