Factors associated with body weight and desire to lose weight among college women

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Executive Summary

Maintaining proper body weight and shape has become a prevailing social and health concern to young women in the United States, Europe and other developed countries. Survey data from participating 116 college women in the Ohio Stated University were analyzed to determine the factors related to the current body weight and desire to lose/gain body weight. Height, weight, age, major, nutrition attitude, attitude toward physical activity, knowledge of nutrition, knowledge of physical activity, self esteem, body satisfaction---overall and in parts, body image, eating attitude, self efficacy---diet, self efficacy---physical activity, desire to lose/gain weight, cigarette use, ethnicity were examined.

In summary, it is found that four factors: height, total score of nutrition attitude, discrepancy score---- the difference in the body image scales between current weight and what's attractive to peers, difference between current weight and what's considered proper from family are related to the body weight using multiple regression method. Further more, four factors: total score in physical activity attitude, knowledge of physical activity, eating attitude, the difference between current body weight and what's most attractive to peers were found to the related to the desire to lose/ gain weight using logistic regression method.

Data Description and Demographic Information

The questionnaire consisted of six parts, 91 questions.
I.   Personal description (height, weight, age, major, ethnicity)
II.   Knowledge and Opinion (28 questions)
III.   Body imagine/Satisfaction (19 questions)
IV.   Eating attitude (26 questions)
V.   Self Esteem (9 questions)
VI.   Exercise activity (4 questions)

The participants were assured that their responses were both voluntary and anonymous. The outcome variables for Part II: Knowledge and Opinion & Part III: Body Satisfaction were Strongly Disagree, Disagree, Uncertain, Agree and Strongly Agree towards 28 statements, which were assigned as score 1 – 5, and total scores were calculated. Total score for eating attitude was calculated based on the responses (always, very often, often, sometimes, rarely, never) by assigning them to score 1 – 6. Self Esteem total score was based on the Rosenberg scales (0 – 4).

Table 1. Demographic characteristics of study population

	N	%
Major		
1	54	46.5
2	55	47.4
3	3	2.6
No answer	4	3.4
Ethnicity		
Caucasian	103	88.8
African American	6	5.2
Asian	3	2.6
Hispanic	1	0.9
Other	3	2.6
Desire to lose weight		
Yes	33	28.5
No	83	71.5
Cigarette use		
No	90	77.6
< 10 /day	8	6.9
11-20 /day	11	9.5
21-30/day	5	4.3
31-40/day	2	1.7

Data Analysis and Results

Table 2. Descriptive Statistics

Variable	N	N*	Mean	Median	StDev	Min	Max
Ht (cm)	114	2	165.38	165.10	6.49	152.40	185.40
Wt (kg)	113	3	61.85	59.10	10.83	45.50	120.50
Age	116	0	21.388	20.00	3.815	18.00	41.00
Sum(NA)	116	0	17.733	18.00	2.935	12.00	25.00
Sum(NK)	115	1	29.339	29.00	2.856	23.00	35.00
Sum(PA)	116	0	19.129	19.00	2.528	14.00	25.00
Sum(PK)	115	1	19.939	20.00	2.100	15.00	26.00
Sum(Self Est)	116	0	19.069	19.00	2.508	13.00	25.00
Sum(BS-overall)	116	0	16.750	17.00	3.257	10.00	23.00
Sum(BS-part)	114	2	28.711	29.50	5.304	14.00	45.00
Sum(Self Deit)	116	0	15.267	16.00	3.031	7.00	20.00
Sum(Self Act)	116	0	18.328	19.00	3.813	8.00	25.00
Wt-Peer	108	8	1.880	2.00	1.194	-1.00	5.00
Wt-Ideal	116	0	1.478	1.00	1.100	-1.00	5.00
Wt-Family	106	10	0.892	1.00	1.252	-1.00	5.00

Note: There is no imputation for the missing data when we do the analysis since we think we have large enough sample size and relative small portion of the missing data.

Data Analysis and Results

1. a) Factors related to body weight
We use Minitab to do the multiple regressions in order to determine the factors related to the body weight. 11 factors were of interests initially, including: height, total score of Nutrition attitude (NA), Nutrition Knowledge (NK), Physical activity attitude (PA), Physical activity Knowledge (PK), Body Satisfaction – overall (BSO), Body Satisfaction – parts (BSP), Current weight – Ideal Weight, Current Weight – attractive to peers, Current Weight – attractive to family, Eating Attitude (EA). Two selection methods (best subsets, step-wise selection: backward, forward, mixed) were used to select suitable explanatory variables related to body weight. Also, an outlier of weight 120.50 kg is excluded from the study. At a   level = 0. 20, we included fours factors as our predicting variables. These 4 factors are: Wt-family (p-value = 0.001), Height(p-value = 0.008), NA (p-value = 0.128) and Wt-peer (p-value = 0.166). The corresponding regression model is:

  Wt (kg) = - 6.9 + 0.338 Ht (cm) + 0.406 Sum(NA) + 1.60 Wt-Peer + 3.52 Wt-Family

There were 14 cases containing missing value in at least one of the 5 variables, thus 102 cases were used in fitting this model. The R-sq is 40.0%, and adjusted R-sq is 37.5%. (The R-sq is 42.2% when including all 11 factors, and adjusted R-sq is 34.4%)
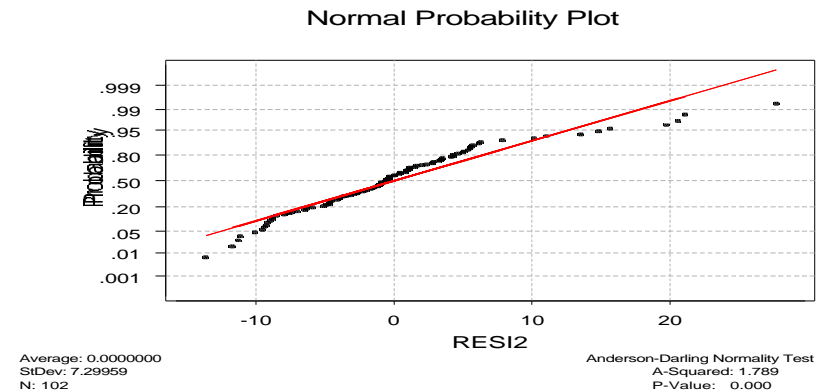

FIGURE.1

b) Factors related to Desire to Lose Weight
Since the dependent variable here is dichotomous in this question, to find which factors are related to one's desire to lose weight, we found that it is appropriate to run a logistic regression. Three selection methods (step-wise selection, backward elimination, and forward selection) provided by SAS in Proc Logistic were used to select suitable explanatory variables in the model. Considering that the independent explanatory variables are

continuous, we use Hosmer and Lemeshow's test to check the model's goodness-of-fit. The final model was selected based on goodness-of-fit test and its predictive ability. The final fitted model is:

$$In \frac{p}{1-p} = -2.13 + 0.368 \ PhyAtt - 0.309 \ PhyKn$$

$$+ 0.164 \ EatAtt + 0.870 \ CurPeers$$

Where: *p* is the probability that one wants to lose weight; *PhyAtt* one's physical activity attitude; *PhyKn* one's physical activity knowledge; *EatAtt* one's eating attitude; and *Curpeers* one's discrepancy score between current weight and that attractive to peers.

The odds ratios from unit changes of each explanatory variable could be obtained by taking exponent of corresponding coefficient. To see how well the model will discriminate between those who want to lose weight and those who do not, receiver operating characteristic (ROC) curve was plotted below:
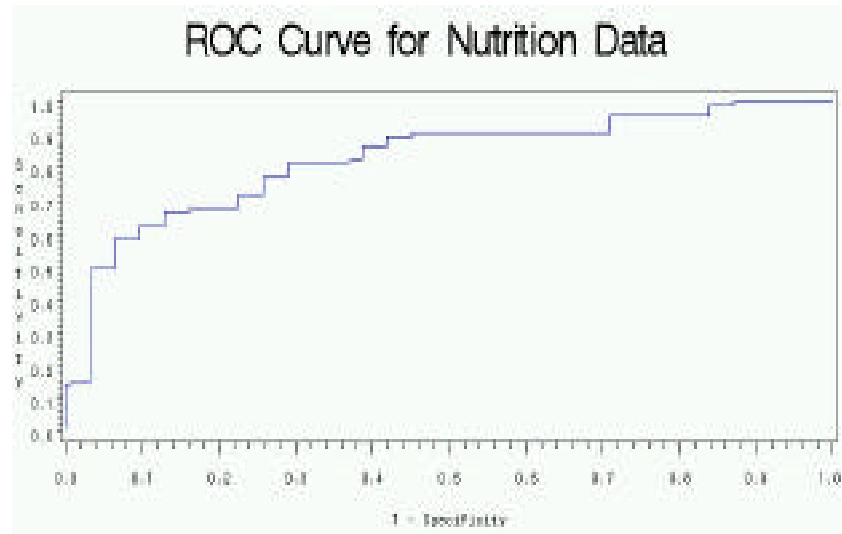

FIGURE 2.

ROC Curve from the logistic regression model.

The area under ROC curve is a measure of discrimination. It is a measure of the likelihood that one who wants to lose weight will have a higher probability than one who does not. In general, a model with an area under ROC curve greater than 0.8 has an excellent discrimination. In this model, the area is 0.828, which indicates that this model has an excellent discrimination.

2.   Correlation
Correlations between NA, NK, PA, PK and dietary self-efficacy, physical activity self-efficacy were studied. The correlation matrix plot is as below:

	Sum(NA)	Sum(NK)	Sum(PA)	Sum(PK)	Sum(Self Diet)
Sum(NK)	0.177				
	0.058				
Sum(PA)	0.463	0.244			
	0.000*	**0.008***			
Sum(PK)	0.060	0.268	0.159		
	0.526	**0.004***	0.090		
Sum(S Diet)	0.284	0.211	0.309	0.129	
	0.002*	**0.023***	**0.001***	0.168	
Sum(S Act)	0.253	0.169	0.572	0.118	0.456
	0.006*	0.071	**0.000***	0.209	**0.000***

Cell Contents: Pearson correlation and P-Value
Bond letter and * indicates significant correlation at   level
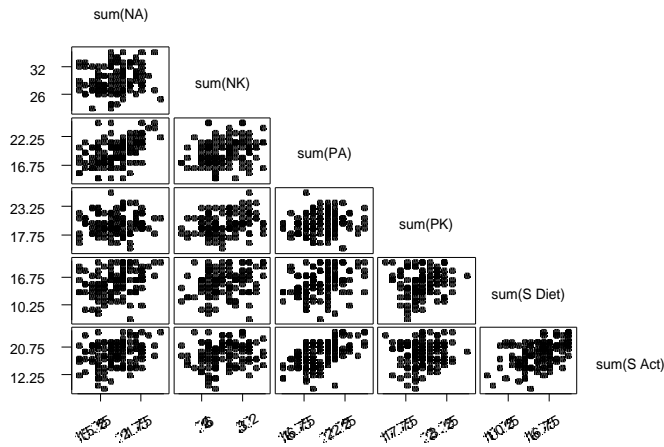= 0.05.

Figure 3.

Correlation Matrix: NA, NK, PA, PK, Self Diet, Self Act.

The plot matrix and the correlation matrix indicate that there were strong correlation between knowledge of nutrition and knowledge of physical activity; between attitude toward nutrition and attitude toward physical activity; between nutrition knowledge and attitude toward physical activities; between dietary self-efficacy and physical activity self-efficacy; between both self-efficacy and Nutrition and physical activity attitude; between dietary self-efficacy and nutrition knowledge. And because these factors were highly correlated, including some factors in the regression model would exclude the others from entering the regression model.

Concluding Remarks

Of the 116 college women who answered the survey questionnaire, 83 (71.5%) express the desire to lose weight, 33 (28.5%) want to remain the current body weight, and nobody wants to gain weight.

Fours factors were found to be strongly related to the body weigh: a) height; b) total score of nutrition attitude; c) discrepancy score---- the difference in the body image scales between current weight and what's attractive to peers; d) difference between current weight and what's considered proper from family.

Furthermore, we try to determine what factors make the women want to lose weight and four factors were found to be strong related to one's desire to lose weight: a) Physical activity attitude; b) Physical activity knowledge; c) Eating attitude; and d) comparison between one's current weight and that most attractive to peers.

Reference:

Allaz Anne-Francoise, Bernstein Martine et al. (1998), "Body Weight Preoccupation in Middle-Age and Ageing Women: A General Population Survey," International Journal of Eating Discord 23: 287~94.

Taylor Barr C., Sharpe Tamara et al., (1998), "Factors Associated with Weight Concerns in Adolescent Girls," International Journal of Eating Discord 24: 31~42.