

## THE RELATIONSHIP BETWEEN WEIGHT PERCEPTION, GENDER, AND DEPRESSIVE SYMPTOMS AMONG RURAL ADOLESCENTS

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### ABSTRACT

Research findings indicate a relationship between weight perception and depression in adolescents. This study explored the relationship between weight perception, gender, and depressive symptoms in rural adolescents. Among 623 rural adolescents who completed a health inventory and a depression scale, 75 participants (n = 62 females; n = 13 males) had depressive symptoms and were used in data analysis. A two-way ANOVA model was used to evaluate the effects of weight perception and gender on depressive symptoms in rural adolescents. Although the 2-way ANOVA was not significant, there was a statistical significant finding for females who reported perceived weight problems and depression. The interaction between gender and weight perception was of marginal statistical significance (p = 0.07). Females who perceived a problem with their weight had higher depressive scores compared to females who did not perceive a problem with their weight (p = 0.0002), however no difference was observed for males. Implications are for rural nurses to screen adolescents for depressive symptoms and their weight perception during health care visits, with emphasis on females.

### INTRODUCTION

Current evidence demonstrates a strong relationship between a negative weight perception and depressive symptoms in adolescents, even when physical weight is within a normal range (Daniels, 2005; Eaton, Lowry, Brener, Galuska, & Crosby, 2005; Xie et al., 2003). This trend is particularly disturbing considering our nation's obsession with body weight and appearance, especially in the adolescent population.

#### ***Weight Perception***

Numerous studies conclude that there are discrepancies between adolescents' perception of body weight and actual body weight. Cheung, Ip, Lam, and Bibby (2007) surveyed nationally 1,132 adolescents and found that there was poor agreement between body mass index (BMI) and perceived weight in females, and a fair agreement in males. Females were more likely to employ

weight control behaviors, based on their perceived weight, while males used weight control behaviors based on their perceived and actual weights.

Al-Sendi, Shetty, and Musaiger (2004) surveyed Bahraini adolescents (N = 504) to determine relationships between BMI, their perception of self-weight and their perceived opinion of parents and peers about weight. Overweight was more prevalent among the females. Among females, 6.6% perceived themselves as obese, but 20.4% were classified as obese based on their BMI; 3.2% of males perceived themselves as obese, with 16.3% classified as obese by their BMI. For both males and females, there was a statistically significant difference among their perceived and actual weight based on BMI.

### ***Depressive Symptoms***

Research on mental health in rural adolescents reflected that on average 10-12% of youth have depressive symptoms (Puskar, Tusaie-Mumford, Sereika, & Lamb, 1999b; Puskar et al., 2006). The Youth Risk Behavior Surveillance-United States, 2005 (Centers for Disease Control and Prevention, 2006) report 28.5% students nationwide felt sad or hopeless and that the prevalence was greater in females (36.7%) versus males (20.4%). Numerous data sources point to the prevalence of depressive symptoms in adolescents and rural areas (Centers for Disease Control and Prevention, 2006; Probst et al., 2006; Paxton, Valois, Watkins, Huebner, & Drane, 2007; Burns et al., 2004). A longitudinal study was done by Burns et al. (2004) to ascertain depression and risk factors in rural adolescents (N=64). Baseline depression data were related, over time, to the risk factors of tobacco use, substance abuse, and history of physical and sexual abuse.

### ***Weight Perception and Depression***

An emerging body of evidence supports the relationship between weight perception and depression in adolescents. Rierdan and Koff (1997) surveyed 176 young female adolescents to evaluate their self-reported weight, weight categorization, weight satisfaction and weight concerns. Height and weight (BMI) were measured by a school nurse. Subjects with a high objective weight tended to underreport their weight. The higher the BMI, the more dissatisfied they were with their weight and their weight concerns were greater as well. There was no relationship between BMI and depressive symptoms; however, weight satisfaction and weight concerns were significantly correlated with depressive symptoms. A weight concern was a significant independent predictor of depression levels.

Daniels (2005) conducted a secondary analysis of data from the United States Youth Risk Behavioral Surveillance System, 1999 and 2001 data, to identify a relationship between weight, perception of weight, weight management behaviors, and the relationship between these variables and depressive symptoms in over 13,000 students. Depressive symptoms were related to perceived weight and dieting behaviors, while no relationship was found between self reported depressive symptoms and Body Mass Index (BMI). There was a 35% likelihood of depressive symptoms reported by those who perceived themselves as either underweight or overweight. Females were 20% more likely to view their weight as either under or overweight compared to males (Daniels, 2005).

Eaton et al. (2005) explored whether BMI and perceived weight were associated significantly with suicide ideation and suicide attempts. White students who perceived

themselves as very underweight and very overweight were at greater odds of suicide attempt. Regardless of BMI, adolescents with extreme perceptions of body size were at increased risk for suicide ideation and attempts. These authors concluded that perception about weight may be more important than actual weight.

Xie et al. (2003) investigated weight perception and its relationship with psychological distress among 2,179 Chinese adolescents. Perceived overweight was more likely to occur in females. Also, males and females who perceived themselves as overweight were more likely to experience anxiety and depression.

Kim and Kim (2001) determined if BMI and perception of body weight (having a weight problem) predicted self esteem and depression in Korean female adolescents. While only 2.6% of the subjects were overweight, 78.5% desired to be underweight. Perception of having a weight problem (overweight) was predictive of self-esteem and depression.

Ivarsson, Svalander, Litlere, and Nevonen (2006) surveyed 405 Swedish adolescents to assess weight problems and their correlation with BMI, body image, depression, and anxiety. Females were found to have higher scores for depression and anxiety. Females who were overweight had negative self-esteem, compared to males.

Ozmen et al. (2007) conducted a cross-sectional survey of 2,101 Turkish adolescents to examine the effects of weight, perceived weight and body satisfaction on self-esteem and depression. Only 9% of the subjects were overweight. Among females, a higher socioeconomic status was associated with a perception of overweight. Females were also more likely to report dissatisfaction with their bodies.

This literature correlating weight perception, depression and combination of weight perception and depressive symptoms found a troubling pattern with adolescent females. Females reported more dissatisfaction with their perceived weight than males (Cheung et al., 2007; Al-Sendi et al., 2004). Other studies identified females with negative perceptions or weight concerns with depressive symptoms (Rierdan & Koff, 1997; Daniels, 2005; Eaton et al., 2005; Xie et al., 2003; Kim & Kim, 2001; Ivarsson et al., 2006; Ozmen et al., 2007).

### ***Theoretical Framework***

The theoretical framework of stress and coping posited by Lazarus (1991) and Lazarus and Folkman (1984) guided this study. Adolescence is a time of turbulence which tests young people's coping with (a) life events, (b) changing body images, and (c) issues of belonging and acceptance within peer groups. Such events and their meaning are determined by the adolescents' perceptions and coping resources. Emotions are an integral part of this process and have an impact upon the adolescents' biological, social, and cognitive functions. Emotions can be positive or negative, healthy or unhealthy. The inability to cope with negative perceptions, such as perceived problems with weight, can possibly lead to depression, anxiety, and other mental health issues. Exploring relationships between how adolescents appraise a situation (perception of body weight) and how these appraisals affect their mental health (depression) underpins this research study.

### ***Purpose of Study***

There is a paucity of research on rural adolescents' perception of their weight and depressive symptoms. Rural researchers emphasize the importance of assessing adolescents'

somatic complaints and depressive symptoms as part of rural adolescent health promotion (Puskar, Lamb, & Tusaie-Mumford, 1997; Puskar, Sereika, & Haller, 2003; Puskar et al., 1999a; Puskar et al., 1999b; Puskar et al., 2006). The research question was “Is there a relationship between weight perception, gender, and depressive symptoms in rural adolescents?”

## METHOD

The design was a cross sectional descriptive study. The study was completed in four rural high schools in Southwestern Pennsylvania. A total of 623 adolescents completed the study measures that are described below. Written informed consent was obtained from both the adolescent subjects and parents prior to study participation. The protocol was approved by the University of Pittsburgh Institutional Review Board on Human Subjects and the four participating school districts.

### *Measures*

*Adolescent Health Inventory.* Weight perception was measured with the Adolescent Health Inventory (AHI) (Nelson, Barnard, King, Hassanain, & Repoff, 1991), using item number 12 “I have a problem with my weight”. The forced choices were never, occasionally, often, and always. The choices of “never” and “occasionally” were combined to create the group ‘perception of no weight problem’. The choices of “often” and “always” were combined to create the group ‘perception of having a weight problem’.

The AHI measures physical health perceptions, needs, and concerns of adolescents in a 36-item inventory. Internal consistency was measured by Cronbach’s alpha with values ranging from .51 to .80 in each of the four areas of need. Test-retest reliability was evaluated using Pearson’s correlation and the coefficient ranged from .30 to .86 with greater than 50% being above .70. The percent agreement ranged from 64.39 to 100% with a mean of 81.92% (Ware & Sherbourne, 1992). Content validity of the AHI was determined by expert evaluation of doctors, nurses, and teachers and with an extensive background literature review.

*Reynolds Adolescent Depression Scale.* Depressive symptoms were measured by the Reynolds Adolescent Depression Scale (RADS) (Reynolds, 1987). The Reynolds Adolescent Depression Scale (RADS) is an adolescent self-report of depressive symptomatology which measures cognitive, motor, somatic, and interpersonal symptoms commonly associated with depression (Reynolds, 1987). The RADS consists of 30 items with a four-point Likert format. Internal consistency and split-half reliabilities are high (.91-.96); test-retest reliability is 0.79 over three months and 0.63 over 12 months. Based upon examination of RADS scores and on other self-report depression measures, a cutoff score of 77 on the RADS identified subjects having depressive symptoms (Reynolds, 1987). Therefore, in this study, participants were classified as having depressive symptoms if their RADS score was greater than or equal to 77. Also, participants were classified as not having depressive symptoms (or normal) if their RADS score was less than 77.

### *Survey Procedures*

The research team met with the superintendent and principal of each of the four high schools to explain the project and obtain their school board approval. Next, the team held an

assembly with students to explain the research project and distribute consent forms. Students with signed consents and signed parental consents completed the study two questionnaires (AHI and RADS) and a demographic survey during a one-and-a-half hour time period during school. They were given ten dollars to compensate for their time. The Reynolds Adolescent Depression Scale (RADS) was scanned within 2 days to identify scores  $\geq 77$  points, which indicates depressive symptoms therefore requiring further assessment, intervention and possible referral. Data from the students who had depressive symptoms were used for analysis.

### *Analysis*

Descriptive statistics were used to report frequencies of weight perception on the AHI (item number 12 “I have a problem with my weight”), gender, and scores  $\geq 77$  on the RADS. To answer the research question “Is there a relationship between weight perception, gender, and depressive symptoms in rural adolescents” a two way ANOVA model was employed. SAS 9.1 was used for all analyses, and the level of significance was set at 0.05.

## **RESULTS**

This study identified that a negative perception of weight was associated with increased depressive symptoms in rural female adolescents, however not in rural male adolescents.

### *Characteristics of Subjects*

The original sample of 623 adolescents from four rural high schools in Southwestern Pennsylvania have been reported elsewhere (Puskar et al., 1997; Puskar et al., 2003; Puskar et al., 1999a; Puskar et al., 1999b). Briefly, the majority of the subjects were Caucasian (97.27 %,  $n = 606$ ), female (60.3%,  $n = 376$ ), with mean age of 15.85 (SD = 0.99).

A sub-total of 548 (88%) adolescents scored in the non-depressive range (less than 77 on the RADS) while 75 (12%) participants scored in the depressive symptom range (77 or greater) out of the sample of 623. The overall mean score was 57.39 (SD 15.706), the median was 55, and the range of scores was 30-106. For females, the mean RADS score was 61.06 (SD 16.182), and the median was 61. For males, the mean RADS score was 51.82 (SD 13.15), with a median of 49. Of importance, 75 (12%) of the sample scored 77 or greater on the RADS which is suggestive of depressive symptomatology. By gender, 16.5% ( $n=62$ ) of the females and 5.2% ( $n=13$ ) of the males scored 77 or greater.

There were 494 (79%) adolescents who answered “I have a problem with my weight” as never or occasionally (perception of no weight problem). The remaining 129 (21%) adolescents answered “I have a problem with my weight” as often or always (perception of having a weight problem).

### *The Effects of Weight Perception and Gender on Depressive Symptoms*

Of the 75 rural adolescents scoring  $\geq 77$  points on the RADS (indicating depressive symptoms), 31 (41%) perceived themselves as having a problem with their weight. According to gender, 25 (33%) females and six (8%) males with depressive symptoms reported a problem with their weight (‘often’ or ‘always’).

A two-way ANOVA model with interaction was used to evaluate the association of depressive symptoms with gender and weight perception. The interaction between gender and weight perception was of marginal statistical significance ( $p=0.07$ ).

The appropriate statistical contrast was used to compare the difference between the two perception groups “no weight problem” and “weight problem” for male and female respectively. All the subjects with depressive symptoms, rural adolescent females who perceived themselves as having a problem with their weight had significantly higher depressive scores compared to females did not perceive a weight problem (adjusted mean:  $90.3\pm 1.39$  vs.  $82.9\pm 1.14$ ;  $p=0.0002$ ). However, no difference was observed in males between perception of having a weight problem and not having a weight problem (adjusted mean:  $83.7\pm 2.62$  vs.  $83.3\pm 2.83$ ;  $p=0.88$ ) (Table 1; Figure 1).

Table 1

Two-way ANOVA Model Associations between Gender, Weight Perception, and Depressive Symptoms (RADS  $\geq 77$ )

Gender/weight perception	Number of subjects with depressive symptoms N = 75	Depressive symptoms adjusted mean score (SE)
Gender		P = 0.15
Female	n = 62 (82.7%)	86.6 (0.90)
Male	n = 13 (17.3%)	83.5 (1.93)
Weight perception “I have a problem with my weight”		P = 0.10
No (never, occasionally)	n = 44 (58.7%)	83.3 (1.43)
Yes (often, always)	n = 31 (41.3%)	86.8 (1.58)
Gender with weight perception		P = 0.07
Female with perception* of :		
No	n = 37 (49.3%)	82.9 (1.14)
Yes	n = 25 (33.3%)	90.3 (1.39)**
Male with perception* of:		
No	n = 7 (9.3%)	83.7 (2.62)
Yes	n = 6 (8.0%)	83.3 (2.83)

\* “I have a problem with my weight”

\*\*  $p = 0.0002$

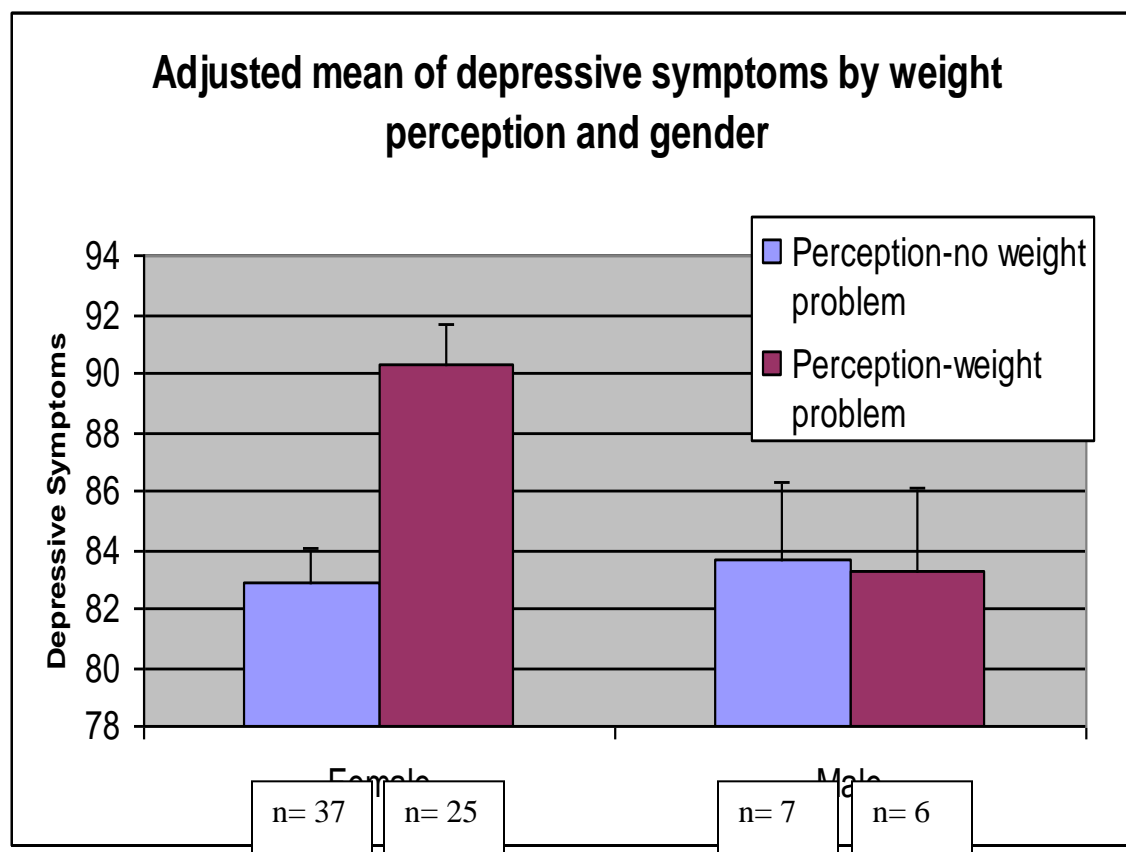


Figure 1: Adjusted mean of depressive symptoms by weight perception and gender

## DISCUSSION

This rural study found a troubling relationship between weight perception and depressive symptoms in female adolescents, similar to reported findings (Rierdan & Koff, 1997; Kim & Kim, 2001; Eaton et al., 2005). Eaton et al. (2005) supports this study's implications that perception about weight may be more important than actual weight. Daniels (2005) found depressive symptoms were related to those who perceived themselves as either underweight or overweight. There was a 35% increase in possibility of those youth reporting depressive symptoms than those who perceived their weight as "okay". Xie et al. (2003) found that both males and females with perceived weight problems were more likely to have anxiety and depression. These studies relate to the finding in this paper.

The main finding of this study is that rural females with depressive symptoms who perceive themselves as having a problem with their weight tend to have higher depressive scores. Rierdan and Koff (1997) speculated that adolescent females may have body dissatisfaction and depression in the absence of objective over- or under-weight. Such dissatisfaction and depression may be related to accepting 'implausible ideals about thinness' and body-related experiences in early adolescence, such as responses to their developing bodies and bodily changes by families and friends.

### ***Limitations***

There is a need for continued inquiry into the relationship between male and female adolescents' weight perception and depressive symptoms particularly in rural youth. Limitations to this study include a small sample size, especially for males. Actual weight, height and BMI were not measured as an objective comparison. Perception of overweight or underweight was not based on BMI, but reported by the adolescents as having a problem with their weight often or always. This sample of four high schools in rural Pennsylvania may not be generalizable to other rural high schools. As a cross-sectional study, adolescents were not followed over time for changes in depressive scores and weight perception.

### **IMPLICATIONS FOR RURAL ADOLESCENT HEALTH**

Achieving healthy lifestyles can be difficult in a rural area, where there is limited access to organized activities and where poverty may affect diet. Other rural challenges of culture and structure include: TV and video game preference over active activities, less sidewalks, and less exercise services (Jackson, Doescher, Jerant, & Hart, 2005).

Nurses practicing in rural hospitals and community settings must be vigilant to adolescents' perceptions of their body weight and its relationship to their mental health. Sadly, federally designated mental health professional shortage areas have been found to be more than 85% are in rural areas. Rural America has been underserved by mental health professions for the past 40 years. Factors that prevent rural individuals from receiving the mental health care they need are accessibility, availability, and acceptability (The Annapolis Coalition on the Behavioral Health Workforce, 2006).

Rural nurses are in an ideal position to facilitate health promotion among rural adolescents through teaching awareness, screening, and referral for problems with weight perception and depressive symptoms. Female adolescents can be further assessed by rural nurses using the findings of this study.

Rural nurses have the opportunity to teach adolescents about healthy lifestyle choices, including nutrition and physical activity to address healthy body weights and accurate perceptions about weight. Studies have explored the effectiveness of interventions to address adolescent nutritional education, one included a World Wide Web educational intervention (Long & Stevens, 2004; Stewart et al., 1995). Other studies included an intervention of physical activity with nutrition education (Neumark-Sztainer, Story, Hannan, Stat, & Rex, 2003; Prochaska & Sallis, 2004; Sallis et al., 2003). Nursing interventions need to include education, motivation and skill building to create behavioral change (B. Vreland, personal communication, August 12, 2005), especially around weight and mood.

Screening about weight and depressive symptoms are important primary prevention skills. When nurses perform height, weight and Body Mass Index measurements, they can explore with the adolescent their perception of their weight. Rural nurses can engage adolescents in discussions about nutrition and how they view their weight and their weight intentions (Daniels, 2005). Healthy choices and desired weight ranges need to be explained to promote health.

Nurses caring for rural female adolescents are in a privileged and trusted position. It is important to ask adolescents if they believe they have a problem with their weight, even if these adolescents do not appear overweight. Adolescents who perceive themselves as having a



problem with their weight can be educated about the health risks associated with too much or too little weight plus be assessed for depressive symptoms.

Involving parents and caregivers about weight perceptions and depressive symptoms can be an important intervention and implementation will vary from adolescent to adolescent. Collaboration and referrals to a dietician, nutritionist, psychiatric nurse practitioner, or other mental health specialists are valuable resources. It may be necessary to refer to an endocrinologist when nutrition and exercise habits have improved but there is no improvement in normalizing the adolescent's weight, perception, or mood.

Those females showing signs of depressive symptoms should be assessed about how they view their weight due to the correlation of increased depressive scores with belief they have a problem with their weight. A screening tool for depressive symptoms could be used, such as the Reynolds Adolescent Depression Scale (Reynolds, 1987). Interventions to treat depressive symptoms and weight concerns are important to the future of these vulnerable adolescents. In conclusion, rural nurses can make a difference in the lives of rural adolescents.

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