



## *The Relationship between General and Central Obesity with Anxiety among Iranian Young Men*

Jamal Rahmani; MSc<sup>1</sup>, Hamed Kord Varkaneh; MSc<sup>1</sup> & Ahmad-Raza Dorosty; PhD\*<sup>1</sup>

<sup>1</sup> Department of Community Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran.

### ARTICLE INFO

### ORIGINAL ARTICLE

#### Article history:

Received: 12 Jan 2017

Revised: 14 May 2017

Accepted: 17 Jun 2017

#### \*Corresponding author:

Dorostim@tums.ac.ir

NO. 44 Hejratdoost  
Street, Naderi Street,  
Keshavarz BLV, Tehran,  
Iran.

Postal code: 1416643931

Tel: +98 21 88955569

### ABSTRACT

**Background:** Anxiety is a common psychological disorder that impacts on the quality of life. In recent decades, anxiety has increased, as well as obesity especially among young people. The aim of this study is to investigate the relationship between general and central obesity with anxiety among Iranian young men. **Methods:** This cross-sectional study was conducted in 2016 on 246 men who were selected through cluster sampling according to the inclusion criteria. Anthropometric measurements were performed according to the standard procedure. Anxiety was assessed by DASS questionnaires with Cronbach's coefficient 0.78. In the final analysis, confounding factors were controlled and  $P < 0.05$  was considered statistically significant. **Results:** In this study, 27% of the population had extreme anxiety and 29% had moderate anxiety. In the adjusted model, there was an inverse relationship between anxiety and central obesity (OR = 0.25, 95% CI: 0.07-0.85,  $P$ -trend < 0.01), as well as total body fat. The odds ratio of anxiety based on body mass index groups was not significant. **Conclusions:** Overall central obesity and total body fat have an inverse relationship with anxiety. Prospective studies are required to confirm these associations in young populations.

**Key words:** Anxiety; Obesity; Total body fat; Abdominal obesity.

### Introduction

We are living in "the age of anxiety" (Spielberger, 1983), an age that people are more anxious than before (Lader, 1985). In recent decades, new media, society change, security, social acceptance, jobs and ... make people more anxious (Menzies, 2009, Rosen, 1998, Sloan, 1996, Wainwright and Calnan, 2002). Several studies have suggested an increased rate of anxiety in different society. Anxiety increased by 5.23% during the years 1990-2003 in the United

States of America (Kessler, 1994, Kessler *et al.*, 2005). And similar results obtained in Japan (Demyttenaere *et al.*, 2004) and Lebanon (Tanios *et al.*, 2009) have confirmed this subject. In Iran, 8.35% of people are suffering from anxiety; thus the anxiety pattern in Iran is similar to Western countries (Mohammadi *et al.*, 2005).

Anxiety is one of the most common psychological disorders that play a significant role in increasing global burden of disease (Whiteford

et al., 2013). It is an emotion characterized by an unpleasant state of inner turmoil, often accompanied by nervous behavior, such as pacing back and forth, somatic complaints, and rumination. (Seligman *et al.*, 2001). An increase in anxiety can affect other levels of public health and leads to depression (Seligman *et al.*, 2001). Anxiety leads to absenteeism in workplace and economic losses (Hoffman *et al.*, 2008). It is associated with chest pain, lack of self-control, isolation, and irritable bowel syndrome (Barlow, 2004, Hoffman *et al.*, 2008). It may also increase self-injury (self-harm) (Carr *et al.*, 2007, Yuan and Devine, 2016).

On the other hand, an increase in overweight and obese began in the years 1976-1980 (Flegal *et al.*, 2002, Ogden *et al.*, 2002); therefore, it is possible that the relationship between increased incidence of obesity and anxiety has been existing. However, cross-sectional studies have suggested a direct relationship between increase in obesity and anxiety (Mather *et al.*, 2009, Scott *et al.*, 2008, Simon *et al.*, 2006). In contrast, some studies suggested that there is an inverse relationship between obesity and anxiety called "jolly fat" theory (Jasienska *et al.*, 2005, Palinkas *et al.*, 1996).

Obesity results from an imbalance energy and the accumulation of fat in the body, which can disrupt health (WHO, 2013). Obesity is a risk factor for many health problems and diseases (Hall, 2015). The prevalence of this disease in many industrialized countries, especially the United States and the developing countries is rapidly growing. Systematic study on 191 countries showed that 1.46 billion people are overweight and 504 million people are obese in the world (Finucane *et al.*, 2011). The complications of obesity and overweight are type 2 diabetes, cardiovascular disease, some cancers, neurological disorders and mental illness (Popkin and Doak, 1998, WHO, 2000). Obese people are prodigal individuals, chaotic, curious and self-centered (Sullivan *et al.*, 2007).

Can obesity with multiple complications reduce anxiety? The results of several studies conducted

in this regard are not conclusive. Although in most of the studies, the relationship between anxiety and general obesity has been measured, central obesity or abdominal circumference is a more important factor in predicting physical and mental chronic diseases (Esmailzadeh *et al.*, 2006, Wei *et al.*, 1997). Several studies have shown that race, age and gender have effect on anxiety and obesity (Caprio *et al.*, 2008, Low *et al.*, 2009, Toufexis *et al.*, 2006), but one of these study did not investigate this relationship in young men. Therefore, this study was carried out to investigate the relationship between general and central obesity with anxiety among Iranian young men.

### Materials and Methods

*Study population:* This cross sectional study was performed in 2016 on 246 Iranian young men, who were selected through cluster sampling from the Tehran. The inclusion criteria included having no specific diet or food allergies, lack of physical illness and drug use.

*Anxiety:* Anxiety was assessed by DASS questionnaire (Henry and Crawford, 2005, Lovibond and Lovibond, 1995). This questionnaire was confirmed by Cronbach's alpha coefficient of 0.78 for measuring self-esteem in Iran (Sahebi *et al.*, 2005, Samani and Joukar, 2007). Based on this questionnaire, people earned points between 0 to 42. The lower the score obtained, the lower the anxiety. In order to perform statistical tests, participants were divided into two groups: low anxiety (Score:  $\geq 14$ ) and high anxiety (Score  $> 14$ ) (UNSW, 2014).

*Anthropometric measurement:* The body weight was measured using a Seca scale (made in Germany) with 100-gram accuracy, without shoes and with minimum clothing. Also, height was measured using a Seca portable stadiometer (made in Germany) with an accuracy of 0.1 cm in a standing position (the whole body in one direction, the eyes must look forward) without shoes. Thereafter, body mass index (BMI) was calculated by dividing the body weight (in kilogram) by the height (in meters squared).

Total body fat measurement using the method of skin folds: Skin folds were measured at three sites (abdomen, suprailiac, and triceps) using a standard caliper with the principles described by the American College of Sports Medicine (Kaminsky and Medicine, 2006). Subsequently, the Jackson and Pollock's equation was used to calculate the total body fat (Jackson and Pollock, 1985).

$$\% \text{ Body fat} = (0.39287 * \text{sums of three skinfolds}) - (0.00105 * [\text{sums of three skin folds}]^2) + (0.15772 * \text{age}) - 5.18845$$

Evaluation of other variables: Socioeconomic status was assessed by questionnaire and physical activity was measured by the international physical activity questionnaire (IPAQ) (Ainsworth *et al.*, 2000).

**Obesity:** General obesity was determined based on BMI.  $\text{BMI} \geq 30$  as obese and  $30 > \text{BMI} \geq 25$  were considered overweight (Stunkard and Wadden, 1993). Central obesity based on waist circumference was divided into 3 groups: The first group with waist circumference less than 94 cm, second group with waist of 94-102 cm and the third group of people with waist circumference higher than 102 cm (Wang *et al.*, 2005). In order to divide the total body fat, fat less than 20% was considered normal, 20 to 25% overweight and over 25% were considered obese (Gallagher *et al.*, 2000).

**Data analysis:** All statistical analysis was performed using SPSS 23 (IBM SPSS statistics, IBM Corporation, Chicago, IL). In order to determine the significant relationship between quantitative and qualitative variables with body mass index, ANOVA and the chi-2 test were used. Multivariable logistic regression was used to investigate the relationship between body mass

index, waist circumference and total body fat with anxiety. Except for raw model, two other models were used for investigation. The first model was adjusted for age, and other models in addition to age, smoking, total energy intake, physical activity, marital status, family and educational and socioeconomic status were adjusted.  $P$ -value  $< 0.05$  was considered statistically significant.

## Results

In this study, 246 young men were examined. Their age ranged from 21 - 29 years with a mean age of  $24.1 \pm 1.5$ . The average BMI was  $23.9 \pm 3.8$   $\text{kg/m}^2$  and mean waist circumference was  $88.7 \pm 10.6$  cm. Thus 44% of the population had normal anxiety, 29% moderate and 27% had high anxiety. Age distribution was significant on BMI and those with higher BMI had a higher mean age (**Table 1**). Other demographic variables distributed according to the BMI are shown in **Table 1**. People with higher BMI have a better economic situation.

By increasing the percentage of body fat, the anxiety levels reduced. This figure shows that the top 25% fat (obese people) as compared with the other two groups, had lower chances of developing anxiety ( $P$  trend = 0.01).

The crude model suggests that individuals with higher waist circumference had lower odds of having severe anxiety ( $P$ -trend = 0.03). This relationship remains after the adjustment for confounding factors such as age, marital status, smoking, total energy consumption, education, household members, physical activity and economic situation ( $P$ -trend = 0.01). But the odds ratio of anxiety based on body mass index in crude model ( $P$ -trend = 0.75) and adjusted models ( $P$ -trend = 0.70) was not significant.

**Table 1.** Characteristics of participants in term of body mass index

Variables	Body mass index classification (kg/m <sup>2</sup> )			P- value
	< 25 N = 158	25 - 30 N = 72	30 < N = 16	
Age (year)	23.9 ± 1.4	24.2 ± 1.3	25.6 ± 1.9	0.001 <sup>a</sup>
Waist circumference (cm)	83.2 ± 5.9	95.3 ± 7.7	113.1 ± 5.1	0.001 <sup>a</sup>
Marital status, (Single) (%)	84.2	94.4	93.8	0.06
The economic statuses (%)				
Poor	43.0	33.3	0	0.001 <sup>b</sup>
Moderate	51.3	59.7	56.3	
Good	5.7	6.9	43.8	
Non-Smoking (%)	89.9	98.6	81.3	0.02 <sup>b</sup>
Physical activity (%)				
Low	8.2	56.9	43.8	0.001 <sup>b</sup>
Moderate	47.5	41.7	18.8	
Severe	44.3	1.4	37.5	
Anxiety (%)	27.2	29.2	18.8	0.69 <sup>b</sup>

<sup>a</sup> : ANOVA test, <sup>b</sup>: chi-square test

**Table 2.** Results of adjusted multiple logistic regression for review of odds ratio of anxiety in general and central obesity

Variables	Central obesity			P-value	General obesity			P-value
	Waist circumference (cm)				Body mass index (kg/m <sup>2</sup> )			
	1 < 94	2 94 -102	3 102 ≤		1 < 25	2 25 - 30	3 30 ≤	
Crude Model	1.00	0.53 (0.27-1.01)	0.48 (0.19-1.20)	0.03	1.00	0.90 (0.49 - 1.68)	1.62 (0.44 - 3.96)	0.75
Model 1	1.00	0.52 (0.27-1.01)	0.58 (0.23-1.48)	0.07	1.00	0.94 (0.50 - 1.78)	2.18 (0.57 - 6.28)	0.45
Model 2	1.00	0.35 (0.13-0.90)	0.25 (0.07-0.85)	0.01	1.00	0.99 (0:39 - 2.46)	1.57 (0.31 - 4.88)	0.70

Model 1: Adjust for age, Model 2: Model 1 with marital status, smoking, total energy consumption, education, household members, physical activity and economic status.

## Discussion

This study was conducted on young Iranian men with the aim of investigating the relationship between total body fat, general and central obesity with anxiety. The results of this study suggest an inverse association between central obesity and the risk of anxiety. The study also showed a significant inverse relationship between total body fat and anxiety. This relationship does not apply to body mass index.

The results of the present study are in agreement with those of previous studies (Jasienska *et al.*, 2005, Palinkas *et al.*, 1996). These studies supported the theory of “jolly fat” and showed that with an increase in obesity, psychological disorders, such as anxiety disorders, are reduced (Crisp *et al.*, 1980). Certainly, these studies are limited to body mass index and did not consider the waist circumference and total body fat. But their conclusions are in line with the present study.

In a study on 2201 Korean women by Yim *et al.*, it was concluded that High waist circumference reduces depression and increases mental health. Thus this result is in line with that obtained in the present study (Yim *et al.*, 2012).

In contrast, the study concluded that the hope of life, depression and anxiety are inversely related to body mass index. The present study relied on body mass index and did not consider the total body fat. In another study, it was concluded that the relationship between anxiety and obesity is 30% (Strine *et al.*, 2008). Other similar studies also rejected the theory of “jolly fat” (Bodenlos *et al.*, 2011, Mather *et al.*, 2009, Rivenes *et al.*, 2009).

The results of other studies mentioned showed that apart from physiological mechanism, there can be a psychological answer. The most important issues affecting people's mental health and status of anxiety are media, the community and the social acceptance (Menziez, 2009, Rosen, 1998, Sloan, 1996, Wainwright and Calnan, 2002). Media has influence on activity, success and mental health of society by determining Community Standards and has profound impact on peoples' perception of their body (Posavac *et al.*, 2001, Yamamiya *et al.*, 2005). It can also affect health, nutrition, activity and people's confidence (Derenne and Beresin, 2006). Massive advertisements media causes people to worry about their own body condition (Grabe *et al.*, 2008). On the other hand, success and mental health are a deep connection with the social acceptance of body (Gottfried, 2003). The body acceptance criteria in each society are dependent on media criteria (Yamamiya *et al.*, 2005). The body shape has become a platform for cultural activities and social acceptability (Wellington and Bryson, 2001). The media and society play a fundamental role in accepting young people in the community and social success. They affect people's mental health and status anxiety. Advertising is an important tool for demonstrating the body model. Currently in Western societies, Slimming is a criterion for beauty and success (Jackson, 1995).

Different cultures and societies have different criteria for identifying obesity and ideals of life

(Klaczynski *et al.*, 2004). A recent study rejected the “jolly fat” Theory and expressed that with increasing body mass index and obesity, the rates of anxiety and psychological diseases increase (Bodenlos *et al.*, 2011, Mather *et al.*, 2009, Rivenes *et al.*, 2009, Strine *et al.*, 2008). While previous studies (Crisp and McGuiness, 1976, Palinkas *et al.*, 1996) or studies in Eastern countries (Yim *et al.*, 2012) have shown that, in Islamic countries, media advertising about body modeling is scanty, all types body, have social acceptance. In these countries, the individual and society should not be fully judged about model and body image yet. Therefore, in these countries, the theory of “jolly fat” ruling is effective. This is because all types of body have social acceptance, and body condition barely determines the success of the community. As a result, people with higher body mass index do not suffer from rejection and psychological distress. In contrast, in Western countries with media advertising of body types, obese people suffer loss of confidence (Derenne and Beresin, 2006) and as such, their social acceptance is affected (Grabe *et al.*, 2008). Reduced confidence and social acceptance in all social groups can lead to the psychological discomfort and anxiety (Budge *et al.*, 2013, Cheng *et al.*, 2015, Paul, 2016, Reitzel *et al.*, 2017).

The strengths of this study include the nutritional and psychological approach to the subject and not one-dimensional look at the problem. In addition, controlling for confounding by age, marital status, the number of household members, smoking, total energy intake, physical activity and socioeconomic status is the strength of this study. Moreover, since body mass index is defective to determining obesity (Burkhauser and Cawley, 2008), measurement of the amount of total body fat is one of the highlights of this study.

The major limitation is the cross-sectional design of the study, which does not allow causal inference. Prospective studies will help to understand these mechanisms. Prospective studies will help to understand these mechanisms.

The results of the present study showed that increasing waist circumference and total body fat

reduced the anxiety of population. This relationship is largely dependent on the society, culture and the media. BMI does not have a significant effect on the incidence of anxiety. More prospective studies could help to explain the physiological and psychological mechanisms of this issue.

#### Authors' contributions

Rahmani J and Dorosty AR participated to design the work and drafting the manuscript. Statistical

analysis: Rahmani J and Kord Varkaneh H participated to data collection and analysis data. All authors read the manuscript and verified it.

#### Acknowledgments

The authors sincerely thank the Tehran University of Medical Sciences for their supports.

#### Conflict of interest

The authors declare no conflict of interest.

#### References

- Ainsworth BE, et al.** 2000. Compendium of physical activities: an update of activity codes and MET intensities. *Medicine and science in sports and exercise.* **32 (9; SUPP/1):** S498-S504.
- Barlow DH** 2004. Anxiety and its disorders: The nature and treatment of anxiety and panic. Guilford press.
- Bodenlos JS, Lemon SC, Schneider KL, August MA & Pagoto SL** 2011. Associations of mood and anxiety disorders with obesity: comparisons by ethnicity. *Journal of psychosomatic research.* **71 (5):** 319-324.
- Budge SL, Adelson JL & Howard KA** 2013. Anxiety and depression in transgender individuals: the roles of transition status, loss, social support, and coping. *Journal of consulting and clinical psychology.* **81 (3):** 545-557.
- Burkhauser RV & Cawley J** 2008. Beyond BMI: the value of more accurate measures of fatness and obesity in social science research. *Journal of health economics.* **27 (2):** 519-529.
- Caprio S, et al.** 2008. Influence of race, ethnicity, and culture on childhood obesity: implications for prevention and treatment. *Obesity.* **16 (12):** 2566-2577.
- Carr D, Friedman MA & Jaffe K** 2007. Understanding the relationship between obesity and positive and negative affect: the role of psychosocial mechanisms. *Body Image.* **4 (2):** 165-177.
- Cheng G, Zhang D & Ding F** 2015. Self-esteem and fear of negative evaluation as mediators between family socioeconomic status and social anxiety in Chinese emerging adults. *International journal of social psychiatry.* **61 (6):** 569-576.
- Crisp A, Queenan M, Sittampaln Y & Harris G** 1980. 'Jolly fat' revisited. *Journal of psychosomatic research.* **24 (5):** 233-241.
- Crisp AH & McGuinness B** 1976. Jolly fat: relation between obesity and psychoneurosis in general population. *British medical journal.* **3 (1):** 7-9.
- Demyttenaere K, et al.** 2004. Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *The journal of the American medical association.* **291 (21):** 2581-2590.
- Derenne JL & Beresin EV** 2006. Body image, media, and eating disorders. *Academic psychiatry.* **30 (3):** 257-261.
- Esmailzadeh A, Mirmiran P, Azadbakht L, Amiri P & Azizi F** 2006. Independent and inverse association of hip circumference with metabolic risk factors in Tehranian adult men. *Preventive medicine.* **42 (5):** 354-357.
- Finucane MM, et al.** 2011. National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *The lancet.* **377 (9765):** 557-567.
- Flegal KM, Carroll MD, Ogden CL & Johnson CL** 2002. Prevalence and trends in obesity among US adults, 1999-2000. *The journal of the*

- American medical association.* **288 (14):** 1723-1727.
- Gallagher D, et al.** 2000. Healthy percentage body fat ranges: an approach for developing guidelines based on body mass index. *The American journal of clinical nutrition.* **72 (3):** 694-701.
- Gottfried H** 2003. Temp (t) ing bodies: Shaping gender at work in Japan. *Sociology.* **37 (2):** 257-276.
- Grabe S, Ward LM & Hyde JS** 2008. The role of the media in body image concerns among women: a meta-analysis of experimental and correlational studies. *Psychological bulletin.* **134 (3):** 460-476.
- Hall JE** 2015. Guyton and Hall textbook of medical physiology. Elsevier Health Sciences.
- Henry JD & Crawford JR** 2005. The short- form version of the Depression Anxiety Stress Scales (DASS- 21): Construct validity and normative data in a large non- clinical sample. *British journal of clinical psychology.* **44 (2):** 227-239.
- Hoffman DL, Duker EM & Wittchen HU** 2008. Human and economic burden of generalized anxiety disorder. *Depression and anxiety.* **25 (1):** 72-90.
- Jackson AS & Pollock ML** 1985. Practical assessment of body-composition. *Physician and sportsmedicine.* **13 (5):** 76-90.
- Jackson LA** 1995. Physical attractiveness and intellectual competence: A meta-analytic review. *Social psychology quarterly.* **58 (2):** 108-122.
- Jasienska G, Ziomkiewicz A, Górkiewicz M & Pająk A** 2005. Body mass, depressive symptoms and menopausal status: an examination of the “Jolly Fat” hypothesis. *Women's health issues.* **15 (3):** 145-151.
- Kaminsky LA & Medicine ACoS** 2006. ACSM's resource manual for guidelines for exercise testing and prescription. Lippincott Williams & Wilkins Baltimore, MD.
- Kessler RC** 1994. The national comorbidity survey of the United States. *International review of psychiatry.* **6 (4):** 365-376.
- Kessler RC, Chiu WT, Demler O & Walters EE** 2005. Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of general psychiatry.* **62 (6):** 617-627.
- Klaczynski PA, Goold KW & Mudry JJ** 2004. Culture, obesity stereotypes, self-esteem, and the “thin ideal”: A social identity perspective. *Journal of youth and adolescence.* **33 (4):** 307-317.
- Lader M** 1985. The nature of clinical anxiety in modern society. *Mental health nursing.* **7 (1-4):** 309-334.
- Lovibond PF & Lovibond SH** 1995. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy.* **33 (3):** 335-343.
- Low S, Chin MC & Deurenberg-Yap M** 2009. Review on epidemic of obesity. *Annals academy of medicine singapore.* **38 (1):** 57-65.
- Mather AA, Cox BJ, Enns MW & Sareen J** 2009. Associations of obesity with psychiatric disorders and suicidal behaviors in a nationally representative sample. *Journal of psychosomatic research.* **66 (4):** 277-285.
- Menzies H** 2009. No time: Stress and the crisis of modern life. D & M Publishers.
- Mohammadi M-R, et al.** 2005. An epidemiological survey of psychiatric disorders in Iran. *Clinical practice and epidemiology in mental health.* **1 (1):** 16.
- Ogden CL, Flegal KM, Carroll MD & Johnson CL** 2002. Prevalence and trends in overweight among US children and adolescents, 1999-2000. *The journal of the American medical association.* **288 (14):** 1728-1732.
- Palinkas LA, Wingard DL & Barrett-Connor E** 1996. Depressive symptoms in overweight and obese older adults: a test of the “jolly fat” hypothesis. *Journal of psychosomatic research.* **40 (1):** 59-66.
- Paul GP** 2016. Study of academic anxiety psycho social conflicts and mental health among adolescents.
- Popkin BM & Doak CM** 1998. The obesity epidemic is a worldwide phenomenon. *Nutrition reviews.* **56 (4):** 106-114.

- Posavac HD, Posavac SS & Weigel RG** 2001. Reducing the impact of media images on women at risk for body image disturbance: Three targeted interventions. *Journal of social and clinical psychology*. **20** (3): 324-340.
- Reitzel LR, et al.** 2017. Interactive effects of anxiety sensitivity and subjective social status on psychological symptomatology in Black adults. *Behavioral medicine*. **43** (4): 268-276.
- Rivenes AC, Harvey SB & Mykletun A** 2009. The relationship between abdominal fat, obesity, and common mental disorders: results from the HUNT study. *Journal of psychosomatic research*. **66** (4): 269-275.
- Rosen BC** 1998. *Winners and losers of the information revolution: Psychosocial change and its discontents*. Greenwood Publishing Group.
- Sahebi A, Asghari MJ & Salari RS** 2005. Validation of depression anxiety and stress scale (DASS-21) for an Iranian population. *Iranian psychologists*. **4** (1): 299-313.
- Samani S & Joukar B** 2007. A Study On The Reliability And Validity Of The Short Form Of The Depression Anxiety Stress Scale (DASS-21).
- Scott KM, et al.** 2008. Obesity and mental disorders in the general population: results from the world mental health surveys. *International journal of obesity*. **32** (1): 192-200.
- Seligman ME, Walker EF & Rosenhan DL** 2001. *Abnormal psychology*. Norton.
- Simon GE, et al.** 2006. Association between obesity and psychiatric disorders in the US adult population. *Archives of general psychiatry*. **63** (7): 824-830.
- Sloan TS** 1996. *Damaged life: The crisis of the modern psyche*. Psychology Press.
- Spielberger CD** 1983. *Manual for the State-Trait Anxiety Inventory STAI (form Y) (" self-evaluation questionnaire")*.
- Strine TW, et al.** 2008. The association of depression and anxiety with obesity and unhealthy behaviors among community-dwelling US adults. *General hospital psychiatry*. **30** (2): 127-137.
- Stunkard AJ & Wadden TA** 1993. *Obesity: theory and therapy*.
- Sullivan S, Cloninger C, Przybeck T & Klein S** 2007. Personality characteristics in obesity and relationship with successful weight loss. *International journal of obesity*. **31** (4): 669-674.
- Tanios CY, et al.** 2009. The epidemiology of anxiety disorders in the Arab world: a review. *Journal of anxiety disorders*. **23** (4): 409-419.
- Toufexis DJ, Myers KM & Davis M** 2006. The effect of gonadal hormones and gender on anxiety and emotional learning. *Hormones and behavior*. **50** (4): 539-549.
- UNSW** 2014. *Depression Anxiety and Stress Scale (DASS)*.
- Wainwright D & Calnan M** 2002. *Work stress: The making of a modern epidemic*. McGraw-Hill Education (UK).
- Wang Y, Rimm EB, Stampfer MJ, Willett WC & Hu FB** 2005. Comparison of abdominal adiposity and overall obesity in predicting risk of type 2 diabetes among men. *The American journal of clinical nutrition*. **81** (3): 555-563.
- Wei M, Gaskill SP, Haffner SM & Stern MP** 1997. Waist Circumference as the Best Predictor of Noninsulin Dependent Diabetes Mellitus (NIDDM) Compared to Body Mass Index, Waist/hip Ratio and Other Anthropometric Measurements in Mexican Americans—A 7-Year Prospective Study. *Obesity research*. **5** (1): 16-23.
- Wellington CA & Bryson JR** 2001. At face value? Image consultancy, emotional labour and professional work. *Sociology*. **35** (4): 933-946.
- Whiteford HA, et al.** 2013. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The lancet*. **382** (9904): 1575-1586.
- WHO** 2000. *preventing and managing the global epidemic. Report of a WHO Consultation*.
- WHO** 2013. *Obesity and overweight. Fact sheet N 311. WHO Media Centre. Geneva, Switzerland*.
- Yamamiya Y, Cash TF, Melnyk SE, Posavac HD & Posavac SS** 2005. Women's exposure to thin-and-beautiful media images: Body image effects of media-ideal internalization and impact-reduction interventions. *Body image*. **2** (1): 74-80.



**Yim G, Ahn Y, Cho J, Lim J-Y & Park H-Y** 2012. Abdominal obesity, depressive symptoms and stress status: An explanation for the “Joily fat” hypothesis in middle-aged women in Korea. *International journal of obesity*. **36 (4)**: 595-602.

**Yuan X & Devine D** 2016. The role of anxiety in vulnerability for self-injurious behaviour: studies in a rodent model. *Behavioural brain research*. **311**: 201-209.