

University of Nevada, Reno

**Intimate Partner Violence, Depression and Overweight/Obesity –  
A Population-Based Study on Women in 7 U.S. States**

A thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Science in  
Nutrition

by

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University of Nevada, Reno  
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THE GRADUATE SCHOOL

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prepared under our supervision by

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## ABSTRACT

**Background:** Studies revealed significant associations between overweight/obesity and depression as well as between intimate partner violence (IPV) and depression. However, the relationship between overweight/obesity and IPV, and the roles depression played in this relationship is lacking.

**Objective:** This study aims to explore the relationships among overweight/obesity, IPV and depression based on a large scale population-based survey.

**Methods:** Data were obtained from 2006 nationwide Behavioral Risk Factor Surveillance System (BRFSS). All women from 7 U.S. states where they answered questions in bodyweight, depression and IPV were included. Weighted multiple logistic modeling were utilized for analysis.

**Results:** Out of 14,362 total females respondents, 8,066 (56.16%) reported as overweight/obese (BMI>25). Comparing to normal weight group, overweight/obese group has higher prevalence of depression (16.56% vs. 8.26%) and IPV (physical 11.99% vs. 11.51%, both physical and sexual 8.22% vs. 6.96%). After adjusting for demographics, other related health conditions and risk behaviors, overweight/obesity is significantly associated with depression (aOR = 1.3689; 95% CI 1.1153, 1.6801, P = 0.0027). Association between overweight/obesity and IPV is marginally [aOR = 1.2032; 95% CI (0.9319, 1.5535), P = 0.1560] but becoming weakened after adjusting for depression and other factors.

Conclusions: Overweight/obesity is associated with depression, and marginally and indirectly related to IPV. Further studies on exploring the mechanisms of these relationships are needed.

Key Words: Overweight/obesity, Intimate partner violence, depression, BRFSS

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## **CHAPTER 1:**

### **INTRODUCTION**

There are three interesting and correlated subjects for this paper – overweight/obesity, depression and intimate partner violence or IPV. From theories to studies to evidence, these three subjects seem to go together. It is the objective of this paper to find out the link, if there is, and how this is attained.

Overweight/obesity has been the subject of various studies and researches, and has been addressed to regularly. There are however obvious reasons why this is still one of the major problems of America's health these past decades. The reasons and causes of overweight/obesity are complex and should be the ones that should be addressed to with much certainty in order to fight the disease itself. Some reasons that are commonly known that we can prematurely cite here involve diet, exercise and other health-related causes, but also including what is known as Intimate Partner Violence or IPV.

Whether violence can cause overweight/obesity is still a question. There is the logic that when individuals, particularly women and teens, are exposed to violence, they become depressed, so that their behavior changes and hence they resort to attitudes such as overeating, subsequently causing overweight/obesity.

This paper focuses on the relationship of overweight/obesity and intimate partner violence and how depression results from both. We have accumulated vast literature trying to discover whether depression is the cause or the effect of overweight/obesity and intimate partner violence, or can this be vice versa? Traditionally however, depression is believed to be the outcome or ‘result’ of overweight/obesity and intimate partner violence.

Our theory lies in the belief that overweight/obesity can cause depression, and IPV can cause depression and overweight/obesity. The question “How depression results from both overweight/obesity and IPV” looks at depression as a “catalyzer”, sort of, for both overweight/obesity and IPV, but indeed depression can be both a cause and effect. IPV is obvious a cause to either depression and/or overweight/obesity. But this lies in the evidence that we can gather in the literature. At least, this is for now, at the Introduction for this paper when all else seem blurred from the start; thus it is a theory. We have to go into the voluminous literature such as books, magazines, periodicals, online journals, websites, meta-analyses, and studies and researches to arrive at some logical conclusion and see for ourselves how depression affects the relationship of overweight/obesity and IPV, or how it can be affected by overweight/obesity and IPV.

## **CHAPTER 2:**

### **LITERATURE REVIEW**

#### **2.1 OVERWEIGHT/OBESITY**

An in-depth examination of overweight/obesity, along with the various causes – intimate partner violence and depression – is the subject for this section of the study.

It is commonly said that America is an advanced nation, “the land of milk and honey”; Americans are well-fed and well-nourished, living comfortably in their homes and are free from the scourges of disease and other maladies. But Americans have a health problem, mostly are obese and overweight, a malady associated with chronic diseases such as type-2 diabetes, heart disease, cancer, and strokes.

According to Gillum (1987: 866, as cited in Bailey, 2006, p. 23), overweight/obesity is defined as an excessive amount of adipose tissue in the body; overweight is excessive weight for a given height and stature. The pathology of overweight/obesity lies in the increased size and number of fat cells. An anatomic classification of overweight/obesity from which a pathologic classification arises is based on the number of adipocytes, on the regional distribution of body fat, or on the characteristics of localized fat deposits (Bray, 2008, p. 1).

Further explanation of overweight/obesity comes from Banning (2005, p. 164):

“It is excess fat in the body caused by ingestion of greater amounts of food than can be utilized by the body as energy; and there is an imbalance between the amount of food consumed and exercise taken on a daily basis.”

Banning (2005, p. 165) introduces a term known as *metabolic syndrome X* which is characterized by “high insulin levels, hypertriglyceridaemia and a cluster of cardiovascular risk factors which include overweight/obesity, insulin resistance, hypertension, reduced high-density lipoprotein cholesterol, and type 2 diabetes or borderline diabetes and heart disease” (Banning, 2005, p. 165).

Physicians and institutions, to include the medical world, have formulated a system to determine whether an individual is obese or overweight; this is through measuring Body Mass Index or BMI.

The American Medical Association considers one overweight when he/she has a BMI of 25 to 29.9. According to Kushner (2003, as cited in Pharia and Kase, 2008), overweight/obesity is divided into 3 classifications:

- a.) Mild which has a BMI of 30 to 34.9,
- b.) Moderate which has a BMI of 35 to 39.9, and
- c.) Severe or extreme which has a BMI  $\geq$  40.

A BMI of 30 is about 30 lb. overweight and equivalent to 221 lb in a 6' 0" person and to 186 lb in one 5' 6" (NHLBI 1998, cited in Bailey, 2006, p. 23).

Statistics from government agencies and the private sector are alarming: one American dies every ninety seconds from overweight/obesity-related problems (Burd-Sharps et al., 2008, p. 64). The proportion of Americans who are overweight and obese has increased dramatically within the past two decades, and increases in overweight and overweight/obesity cuts across all ages, racial and ethnic groups (Bailey, 2006, p. 24).

According to the Centers for Disease Control and Prevention, for the first time in history, there are more overweight and obese people in the nation than people of normal weight. An estimated 61% of U.S. adults are either overweight or obese. But a later report from Cooke & Wardle (2007, p. 238) suggests that 65% of US adults are overweight, of whom 30% are obese ( $BMI \geq 30$ ) and almost 5% are severely obese ( $BMI \geq 40$ ).

Overweight/obesity develops more rapidly in black men after approximately age 28 years. This was proven by studies of Gillum (1987), Burke et al (1992), Shavers V. & Shankar S. (2002), U.S. Department of Health and Human Services (1997) and the U.S. Surgeon General. Black women and Hispanic men were at highest risk for overweight/obesity (McTigue, Garrett, and Popkin, 2002, cited in Bailey, 2006, p. 24).

Worldwide, there are at least 300 million obese people and two to three times are overweight (Cooke and Wardle, 2007, p. 238). Globally, 65.1% of adults are overweight (Hedley et al., 2004, cited in Latner, Wilson, Jackson, & Stunkard, 2009, p. 191).

Although associations between overweight/obesity and physical health consequences such as diabetes, heart disease and cancer, as well as all-cause mortality, are well documented, the psychological impact of overweight/obesity remains poorly characterized.

Overweight/obesity is linked to diseases with high percent of mortality such as type-2 diabetes, hypertension leading to stroke, coronary heart disease, and several types of cancer.

People with a weight control problem have a real and identifiable physiological and medical condition (Ezrin and Kowalski, 1999); obese people have shorter lives than non-obese people (Smith, 1999). Controlling overweight/obesity and its underlying diseases costs billions of dollars for the government – estimated at \$110 billion a year, equivalent to 1 percent of the U.S. Gross Domestic Product (Burd-Sharps et al., 2008, p. 64).

What is more alarming is that a great percent of the children's population is succumbing to the disease. Concern has been growing over the increasing incidence of type 2-diabetes in childhood and among teenagers, attributable to inactivity and increasing overweight/obesity levels in childhood. Early appearance of type-2 diabetes is a growing

problem among minority groups in the United States, including Hispanic Americans, African Americans, and Native Americans (Blaum, 2007, p. 2).

The etiology of overweight/obesity is a cumulatively greater energy intake than is needed for daily activities. In diabetes, there is energy imbalance: more energy intake with less energy expenditure. The excess energy is stored in the form of fat, carbohydrate, or protein. The pathology, which is enlarged fat cells, produces detrimental health consequences that depend on two major factors (Bray, 2008), namely:

- The mass of fat that leads to changes in body configuration and resulting reactions (e.g. stigma, osteoarthritis, or sleep apnea).
- The second is the location of the fat cells. The fat cells enlarge that may be accentuated with increased intra-abdominal or visceral fat. Visceral fat cells produce adipocytokines, inflammatory markers, vascular factors, and leptin which in turn cause metabolic derangements like diabetes, atherogenic dyslipidemia (decreased HDL cholesterol and increased triglycerides).

In children, the relationship between BMI and body fat varies considerably with age and with pubertal maturation; however, when adjusted for age and gender, BMI can point mass.

Many countries are following the standardized charting, the so-called BMI centile charts that use National BMI reference data and facilitate the graphical plotting of serial BMI measurements in individual patients. These charts are often based on arbitrary statistical



measures and not on biological data related to the risk of later morbidity. (Farooqi & O’Rahilly, 2008)

The U.S. Preventive Services Task Force along with health organizations has endorsed periodic measurement of height and weight for all patients. The U.S. Department of Health and Human Services Agency for Healthcare Research and Quality (AHRQ) checklist for health recommends that all men and women have their body mass index (BMI) calculated to screen for overweight/obesity.

Communities can help to address the problems (as per paper entitled “The Surgeon General’s Call to Action to Prevent and Decrease Overweight and Obesity”). Some of the suggestions:

- Requiring physical education at all school grades,
- Providing more healthy food options on schools campuses, and
- Providing safe and accessible recreational facilities for residents of all ages.

In the article, “A Potential Decline in Life Expectancy in the United States in the 21<sup>st</sup> Century,” researchers stipulated that if the prevalence of overweight/obesity continues to rise, especially at younger ages, the negative effect on health and longevity in the coming decades could be much worse. Moreover, overweight/obesity is also linked to depression and IPV. This leads us to the next section of this paper (Bailey, 2006).

## 2.2 CAUSES OF OVERWEIGHT/OBESITY

Modern lifestyle characterized by inactivity and overweight/obesity is a risk factor leading to diabetes and diseases with high mortality: insulin resistance, lipid disorders, hypertension, and vascular disease (Blaum, 2007, p. 2).

Food is cheaper, particularly high-fat foods. There are continuous changes in the nature of work, time pressures in the daily living “due to the rapid evolution of two- and single-parent families, who often rely on quick, convenient food preparation or takeout” (Burd-Sharps et al., 2008).

Women are more susceptible to overweight/obesity. They suffer economic harm as they become more inactive when their body mass grows. Census shows that in poor Latino families, those living below the poverty line keep their children indoors for fear of neighborhood violence, giving way to inactivity among the young (Bray, 2008).

Besides the obvious causes for overweight/obesity, such as overeating and physical inactivity, there are also some less obvious ones. The Fat Mass and Overweight/obesity Associated, also known as FTO is a gene appears to be related to human overweight/obesity. The FTO gene is highly expressed in the hypothalamus and pancreatic islets. A study that carried out in Europe for variants of FTO identified an overweight/obesity risk allele. The results indicated that subjects with one copy of the allele weighed on average 1.2 kg more than people with no copies and subjects with two

copies weighed 3 kg more and had a 1.67-fold higher risk of overweight/obesity than those with no copies (Frayling, 2007).

The assessment of severely obese children and indeed adults should be directed at screening for potentially treatable endocrine and neurological conditions and identifying genetic conditions to that appropriate genetic counseling and in some cases treatment can be instituted (Bray, 2008, p. 1).

Survey studies conducted among patients and physicians uniformly demonstrate that physicians are failing to adequately identify the overweight and mildly obese patient, although there is greater recognition for the moderately to severely obese patient, particularly when accompanied by co-morbid conditions.

Diet, exercise and enough sleep are the keys to a successful diabetic regimen; above all, full cooperation from people suffering from this disease must be attained. Teamwork is essential. Sacrifice and care for one another are needed. Away from fat-filled foods, keep on monitoring blood pressure, glucose, and keep on following what the doctor and other health professionals say. With these short reminders, there is no way diabetes can conquer us.

Aerobic exercise is a planned and structured bodily movement resulting in increased oxygen consumption and calorie expenditure. One should aim for a balance in calorie

intake and energy expenditure in the form of exercise such as aerobic exercise. Some simple types of exercise like walking, jogging, swimming, etc. maybe useful.

There is substantial evidence demonstrating that 5% to 10% loss of initial weight is sufficient to reduce, at least in the short term, the risk of many health complications associated with overweight/obesity including essential hypertension, type 2-diabetes, and dyslipidemia.

### **2.3 DEPRESSION**

Anxiety or depression is tense but vague event, intriguing but complex. From Freud's psychoanalysis to the present time of countless researches on anxiety and depression, the subject has become a favorite of many authors and scholars. Depression will remain in our emotions because of the many negative experiences we have in our lives. Changes in everything create problems and confusions. Financial problems, relationships, way of life, above all violence, all contribute to depression. Women are most susceptible to depression, particularly depression as a result of intimate partner violence.

Depression is a universal, timeless, and ageless human affliction (Hammen, 1997). Depression is also a symptom, a syndrome, a single condition, or a spectrum of biopsychosocial manifestations, and is the most common mental disorder (Jablensky 1987, cited by Flynn and Cappeliez, 1993, p. 1). Depression is a central part of human

experience and is characterized by loss, isolation, hopelessness, and emptiness (Reinecke, 2002, p. 1).

The World Health Organization described depression as the leading cause of disability as measured by years lived with disability and the fourth leading contributor to the global burden of disease (disability adjusted life years) in 2000. By the year 2020, depression is projected to reach second place of the ranking of disability adjusted life years calculated for all ages, both sexes (Gilliam et al., 2006).

The National Institute of Mental Health (2001, as cited in Martin, Li, Casanueva, Harris-Britt, Kupper, & Cloutier, 2006, p. 222) cites the most common psychiatric disorders found in the adult U.S. population, which are depressive order dysthymic disorder, and bipolar disorder. Depression is twice as common among females than among males.

The lifetime prevalence of depression among women has been estimated to be between 10% and 25% in community samples, with the prevalence peaking during women's reproductive years (Frank, Weihs, Minerva, & Lieberman, 1998; Kornstein, 1997; Szewczyk & Chennault, 1997; Williams et al., 1995; Wisner, Gelenberg, Leonard, Zarin, & Frank, 1999; Wu & Anthony, 2000, as cited in Martin et al., 2006, p. 222).

However, women with disabilities are at comparable or greater risk for abuse than women without disabilities, and the violence might in the form of IPV, sexual assault or personal assistant assault.

According to Weissman et al. (1996, cited in Üstün, 2001, p. 35), depressive disorders with accompanying biological, behavioral, and cognitive changes, are the most common forms of mental disorders in community health care settings, and are associated with significant disability.

There is a subjective experience of misery and the individual suffering depression experiences his mood as different from ordinary sadness, either in degree or in quality (Gilliam et al., 2006, p. 15). The sadness is accompanied by irritability or anxiety.

Parker (2000, as cited in Gilliam et al., 2006, p. 22) suggests three subtypes of depression, namely:

- 1.) Psychotic
- 2.) Melancholic
- 3.) Non-melancholic

Intimate partner violence significantly increases the risk for serious mental health consequences for victims, including depression, traumatic and posttraumatic stress disorder, anxiety, and suicidal ideation (Pyrek, 2006; Calder, 2010).

One risk factor is suicidal behavior. According to Kaslow et al (2000, as cited in Houry et al., 2005, p. 1468) physical and non-physical partner abuse were risk factors for suicide attempts among African American women. Elliott, Pages, Russo, Wilson, & Roy-Byrne

(1996, as cited in Houry et al., p. 1468) reported that history of physical abuse was common on 31% of suicide attempters who required medical hospitalization and 56% of suicide attempters who were referred for psychiatric treatment.

Campbell, Clauw, & Keefe (2003, as cited in Koopman et al., 2007, p. 439) found that moderate to severe depression was predicted by physical abuse coupled with daily stress among battered women. In Bergman and colleagues' (Bergman, Larsson, Brismar, & Klang, 1987) study of battered women, approximately one third of abused women reported depressive symptoms. A meta-analysis of 18 studies (Golding, 1999) found a mean prevalence of depression in 47.6% of abused women. Of abused women, 18% meet criteria for current major depressive disorder (Stein & Kennedy, 2001).

Previous researches indicated that overweight/obesity might be significantly associated with depression (Stunkard et al, 2003; Faith et al, 2002). There has been recent evidence that stress is associated with adiposity, and both cortisone and leptin have been implicated in linking the hypothalamic-pituitary adrenocortical (HPA) axis and adipose tissue. Distress could contribute to overeating and overweight (Cooke and Wardle, 2007, p. 238).

The National Institute of Mental Health (NIMH) in 2000 estimated that 9.5% of the U.S. populations suffer from a depressive illness in any given year (Kessler et al, 2005).

Further studies on physical violence produce a link between depression and IPV. According to Plichta (2004, as cited in Koopman, Ismailji, Palesh, Core-Felton, Narayanan, et al., 2007, p. 440), physical violence by intimate partners is linked to physical health problems, then to depression. Injuries are the most visible and immediate effects of physical and sexual abuse, and the level of physical abuse is strongly related to injuries.

However, Sutherland, Bybee, & Sullivan (2002, as cited in Koopman et al., p. 440) found in a study that abuse-related injuries were not significantly associated with the physical health symptoms as reported by the survivors. Campbell et al. (2003) and Plichta (2004, as cited in Koopman et al.) found pain as one of the major symptoms reported by abused women, who suffer more than other women from chronic pain such as headaches, abdominal and pelvic pain, and back pain. The chronic pain results in depression.

## **2.4 OVERWEIGHT/OBESITY AND DEPRESSION**

This section deals with the question: Does overweight/obesity lead to depression then to IPV?

Blaine, Rodman & Newman (2007, p. 66) conducted a meta-analysis of 117 weight loss treatment tests found that weight loss treatment was associated with lowered depression and increased self-esteem. As a result, treatment effects on depression and self-esteem were moderated; however, actual weight loss moderated treatment effects on self-esteem



but not depression. Only treatments that produced actual weight loss predicted increased self-esteem whereas improvements in depression were independent of weight loss.

Weight loss treatment has some psychological effects. Stunkard and Rush (1974, as cited in Blaine et al., 2007, p. 67) found a high incidence of depressive responses to weight loss treatments among obese persons, but during the time of their review treatment of overweight/obesity consisted of fasts and very low-calorie diets administered by the hospital.

Likewise, Wadden and Stunkard (1985, as cited in Blaine et al., p. 67) reviewed some studies from the late 1960s and early 1970s using semi-starvation diets that found negative emotional reactions to weight loss treatment. This was explained by the fact that early diet-based treatment programs which imposed semi-starvation were traumatic to patients, added to the experience of hospitalization.

Blaine (2008) suggests that experimentation provides the best evidence of a causal hypothesis. Although depressive disorder cannot be ethically manipulated, studies that manipulate short-term depressive mood find that it does affect eating behavior. Baucom & Aiken (1981, as cited in Blaine, 2008, p. 67) conducted a study wherein depressed and nondepressed mood were experimentally induced in obese and nonobese dieters or nondieters. After the mood induction, eating behavior was covertly measured. They found that dieters ate more when depressed than when non-depressed, and the reverse was true for nondieters.

Bekker, van de Meerendonk, & Mollerus (2004, as cited in Blaine, 2008, p. 67) found in an experiment that induced negative compared with neutral mood caused more self-reported emotional eating in college students.

Koopman et al's (2007, p. 451) study found that psychological abuse was significantly related to the level of women's depression, particularly given how difficult it was to define and assess psychological abuse, and that psychological abuse is inherent in virtually all forms of abuse.

Studies conducted on the relationship between overweight/obesity and depression found significant correlations between the two, to cite some:

- The study on 30,000 American adults conducted by the National Center for Health Statistics (2006) found that depression and body mass index (BMI) correlated at .08 (Blaine, 2009, p. 1191).
- The survey of 20,000 youth by the National Longitudinal Study of Adolescent Health in 1995 found small correlations between depression and BMI:  $-.08$  and  $-.01$  for girls and boys, respectively (Needham & Crosnoe, 2005, cited in Blaine, 2009).

Overweight/obesity also points to psychosocial effects in the form of stereotyping overweight/obesity across gender, age, and culture. Harris, Harris, & Bochner (1982, as

cited in Tillman, Kehle, Bray, Chafouleas, & Grigerick, 2007, p. 69) conducted a seminal study of Australian university students who described obese people as significantly lower in intelligence, athleticism, attractiveness, and popularity than average-weight targets.

Overweight/obesity is a deeply stigmatizing attribute that prompts negative stereotyping and discrimination in others, which, in turn, causes depression and other negative psychological and social outcomes (Brownness, Puhl, Schwartz, & Rudd, 2005; Puhl & Brownell, 2006, cited in Blaine, 2009, p. 1191).

However, Blaine (2009) further revealed that there is weak cross-sectional evidence linking depression and overweight/obesity, but this later finding can lead to further theories. Children's stigmatization of obese peers is on the rise; overweight girls had less participation in school organizations and fewer dates, and with a pattern of decreased social interactions until college (Tillman et al., 2007, p. 70).

In a meta-analysis of 16 studies, Blaine (2009, p. 1190) found the results to confirm that depressed people were at significantly higher risk for developing overweight/obesity and that it was particularly high for adolescent females. The findings "highlighted the importance of depression screening and treatment programs especially among adolescents, to assist in the prevention of adult overweight/obesity".

According to Roberts, Deleger, Strawbridge & Kaplan (2003, as cited in Blaine, 2009, p. 1191), several studies proved that obese compared with nonobese adults at baseline measurement are about two times more likely to be depressed at follow-up measurement.

Discrimination against obese people can lead to depression. Exposure to overweight/obesity stigmatization by others is associated with poor body image, low self-esteem and greater psychological distress (Annis, Cash, & Hrabosky, 2004; Friedman et al., 2005; Myers & Rosen, 1999; cited in Latner et al., 2009, p. 191).

Depression is traditionally considered an outcome or effect, but Blaine (2009) argued that there is a large research literature that attests to the causal effects of depression on an array of chronic illnesses, including hypertension and coronary heart disease. Depression then can cause overweight/obesity. Eating and energy expenditure are often proposed as intervening constructs in the depression-overweight/obesity relationship. The theory suggests that depression indirectly causes behaviors as emotional eating, eating calorie-dense food, and decreased physical activity (Blaine, 2009, p. 1191).

According to Blaine (2009), studies that manipulated short-term depressive mood found depression affected eating behavior. In one study (Baucom & Aiken, 1981), depressed and nondepressed mood was experimentally induced in obese and nonobese dieters or nondieters. After the mood induction, the researchers covertly measured the participants' eating behavior, and found out that dieters ate more when depressed than when nondepressed and the reverse was true for nondieters.

In a study by Bekker, van de Meerendonk, & Mollerus (2004, cited in Blaine, 2009, p. 1191), induced negative compared with neutral mood caused more self-reported emotional eating in college students, although the study lacked some constructs to be considered valid.

Moreover, Blaine (2009) went further by conducting a longitudinal study to evaluate the hypothesis that depression causes weight gain. Longitudinal study is the best type of evidence. 'Longitudinal studies establish temporal priority, thereby ruling out the alternative causation that threatens cross-sectional studies' (Blaine, p. 1191). This was similarly acknowledged in a recent review by Faith, Matz, & Jorge (2002) which said that longitudinal research to acquire knowledge and data between depression and weight control is relevant to the study of depression and overweight/obesity.

The articles used in the meta-analysis by Blaine (2009) were sourced from databases of MEDLINE and PsycINFO after using search terms *overweight/obesity*, *depression*, and *longitudinal*. Articles were included if they employed a longitudinal design with a baseline measure of depression and a follow-up measure of weight change or overweight/obesity status. The articles were coded with respect to the following variables: sample size, sample age (coded adolescent or adult), sample sex, mean age of subjects at baseline measure, duration of study (time in years between baseline and follow-up measures), analysis type (coded uncontrolled or controlled), and measure of

depression used in the study. Blaine (2009) used Comprehensive Meta Analysis Version 2 (2005) for the data conversion and meta-analysis.

The results revealed that of the 16 studies included in the meta-analysis, the effect size  $Z$  scores ranged from  $-3.35$  to  $20.22$ , with most (18 out of the 23) samples providing data that depression leads to weight gain. This was reached after using a random effects model to assess the overall relationship between depression and weight control, yielding a significant population effect size estimate of  $1.47$  (95% CI:  $1.16, 1.85$ ), and indicating that depressed people at baseline measurement are about 1.8 times more likely than nondepressed people to have obese status or weight gain at follow-up measurement.

Moreover, Blaine (2009, p. 1192) concluded that ‘...controlling important confounding variables such as baseline BMI strengthened the causal analysis but slightly reduced the size of the effect of depression on weight change, although this meta-effect was still significant.’ Also, adolescent and adult samples differ in the effect of depression on overweight/obesity status. The adolescent samples in the analysis found evidence of significant risk among girls but none among boys for developing later overweight/obesity. It also indicated that adolescents with depression are about 2.5 times more likely than nondepressed adolescents to have overweight/obesity status or weight gain at follow-up measurement. But after controlling for baseline BMI and other variables, it was found out that depression predicted later overweight/obesity only in girls.

There was however a misleading finding in Blaine's (2009) meta-analysis. Three from the eleven samples of adults provided estimates that depression lowers the risk of overweight/obesity status, but five samples proved otherwise. This was further investigated and found out that the age of the adult subjects helped account for the different estimates. The adults to whom depression was found to reduce the risk of overweight/obesity, or produce weight loss, were older. 'This meant that the implications of depression for later weight control are more dependent on other factors (i.e. chronic illness in adults), especially older adults, than in adolescents' (Blaine, 2009, p. 1195).

The longitudinal research of 33,000 subjects was concluded to state that depression caused overweight/obesity, and that depressed compared with nondepressed people are significantly more likely to be obese at follow-up measurement. This is common in female adolescents (termed as heightened vulnerability by Blaine). Depressed female teens are about two-and-a-half times to be obese at follow-up measurement than are nondepressed female teens. According to Blaine (2009) the effect of adolescent depression on overweight/obesity in the young adult years is larger in size than the effect of passive smoking on the development of cancers (Vineis et al., 2005, as cited in Blaine).

Blaine (2009) mentioned other research, such as that of Stice, Presnell, & Spangler (2002) which found out that, after controlling for potential confounds, depression in adolescent girls accounted for binge eating twenty months later. Another study is that of 2,400 weight losers from the National Weight Control Registry in which those who

‘regained weight from baseline to one-year follow-up measurement has significant increases in depression during that time while the weight maintainers’ depression levels did not change’ (Phelan, Hill, Lang, Dibello, & Wing, 2003, as cited in Blaine, 2009, p. 1196).

## **2.5 INTIMATE PARTNER VIOLENCE (IPV)**

In 1996, the 49<sup>th</sup> World Health Assembly declared violence a growing and major health threat throughout the world and called for more stringent measures to address violence, addressing the issue upon policy makers, academicians, public health professionals, and healthcare workers to address its causes and consequences.

Intimate partner violence or IPV is a major problem in society as more and more women are victims of violence, including children. IPV involves violence among intimates, that’s why it is easy to commit and also becoming very common in societies of different cultures.

Mitchell & James (2009, p. 1) define intimate partner violence as “threatened, attempted or completed physical assault or unwanted sex by a current or former intimate partner, and it is violence between intimates”. Intimate includes spouses or ex-spouses alone, but sometimes included are non-married cohabiting partners, or partners in any romantic relationship.



The World Health Organization (2002, as cited in Dutton, Green, Kaltman, Roesch, Zeffiro, & Krause, 2006) defined violence as “the intentional use of physical force or power, intentional or actual, against oneself, against another person, or against a group or community that either results in, or has high likelihood of, resulting in injury, death, psychological harm, maldevelopment, or deprivation.”

Common forms of interpersonal violence are family violence, community violence (e.g. stranger rape, muggings), and institutional violence (e.g., abuse of inmates). Family violence can be separated into child abuse, IVP, and elder abuse.

According to the American Medical Association (1992, as cited in Koopman, Ismailji, Holmes, Classen, Palesh, & Wales, 2005), intimate partner violence involves coercive behaviors perpetrated by someone who had a close relationship with the victim. It is characterized by repeated battering and injury, psychological abuse, sexual assault, progressive social isolation, deprivation and intimidation.

The inclusion of the use of power as a form of violence is particularly relevant to the definition of IPV. Abuse of power includes the use of threats, intimidation, or acts of omission or commission to reinforce the inequality of the relationship. IPV is a form of interpersonal violence, one of three typologies that also include self-violence and collective violence. Self-violence includes personal abuse and suicide; interpersonal violence includes family and community violence; and collective violence includes social, political, and economic violence.

The Centers for Disease Control and Prevention (CDC) suggested the term ‘Intimate Partner Violence’ to distinguish this particular problem from other forms of violence that occur in a domestic setting, as there are other forms of violence inflicted on individuals, especially women, like child maltreatment and elder abuse (Nicolaidis & Paranjape, 2009, p. 20).

More studies have been conducted on the extent of IPV and other forms of violence on the health of individuals, particularly women victims. In one study of 1,000 patients followed over a 3-year period, two thirds of symptoms prompted a medical evaluation, but an organic etiology was found in only 16%. Unexplained symptoms are associated with higher levels of depression, psychological distress, health-care utilization, and a history of prior physical and/or sexual abuse (Nicolaidis and Liebschutz, 2009, p. 134).

According to Mitchell and James (2009), ‘violence is a health risk ... its costs in terms of economics and human suffering make it a major health problem.’

Individuals exposed to trauma report poorer health status and more physical symptoms than do similar nonexposed individuals and have real poor health when diagnosed (Dutton, Green, Kaltman, Roesch, Zeffiro & Krause, 2006, p. 956). Likewise, B. L. Green & Kimerling ( 2004, as cited in Dutton et al., 2006, p. 956) argue that there is evidence that trauma exposure is associated with greater functional impairment and a poorer course of disease among individuals with specific medical conditions.

IPV is a serious public health problem in the United States, at the same time an economic burden for the healthcare system of the government and the victims themselves. It poses a serious threat to the physical and psychological well being of mostly-women victims. Approximately 1.5 million women in the United States are physically or sexually abused by their intimate partner each year (Rennison & Welchans, 2000; Tjaden & Thoennes, 2000, as cited in Martin, Li, Casanueva, Harris-Britt, Kupper, & Cloutier, 2006, p. 222). The United States exceeds all other developed nations in the per capita rate of rapes, homicides, and suicides and in the percentage of its population prisons (Edlin and Golanty, 2010, p. 521).

Max, Rice, Finkelstein, Bardwell, and Leadbetter (2004, as cited in Brown, Finkelstein, & Mercy, 2008) estimated that the medical costs of IPV against U.S. women who were victimized in the past 12 months were approximately \$4 billion in 1995, and \$5.4 billion in 2003. However, Brown et al.'s (2008, p. 1759) own estimates after their study revealed that medical costs of IPV against adult women in the first 12 months post victimization total \$6.0 billion, with a 95% confidence interval from \$2.7 billion to \$9.7 billion.

In Brown et al.'s (2008) study, they used the estimates from the National Violence Against Women Survey from the number of adult women in the United States in 2003, which was 112.1 million (Bureau of the Census, 2005) to estimate the total number of adult women victims and victimizations by type of IPV. They arrived at the following figures: For the year 2003, there were 224,000 victims of rape, 1,457,000 victims of

physical assault, and 560,000 stalking victims, and the total number of adult women victims was 2,018,000. They combined the average number of incidents per victim, and there were 359,000 rapes, 4,955,000 physical assaults, and 560,000 victims of stalking in 2003.

According to Martin et al. (2006, p. 222), found in community-based surveys and statewide surveys was a high rate of violence directed against women during their childbearing years; they experience abuse around the time of pregnancy. This results in a number of health problems including depression.

Intimate partner violence is a severe stressor that affects mental health (Calvete, Corral, & Estevez, 2008, p. 886). Koziol-McLain, Coates, & Lowenstein (2001, as cited in Houry, Kaslow, & Thompson, 2005) suggest that IPV is a widespread medical, psychological, social, and public health problem.

The U.S. Department of Justice (1998, as cited by Houry et al., p. 1467) estimates that almost one million women are victims of IPV each year, and 1,800 victims are murdered by their partners. A more alarming report from Tjaden & Thoennes (2000, as cited in Vaeth, Ramisetty-Mikler, & Caetano, 2009, p. 1) is that approximately 1.5 million American women and 830,000 American men are victims of IPV each year.

Women and children are the most vulnerable. The explanation on why women are mostly the victims is, of course, obvious – women are the weaker part of creation, i.e. when it

comes to physical attributes. Men exert their power over women through their physical strength, but this is not to say that only women experience depression as an outcome of IPV, or that only women experience IPV. Men do experience IPV.

Shoma Chatterji (2006, p. 6), author of *Gender and Conflict*, talks of the concept and identity of 'Woman':

Gender is at the heart of all historical, social and cultural negotiations. Central to such negotiation is the figure of Woman, which has long served as a powerful and ambivalent patriarchal symbol, heavily over-determined as an expression of the male psyche. Feminist cultural history points out that the figure of Woman cannot be fixed in her function as patriarchal value. The 'image of woman' has also been a site of gendered discourse drawn from the specific, socio-cultural experiences of women and shared by women, which negotiates a space within, and sometimes resists patriarchal domination.

In war or conflict, women and children are the most vulnerable. Chatterji (2006, p. xliv) says:

Women and children make up to 80% of the refugees or internally displaced persons. Women fall prey to sexual violence, torture, rape, forced prostitution, sexual slavery, and forced conscription in war. Women lose fathers, husbands, sons, property, and employment in war.

Surveys and interview-based studies establish a link between intimate partner violence (IPV) and adverse health effects (Thomas, Joshi, Wittenberg, & McCloskey, 2008, p. 1252).

Abused women are more likely to be diagnosed with serious health conditions such as migraines, gastrointestinal disorders, diabetes (Coker, Smith et al., 2000), sexually transmitted infections (Johnson & Hellerstedt, 2002; Martin et al., 1999), and cervical cancer (Coker, Sanderson, Fadden, & Pirisi, 2000). Women who have experienced partner violence are at significantly greater risk for heart disease, stroke, asthma, arthritis, heavy drinking, and high-risk sexual practices, than are women who have not experienced partner violence (Mitchell and James, 2009).

## **2.6 IPV AND DEPRESSION**

From the start of our research, all evidence point to IPV as a cause for depression among women who can be described with different demographic characteristics: African American, white or black, teens, pregnant or non-pregnant, adult, women with disabilities, etc.

Moreover, several studies have shown that adverse childhood experiences such as having witnessed one's mother being abused; having experienced emotional, physical, or sexual abuse; or having grown up with a problem drinker, alcoholic, or drug abuser are associated with mental distress, including recent and lifelong depression and attempted

suicide (Anda et al., 2002; Chapman et al., 2004; Dube et al., 2001; cited in Vaeth et al., 2009, pp. 2-3).

According to Dienemann, Boyle, Resnick, Widerhorn, & Campbell (2000, as cited in Koopman et al., 2007, p. 439), depression is a common health response to intimate partner violence. Women who are victims of IPV have shown to exhibit declines in mental health after abuse occurs. A single episode of partner abuse alone can have tremendous psychological effects including shame and guilt, terror, decreased self-esteem, insomnia and nightmares, a sense of disorder, depression, and overall unhappiness (Fischbach & Herbert, 1997; Frank & Rodowski, 1999; Marcus, 1994, as cited in Koopman et al, p. 439).

Additionally, women victims of IPV report more chronic physical symptoms such as headaches, chronic pain, and chronic fatigue (Nicolaidis, 2004). Depression and other psychiatric symptoms such as posttraumatic stress disorder (PTSD) are more prevalent in women exposed to IPV (Golding, 1999).

Outcomes of IPV gathered from literature review by Brown et al. (2008, p. 1753) are ‘suicide, physical injuries, depression, anxiety, smoking, alcohol abuse, drug abuse, sexually transmitted diseases (STDs), cervical cancer, gastrointestinal diseases, eating disorders, femicide, and posttraumatic stress disorder.’

In addition, IPV is associated with women's behavioral health — for instance, Gerber, Banz, Lichter, Williams, & McCloskey (2005, as cited in Thomas et al., 2008, p. 1252) stated that abused women drink and smoke at higher rates than women who are not in abusive relationships.

Depression as a result of violence during the time of pregnancy should be provided paramount concern. This type of depression has been linked to numerous negative health-related behaviors and outcomes, including poor nutrition, increased substance abuse including alcohol, drugs, tobacco, etc., inadequate prenatal care, decreased fetal growth, preeclampsia, premature infant delivery, delivery of low-birth-weight infants, postnatal depression, and suicide (Barrio & Burt, 2000; Hoffman & Hatch, 2000; Horrigan, Schroeder & Schaffer, 2000; Kurki, Hiilesmaa, Raitasalo, Mattila, & Ylikorkala, 2000; Llewellyn et al., 1997; Najman, Andersen, Bor, O'Callaghan, & Williams, 2000; Spinelli, 1998, as cited in Martin et al., 2006, p. 223).

Anita and Jay Silverman conducted a study published in the April 2002 edition of the *Journal of the American Medical Women's Association* (as cited in Chatterji, 2006, p. xliii) on 160 South Asian women living in communities throughout Boston area in 1998, and found that 40 percent of them were victims of 'male-perpetrated intimate partner violence'. The findings revealed that 90 percent had been abused within the past year, nearly 75 percent were married, more than half (51.6 percent) had children, and two-thirds of those who reported physical abuse also reported sexual abuse. (Simona, 1996, as cited in Chatterji, p. xliii)



Feelings of self-dislike and worthlessness were found in the study by Houry et al. (2005, p. 1474) and these were predictive of suicide attempts in the emergency department (ED) patients. Hall, Platt, & Hall (1999, as cited in Houry et al, p. 1474) reported feelings of worthlessness in patients with psychotic depression, and these feelings could be correlated with other psychopathology or personality disorders, and they appeared to be predictive of suicide attempts in certain patient populations.

Women with disabilities are also victims of abuse. They are at comparable or greater risk for abuse than women without disabilities. Forms of violence that these women with disabilities experience are IPV, sexual assault, and personal assistant abuse (Brownridge, 2006; Martin et al., 2006; Nosek, Howland, Rintala, Young, & Chanpong, 1997; Powers et al., 2002; Sobsey & Doe, 1991; Turk & Brown, 1993; Young, Nosek, Howland, Chanpong, & Rintala, 1997, all cited in Oswald, Renker, Hughes, Arthur, Powers, & Curry, 2008, p. 796).

This was supported by Nosek et al. (1997, as cited in Oswald et al., 2008, p. 796) who said that women with physical disabilities were at greater risk for any type of abuse from their intimate partners, compared without disabilities. They experienced abuse within the past year, but also with longer physical and sexual abuse.

In Houry et al's (2005, p. 1474) study, they used the 21-item BDI-II instrument which yielded 78% concordance with four specific symptoms such sadness, self-dislike, suicidal

thoughts, and feelings of worthlessness to have a correlation with suicide attempts. Their conclusion: African American women who are low income and victims of IPV had higher levels of depressive symptoms than non-attempters who also had experience of IPV. “Symptoms of sadness self-dislike, suicidal thoughts, and feelings or worthlessness predicted suicide attempt status 78% of the time” (Houry et al., p. 1474).

On the other hand, coping with IPV is another big problem of battered women. Research conducted by Carver Scheier, & Weintraub (1989) and Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth (2001, as cited in Calvete, Corral & Estevez, 2008) found that coping responses play an important role in the psychological adjustment process of the women victims.

Folkman & Moskowitz (2004, as cited in Zink, Jacobson Jr., Pabst, Regan & Fisher, 2006, p. 635) defined *coping* as the ‘thoughts and behaviors that people use to manage the internal and external demands of situations that are appraised as stressful’ and are grouped into two broad categories: (a) emotion-focused coping in which strategies are used to regulate the distress associated with specific problems and (b) problem-focused coping in which strategies are used to manage specific problems.’

According to Folkman, Lazarus, Gruen, & DeLongis (1986, as cited in Zink et al., 2006, p. 635), problem-focused coping leads to better adjustment when an individual faces a stressful situation that is within his or her control, whereas emotion-focused coping is a more adaptive approach to uncontrollable or unchangeable situations, such as IPV.

Calvete, Corral and Estevez (2008) made their own study of coping responses in women who were victims of IPV with the objectives of assessing what coping responses were more adaptive, and to test both the moderator and mediator roles for coping responses in the relationship between intimate partner violence and symptoms of anxiety and depression.

Calvete et al., (2008, p. 890) used a sample of 1,159 participants from the council of Bizkaia, a province in northern Spain, whose IPV experience was pronounced during the past year. The experience consisted of four or more acts of minor physical aggression, two or more severe acts, or any combination of four or more severe and minor acts during the past year of their relationships. The final sample who met the criterion were 113 women who were patients in services for victimization by severe partner violence, and the rest came from diverse women's associations and work centers (health centers and home assistance services). The participants had a mean age of 39.23 years; 49.7% were married, 20.8% were single, 8.1% cohabited with their partners, 20.1% were separated or divorced, and 0.7% widowed.

The study measured physical aggression with the use of the Physical Assault scale of the CTS2 in which the participants were required to endorse the frequencies of acts of violence that their partners did to them. Psychological abuse was also measured with the use of Psychological Abuse Inventory (PAI; Calvete, Corral, & Estevez, 2005, as cited in Calvete et al, 2008) that included 17 abusive acts (e.g., controlling what the victim can

and cannot do, prohibiting access to transportation or telephone, deliberately doing something to make the victim feel diminished).

Coping responses were assessed by the Responses to Stress Questionnaire which consisted of 57 items that assessed both involuntary stress reactivity and volitional coping responses to a specific domain of stress. The participants reported their volitional responses to the acts of intimate partner violence. They were asked to rate the extent to which they had used each coping strategy on a scale ranging from 0 (*never*) to 3 (*a lot*).

The results of Calvete et al's (2008, p. 893) study revealed that the mean values for depression and anxiety were high. Analyses indicated that women from specialized services scored significantly higher on depression (38.85 vs. 19.95), anxiety (20.93 vs. 9.45), disengagement coping (15.66 vs. 8.82), physical aggression (43.30 vs. 7.51), and psychological abuse (114.37 vs. 50.94). Depression correlated .83 with anxiety symptoms, and physical aggression correlated .62 with psychological abuse.

The results showed that coping responses did not moderate the impact of intimate partner violence on symptoms of anxiety and depression, although both secondary control coping and disengagement coping were directly associated with distress; and disengagement coping was the type of coping with the strongest association with psychological symptoms. Anxiety and depression were associated with this kind of strategy. (Calvete et al., 2008, p. 897)

## **2.7 IPV AND OVERWEIGHT/OBESITY**

In this section of the literature review, we have gathered evidence that overweight/obesity and IPV have a correlation. IPV can lead to overweight/obesity, or overweight/obesity is an outcome of IPV but not IPV as an outcome of overweight/obesity. Obese people do not become violent but victims of violence or abused women, women with disabilities who are victims of rape and physical assault, and children who have been victims of incest, rape and violence, do become obese as a result of the depressed mood which is overeating or physical inactivity.

Women victims of IPV suffer from anxiety, substance abuse, overweight/obesity, or headaches, among others (Edlin & Golanty, 2010, p. 509). Every two or three minutes in the United States a woman is sexually assaulted; about 28% of college women reported that they had suffered from rape or attempted rape since the age of 14 (Edlin & Golanty, 2010, p. 514). As a result, the women victims suffer from various symptoms to include headache, fatigue sleep disturbances, recurrent nausea, eating disorders resulting to overweight/obesity.

Examples of sexual violence include rape, incest, attempted rape, and unwanted sexual touching. There has been a significant increase in public recognition of sexual crimes against women, including intense media scrutiny of rape issues in high-profile rape trials such as the one involving basketball star Kobe Bryant. (Edlin & Golanty, 2010, p. 514)

Acquaintance rape, another term related to IPV, which Edlin and Golanty (2010) described as date rape, occurs when a person known to the victim uses verbal or physical force to coerce the victim into having sex. About half of all cases of sexual violence against women are committed by a friend or acquaintance; about one-quarter are committed by an intimate partner. High school and college students are the most vulnerable to acquaintance rape. Cultural views on sexual relationships between men and women play a significant role in acquaintance rape.

One case study on IPV leading to overweight/obesity is the case of the couple Ian and Patrician England.

Holmes (2005) cites the story of Ian and Patricia who were found dead in each other's arms. The story is told that Ian was a college professor who suffered from depression for several years and was under the care of a psychiatrist. Patricia was also a college professor and fought a constant battle with overweight/obesity. Ian, from Ireland, had been arrested two times for domestic abuse, and Patricia had been treated in the hospital several times for broken bones, lacerations, and other minor injuries. Despite the violence in the family, relatives and friends said that the couple loved each other, and, as is typical of abusers, each time Ian abused his wife, he apologized profusely and promised not to do it again.

Neighbors said that the couple had a loud fight the weekend before their deaths. One neighbor said that she heard some furniture falling, but because this had happened several

times in the past, she did not call the police. Neither reported for work at their university, and Patricia's sister came to their home after attempts to call them failed. She found them in their bedroom on the floor next to the door. Their families had no notion that Ian and Patricia were thinking of suicide. Both were completely devoted to each other, the relatives stated, despite his violent temper and their problems with the criminal justice system, and they seemed willing to end their lives in each other's arms. (Holmes, 2005, pp. 70-71)

This is an example of IPV incident with overweight/obesity as an outcome. Before the suicide, Patricia suffered depression and overweight/obesity in turn.

The study of Vaeth et al. (2009) of 1,135 couples found that psychological as well as physical aggression in IPV was associated with depression. The study was a mix of one third White, one third Hispanic, one fifth Black, and the remaining part of mixed ethnicity, that showed that among women, the rates of depression varied significantly in relation to both "male to female" (MF) and "female to male" (FM) psychological and physical aggression; but among men, the rates of depression did not vary significantly in relation to MF or FM aggression. Significantly, for each category of aggression, a higher prevalence of depression was seen than in the no aggression groups. "A higher prevalence of depression was also seen among women, but not men, who had been victimized by violence as a child as well as among those who had observed parental threats or actual violence" (Vaeth et al., 2009, p. 10). For women, there was greater likelihood of depression when exposed to parental violence.

The findings of Vaeth et al. (2009, p. 12) further revealed that “the rates of depression among individuals involved in relationships with severe psychological and physical aggression were elevated, especially for women...”

But among men, childhood abuse was associated with depression, and that infrequent binge drinking served as a means to moderate depression (Hill & Angel, 2005, cited in Vaeth et al, p. 14).

Physical and mental health have correlations with IPV. Studies by Campbell (2002), Campbell et al., (2002), and Coker, Smith, Bethea, King & McKeown (2000, as cited in Thomas, Joshi, Wittenberg, & McCloskey, 2008) have found that women who experience IPV are more likely to report diminished physical and mental health.

Coker, Smith et al., (2000, as cited in Thomas et al, 2008, p. 1253) reported that abused women are more likely to be diagnosed with serious health conditions such as migraines gastrointestinal disorders, diabetes, sexually transmitted infections and cervical cancer. IPV is also associated with chronic physical symptoms such as headaches, chronic pain, and chronic fatigue (Nicolaidis, 2004, as cited in Thomas et al., 2008).

Abused women drink and smoke at higher rates than women who are not in abusive relationships (Gerber, Ganz, Lichter, Williams & McCloskey, 2005, as cited in Thomas et al., 2008). Sutherland et al. (2002, as cited in Thomas et al., 2008) found correlations



among direct and indirect effects of injuries, depression, life stressors, and stress from abusive relationships on the physical health of women who had experienced IPV. 'They also found that stress significantly mediated the direct relationship between abuse and physical health, accounting for 80% of the indirect effect of abuse on women's physical health' (Thomas et al., 2008, p. 1254).

While women with no physical disabilities experience IPV, Milberger et al (2003), and researchers Young, Nosek, Howland, Chanpong & Rintala (1997, as cited in Thomas et al 2008, p. 1254) found that women with disabilities are at higher risk for abuse from family, friends, caretakers, intimate male partners. Women with disabilities have also been shown to experience all forms of IPV at rates comparable to women without disabilities, but the length of their abuse lasts for significantly longer periods of time than women without disabilities (Thomas et al., 2008, p. 1254).

Thomas et al's (2008, p. 1261) study concluded that stress was 'the conduit by which IPV led to the development of physical illness and to poor behavioral health.' Their study also found three pathways between IPV and health, namely: '(a) IPV directly produces adverse health effects; (b) IPV worsens already-compromised health; and (c) ill health and disability increase dependency on abusive partners.' This is shown in the figure below.

Intimate partner violence (IPV) has many direct short and long-term physical consequences, such as fractures, head trauma, internal organ damage, or even death.

Survivors may also present with physical symptoms that may not appear to have an obvious link to a particular physical assault, and sometimes no medical explanation can be found for such symptoms. An IPV survivor may experience more severe pain or more intense symptoms than a nontraumatized patient with a similar condition.

Nicolaidis & Liebschutz (2009, p. 134) found in a study of 1,000 patients followed over a 3-year period, wherein two-thirds of symptoms prompted a medical evaluation, but an organic etiology was found in only 16%. The unexplained symptoms were associated with higher levels of depression, psychological distress, healthcare utilization, and a history of prior physical and/or sexual abuse.

Numerous large cross-sectional studies show an association between IPV and poorer general health. These studies recruited women from the general population, female members of health-maintenance organizations, or women seeking health care in primary care settings. There were two studies of 3,000 participants each of obstetrics and gynecology patients and health maintenance organization enrollees which found that women with a history of physical or sexual abuse had lower health functioning on all the subscales of the SF-36 (shorter form 20). The studies measured general physical health using a single self-report item taken from the Health Survey Short Form (SF)-36.

There was another of 558 women in the military who found associations between past violence and each of the eight subscales of the SF-36, but only reported results in terms of rape and physical assault (Nicolaidis & Liebschutz, 2009, p. 134).

Golding (1999, as cited in Dutton et al., 2006, p. 958) reported that women who had a history of IPV in the United States had a 3 to 5 times greater likelihood of depression, suicidality, posttraumatic stress (PTSD) and substance abuse than non- victims. The prevalence rates of PTSD among battered women vary from 31% to 84.4% (Golding, 1999; Jones, Hughes, & Unterstaller, 2001, as cited in Dutton et al.). This was further supported by the report of Astin, Lawrence, & Foy (1993), Houskamp & Foy (1991), Kemp, Rawlings, & Green (1991), and Woods (2000), as cited in Dutton et al. (2006) who reported that greater severity and frequency of physical violence, including life threat, was related to the development of PTSD.

Another finding was from Dutton, Goodman, & Bennett (2001) and similarly from Street & Arias (2001, as cited in Dutton et al., 2006, p. 958) who found that greater psychological abuse has been shown to increase posttraumatic symptomatology, and that psychological abuse is a stronger predictor of PTSD than physical abuse among women.

Astin, Ogland-Hand, Coleman & Foy (1995), Messman-Moore, Long, & Siegfried (2000), and Schaaf & McCanne (1998, as cited in Dutton et al., 2006, p. 958) also reported that multiple experiences of victimization throughout adulthood and childhood, especially among women experiencing current IPV with histories of childhood sexual abuse, have been found to be associated with greater PTSD. In a study by Loxton, Schofield, Hussain & Mishra (2006, p. 727), they found that diabetes and low iron were associated with domestic violence.

## 2.8 GENETICS OF HUMAN AGGRESSIVE BEHAVIOR

By far, the most investigated with respect to human aggression is monoamine oxidase A (MAOA) (Fuemmeler, et al, 2008). MAOA is an enzyme which in humans is encoded by the MAOA gene. It is an isozyme of monoamine oxidase. MAOA preferentially deaminates biogenic amines, such as norepinephrine, epinephrine, dopamine, and serotonin. Most studies regarding MAOA have concentrated on detecting behavioral associations with single-nucleotide polymorphisms (SNPs), microsatellites and promoter variable number tandem repeat (VNTR) variants in MAOA. The promoter VNTR variants are known to exhibit significant functional variation and given the high linkage disequilibrium (LD) across the locus. It is possible that the associations between aggression and violence result from their acting as surrogates for the tandem repeat (Craig & Halton, 2009).

Recently, an association between a rare 2 repeats of the VTNR region of MAOA gene and an increase in the likelihood of violence has been found. According to Meyer's research, the MAOA levels in the brain are increased by an average of 34% in patients with major depressive disorder (Meyer, 2006, p. 1211). Some genetic related studies that examine the relationship between MAOA variants and depression have found high-activity variants to major depression in females, depressed suicide in males, major depression and sleep disturbance in males, and major depressive disorder in both males and females (Schulze, 2000; Du, 2002; Du, 2004; Yu, 2005).

Fuemmeler et al (2009) investigated the relation between genotype and depressive symptoms on overweight/obesity in U.S. and observed a genotype  $\times$  depressive symptoms interaction for the polymorphism in the MAOA gene among men, but not women. Men with the active variant of MAOA- and thus low tonic levels of dopamine contributed to higher depressive symptoms and lower reward sensitivity whereby little pleasure was derived from eating resulting in decreased prevalence of overweight/obesity. However, why this potential mechanism might be at play among men but not women is still a question.

## **CHAPTER 3:**

### **RESEARCH DESIGN AND METHODS**

Data from the 2006 Behavioral Risk Factor Surveillance System (BRFSS) was analyzed for the study. The BRFSS is established by the Centers for Disease Control and Prevention (CDC) in 1984. It is the largest, continuously conducted telephone health survey system, which assesses key behavioral risk factors and chronic conditions among adults aged  $\geq 18$  years in all U.S. states and territories. The BRFSS is designed to identify and monitor risk factors for diseases such as diabetes, cancer, overweight/obesity, asthma, nutritional related maladies and more. Mental health is chosen as one of these risk factors. This system can provide abundant data information based on individual-level healthy behaviors of U.S. adults each year. During the survey, the participants was asked to answer several questions that related to healthy behaviors, such as dietary intake (fruits and vegetables), nutrition and physical activity, tobacco and alcohol use, health care access, hypertension, as well as some biological factors including height and weight. BRFSS data have consistently been found to provide valid and reliable estimates when compared to national household surveys (Centers for Disease Control and Prevention, 2007).

### **3.1 STUDY SUBJECTS**

In this study, we analyzed the data collected from women participants of the survey (N=23,154) in 7 states (Arkansas, Hawaii, Louisiana, Montana, Nevada, Virginia and West Virginia), in which both the Anxiety and Depression Module and the Intimate Partner Violence (IPV) Module were implemented in the 2006 BRFSS. Any system missing data were excluded from this study; therefore, a total of 14,362 people were observed in the present study and were the focus of this paper.

### **3.2 DEMOGRAPHIC CHARACTERISTICS**

Demographic characteristics, including age, race/ ethnicity, height and weight, were obtained from the participants' self-reports. Overweight and obesity was defined by BMI [weight (kg) / height<sup>2</sup> (m<sup>2</sup>)] and was classified into three groups: (1) 18.5 – 24.99 kg /m<sup>2</sup> (normal weight), (2) 25 - 29.99 kg /m<sup>2</sup> (overweight), and (3)  $\geq 30$  kg /m<sup>2</sup> (obesity). Previous studies indicated that self-reported height and weight were highly correlated with physical measurements (Kuczmarski et al, 2001; Niedhammer&Bugel, 2000), but self-reports tended to underestimate weight and overestimate height, resulting in lower estimates of overweight and obesity (Niedhammer&Bugel, 2000; Roberts et al, 1995).

Age, race/ ethnicity, and health status were regarded as moderators in this study. Age groups were defined as three groups (years): (1) 18 – 24, (2) 25 – 54, (3) 55+. Race was defined as White/ Non-Hispanic, Black/African American, Hispanic, and Other, by self-report. In addition, we included in the analyses participants' status on smoking (Current Smoker and Not Current smoker), binge drinking (Binge drinking and Not binge

drinking), leisure-time exercise (Had exercise in past 30 days and No exercise), and general health status (Excellent/Very Good/Good Health and Fair/Poor Health). Besides, we used the following socio-economic variables: education level was defined as less than High School (H.S.), H.S. or General Educational Development (G.E.D.) / Some Post H.S., and College Graduates; income level was defined as \$15,000 to \$49,999, \$50,000 to \$74,999, and \$75,000 +; marital status was defined as Married and Unmarried.

### **3.3 OVERWEIGHT/OBESITY-RELATED CO-MORBIDITIES (ORCS)**

The ORCs evaluated in this study included diabetes, heart diseases (heart attack, angina and stroke) and asthma, which were assessed by asking participants whether they had ever been told by a doctor, nurse, or other health professional that they had these diseases (or still had asthma). For diabetes, those who answered that they had not been told so, had diabetes only during pregnancy or had borderline diabetes are classified as “no diabetes”.

### **3.4 INTIMATE PARTNER VIOLENCE (IPV)**

The primary outcome variable in this study was Intimate Partner Violence (IPV). Lifetime sexual IPV was assessed by asking women: “Have you EVER experienced any unwanted sex by a current or former intimate partner?” Lifetime physical IPV was assessed by asking the following question: “Has an intimate partner EVER hit, slapped, pushed, kicked, or hurt you in any way?” Women who reported: a) sexual IPV; b)



physical IPV; or c) both sexual and physical IPV were categorized as having a history of IPV.

### **3.5 DEPRESSION**

The Patient Health Questionnaire-8 (PHQ-8) was used to assess the depression status. The PHQ-8 was conducted in 41 states and territories; it consisted of 8 questions based on the Statistical Manual of Psychiatric Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994; Wittkamp&Naeije, 2007). It was modified from a self-report paper format to a format compatible to telephone interview in order to be used in the 2006 BRFSS. The participants were asked to answer the questions on what they had experienced about emotions or behaviors related to depression during the past two weeks (Appendix 1). The total score for the PHQ-8 ranged from 0 to 14, which also meant the total number of days for participants that might have experienced emotions or behaviors.

In order to separate varying levels of depression, the CDC developed three algorithms (Appendix 2). In this study, we will use the CDC developed Algorithm 3 (Depression severity score is divided into two groups: less than 10 and greater than 10) due to its validity in detecting depression status in the general population and its simplicity in use.

## CHAPTER 4:

### STATISTICAL ANALYSIS

Data were analyzed using multiple logistic regressions to test the odds ratios between overweight/obesity, depression and intimate partner violence. Additionally, descriptive analyses were performed to examine depression status by experience of IPV. Both descriptive and logistic regression analyses have been weighted for the probability of survey sample selections. The data were weighted for the probability of selection of a telephone number, the number of adults in a household, and the number of telephones in a household. A final post stratification adjustment was made for nonresponse and noncoverage of households without telephones. The weights for each relevant factor are multiplied together to get a final weight. The weighting process can be expressed as

$$\text{FINALWT} = \text{GEOWT} * \text{DENWT} * (1/\text{NPH}) * \text{NAD} * \text{CSA} * \text{POSTSTRAT}$$

Where:

- GEOWT: Basic probability of selection among strata (subsets of area code/prefix combinations)
- DENWT: Density (derived from estimated number of household telephone numbers in each bank of telephone numbers)
- 1/NPH: Number of residential telephone numbers in each randomly selected household

- NAD: Number of adults in household
- CSA: Expected/actual cluster size
- POSTSTRAT: age, race, sex adjustment to population

For the logistic regression analyses, the model uses overweight/obesity as the dependent variable and depression or IPV as predictors. After testing the relationships between overweight/obesity, depression and experience of IPV, demographics were added as control factors to the final model. Demographic factors entered as controls included age, gender, race, education, income, employment, and marital status. The conceptual model (Kleinbaum, et al. 2005) is presented as:  $\text{Logit } P(X) = \alpha + \beta E + V + W$

Where

- E=Exposure,
- V=Potential Confounding,
- W=Effective Modifiers

Statistical software SAS v9.1 was utilized for both descriptive and multiple logistic regressions analyses. SAS procedures of SURVEYFREQ were used for the weighted frequency analysis. SAS functions of SURVEY LOGISTIC were used for the logistic model in order to weight the components of sample stratum, cluster and the final weights.

## **CHAPTER 5:**

### **RESULTS**

Out of the 8,066 overweight/obese participants with BMI greater than 25 kg/m<sup>2</sup>, 1,037 (11.99%) reported physical IPV only, 225 (2.74%) had sexual IPV only, and 673 (8.22%) had both physical and sexual IPV. Among the 1,594 participants with depression, a total of 333 (20.89%) reported physical IPV only, 80 (5.02%) had sexual IPV only, and 337 (21.14%) had both physical and sexual IPV (Table 1). Participant characteristics are shown in Table 1. Among all racial/ethnic groups, the non-Hispanic whites have the highest physical IPV rates (11.84%) and sexual IPV rates (3.11%), respectively. But the prevalence of people who had both physical and sexual IPV is highest among Hispanics (9.84%). In addition, the highest prevalence of IPV was observed among those between 18 and 24 years of age, educated less than H.S., unmarried and had an annual income between \$15,000 and \$49,999. For the health conditions and behavior factors category, we can also suggest that common sense guides our analysis of the pattern in this category (Table 1). Smokers, those who indulged in binge drinking, physical inactivity and those who reported fair or poor health were more common to experience all kinds of IPV; those who had diabetes, heart disease, and asthma were more common to experience IPV than those who had no diabetes, heart disease, or asthma.

**Table 1:** Subject Characteristics and IPV Prevalence among Women

	N = 14,362							
	Physical IPV		Sexual IPV		Both IPV		No IPV	
	n	% <sup>a</sup>	n	%	n	%	n	%
<b>Weight Status (BMI)</b>								
Normal	813	11.51	194	3.07	469	6.96	4820	78.46
Overweight/Obese	1037	11.99	225	2.74	673	8.22	6131	77.05
<b>Depression Status<sup>b</sup></b>								
Yes	333	20.89	80	5.02	337	21.14	844	52.95
No	1517	11.88	339	2.66	805	6.30	10107	79.16
<b>Age (years)</b>								
18 – 24	79	13.48	25	3.91	45	9.06	451	73.55
25 – 54	1205	12.94	258	3.05	782	8.62	5806	75.39
55+	566	8.45	136	2.08	315	4.93	4694	84.54
<b>Race</b>								
White/Non-Hispanic	1375	11.84	321	3.11	852	7.80	7977	77.26
Black/Non-Hispanic	139	10.02	35	2.57	88	6.01	919	81.40
Hispanic	257	11.43	50	2.57	159	9.84	1638	76.16
Other <sup>c</sup>	79	15.51	13	1.04	43	5.49	417	77.96
<b>Education</b>								
Less than H.S.	146	11.93	21	3.73	104	9.62	829	74.72
H.S./G.E.D./Post H.S.	1166	13.49	229	2.79	746	8.92	6255	74.79
College Graduate	538	8.99	169	2.87	292	5.23	3867	82.91
<b>Annual income</b>								
\$15,000 to 49,999	1217	13.22	267	2.96	834	9.40	6359	74.42
\$50,000 to 74,999	302	10.64	75	3.92	139	6.67	1996	78.76
\$75,000+	331	9.83	77	2.07	169	5.06	2596	83.04
<b>Marital status</b>								
Married	769	9.74	196	2.44	442	5.56	6500	82.27
Unmarried	1081	15.11	223	3.62	700	11.09	4451	70.18
<b>Binge drinking status</b>								
Yes	267	20.86	38	3.34	147	8.54	869	67.25
No	1583	10.75	381	2.83	995	7.56	10082	78.86
<b>Physical</b>								
Yes	1345	11.46	315	3.03	820	7.30	8325	78.20
No	505	12.74	104	2.44	322	8.76	2626	76.07
<b>General health status</b>								
Excellent/Good	1455	11.22	339	2.86	810	6.73	9262	79.19
Fair/Poor	395	15.01	80	3.02	332	13.12	1689	68.85
<b>Diabetes</b>								
Yes	140	11.16	36	2.78	107	9.50	920	76.56
No	1710	11.82	383	2.89	1035	7.53	10031	77.76
<b>Heart disease</b>								
Yes	79	15.27	18	3.12	58	12.16	384	69.45
No	1771	11.67	401	2.88	1084	7.53	10567	77.92
<b>Smoking status</b>								
Current smoker	619	21.03	99	3.89	453	15.65	1756	59.43
Non-smoker	1231	9.35	320	2.62	689	5.56	9195	82.46
<b>Asthma</b>								
Yes	323	13.60	68	3.01	258	13.38	1384	70.01
No	1527	11.47	351	2.87	884	6.71	9567	78.95

<sup>a</sup>Prevalence Percent

<sup>b</sup>Depression indicates PHQ-8 score  $\geq 10$

<sup>c</sup>Other race/ethnicity = Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaskan Native, and multiracial non-Hispanic

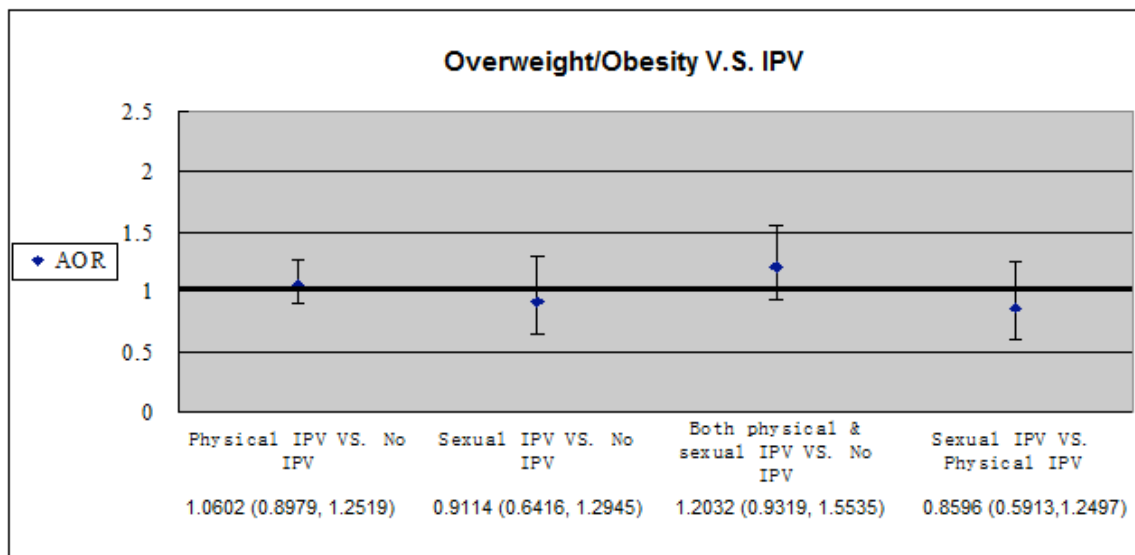
The relationship between body weight, depression and history of IPV among women are presented in Table 2. For normal weight group, their depression prevalence is 16.86%, 12.81% and 32.63% for physical IPV, sexual IPV and both physical and sexual IPV, respectively. For overweight group, their depression prevalence is 22.84%, 27.47% and 33.10% for physical IPV, sexual IPV and both physical and sexual IPV, respectively. While for obese group, their depression prevalence is 24.69%, 35.74% and 35.14% for physical IPV, sexual IPV and both physical and sexual IPV, respectively. Their results indicate that depression is increased in overweight and obese groups, as well as increased by IPV.

**Table 2:** Relationship Between Body Weight, Depression and History of IPV among Women

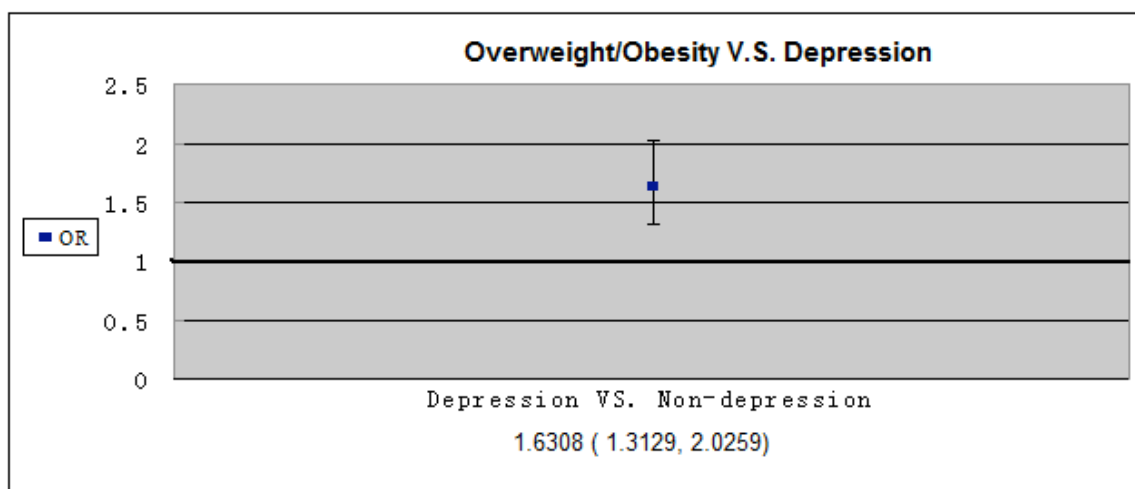
Weight groups		Physical IPV only #(%) <sup>a</sup>	Sexual IPV only #(%) <sup>a</sup>	Both physical & sexual IPV #(%) <sup>a</sup>	No IPV #(%) <sup>a</sup>	Total
Normal	Depression	<b>115</b> <b>(16.86%)</b>	<b>21</b> <b>(12.81%)</b>	<b>118</b> <b>(32.63%)</b>	<b>266</b> <b>(5.19%)</b>	520
	No Depression	698 (83.14%)	173 (87.19%)	351 (67.37%)	4554 (94.81%)	5776
Over-weight	Depression	<b>105</b> <b>(22.84%)</b>	<b>24</b> <b>(27.47%)</b>	<b>96</b> <b>(33.10%)</b>	<b>247</b> <b>(7.16%)</b>	472
	No Depression	471 (77.16%)	86 (72.53%)	234 (66.90%)	3167 (92.84%)	3958
Obese	Depression	<b>113</b> <b>(24.69%)</b>	<b>35</b> <b>(35.74%)</b>	<b>123</b> <b>(35.14%)</b>	<b>331</b> <b>(11.01%)</b>	602
	No Depression	348 (75.31%)	80 (64.26%)	220 (64.86%)	2386 (88.99%)	3034
<b>Total</b>		1850	419	1142	10,951	14,362

<sup>a</sup>Row percentage = Prevalence

The logistic models assessed the independent effect of depression on overweight/obesity and IPV for women, while controlling for demographics, and other significant risk behaviors and health conditions (Figure 1-5). The relationship between overweight/obesity and both physical and sexual IPV is marginally significant [Odds Ratio (OR) = 1.2032; 95% CI (0.9319, 1.5535)]. After adjustment for depression status, demographic variables and other health conditions and risk behaviors, the relationship between overweight/obesity and IPV is weakened [Adjusted Odds Ratio (aOR) = 1.1246; 95% CI (0.8888, 1.4229)], however, the relationship between overweight/obesity and depression is still obviously significant [adjusted Odds Ratio (aOR) = 1.3689; 95% CI (1.1153, 1.6801)].

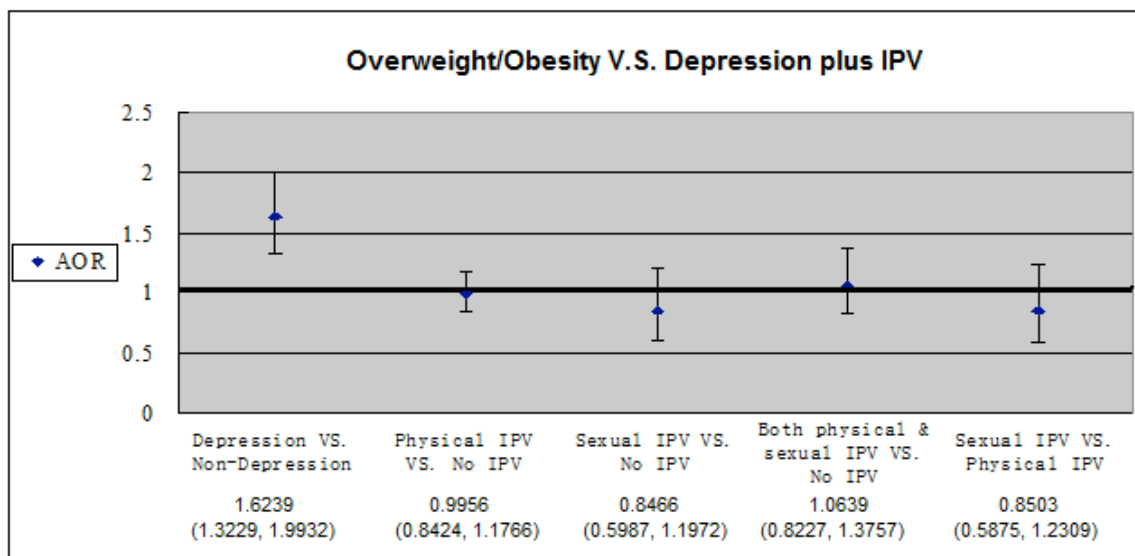


**Figure 1: Odds Ratio (OR with 95% CIs) for Overweight/obesity by IPV among U.S. Women, Respectively.**

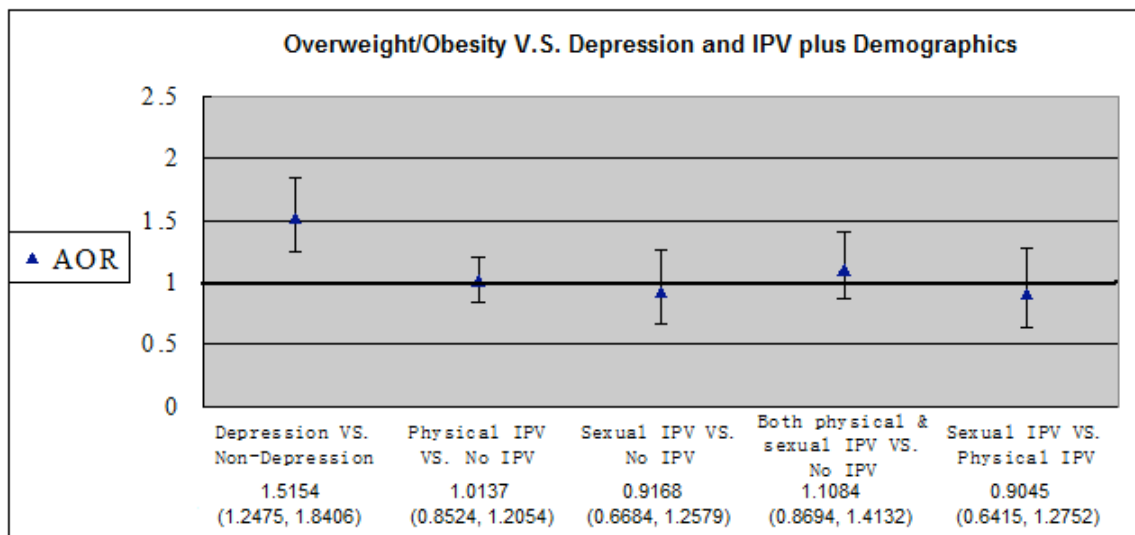


**Figure 2: Odds ratios (OR with 95% CIs) for Overweight/obesity by Depression among U.S. Women.**

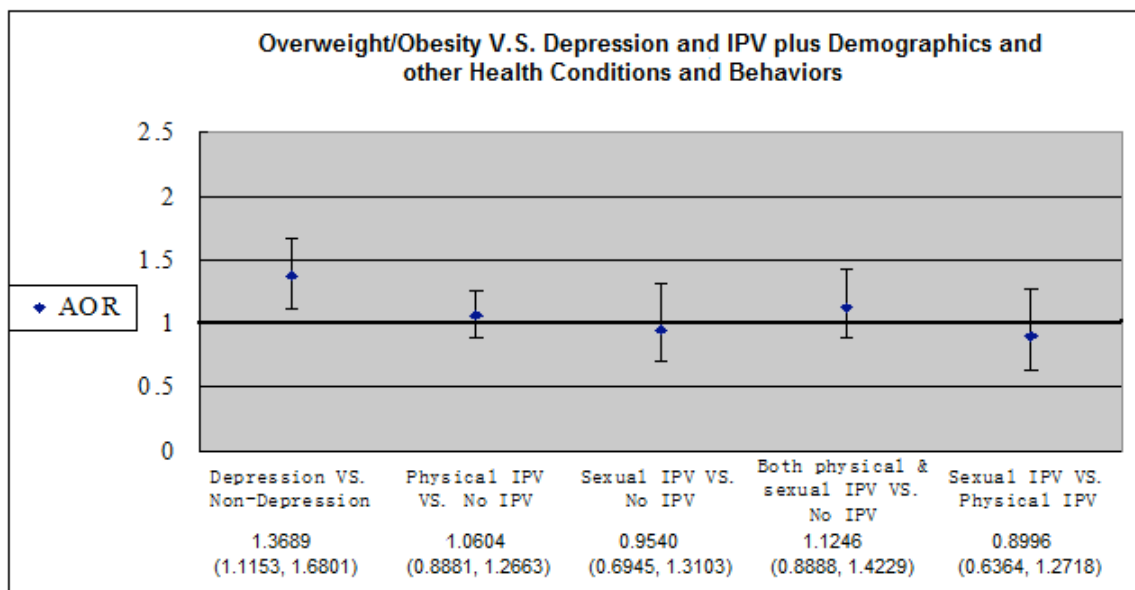




**Figure 3: Adjusted odds ratios (AOR with 95% CIs) for Overweight/obesity by Depression and Intimate Partner Violence (IPV) among U.S. Women.**



**Figure 4: Adjusted odds ratios (AOR with 95% CIs) for Overweight/obesity by Depression and Intimate Partner Violence (IPV) plus Demographics Factors among U.S. Women.**



**Figure 5: Adjusted odds ratios (AOR with 95% CIs) for Overweight/obesity by Depression and Intimate Partner Violence (IPV) plus Demographics Factors and Other Health Conditions and Behavior Factors among U.S. Women.**

## **CHAPTER 6:**

### **DISCUSSION**

To our knowledge, this is the first study to investigate the relationship among overweight/obesity, intimate partner violence, and depression. We tried to seek the link among these three subjects and we finally found a correlation: 1). Overweight/obesity and depression are significantly related; 2). IPV and depression are significantly related; 3) Overweight/obesity and IPV are indirectly related.

It is the women and children who are the most vulnerable when it comes to the subject of intimate partner violence, but overweight/obesity victimizes everyone across cultures and ethnicities. Women and children are primarily the victims of IPV. Depression is common in abused women and obese women. Women with disabilities have the greater chance of being victimized by IPV in the form of sexual and physical assault than women with no disabilities.

#### **6.1 OVERWEIGHT/OBESITY AND DEPRESSION ARE SIGNIFICANTLY RELATED**

In our study, overweight or obese women were more likely (36.89% increased) to be depressed than normal weight women (aOR = 1.3689). In the literature review, some evidence points to overweight/obesity in the long run leading to depression. Examples are

psychosocial effects such as stereotyping overweight across gender, age, and culture. There is also the stigmatizing effect on overweight/obesity. The seminal studies of Tillman et al. (1982) found that Australian university students described obese people as significantly lower in intelligence, athleticism, attractiveness, and popularity than average-weight people. This creates a stigma and discrimination that can in turn result to depression on obese people. It was further found that overweight girls had less participation in school organizations and fewer dates, or with a pattern of decreased social interactions until college.

Depression is traditionally considered an outcome or effect, but Blaine (2009) argued that there is a large research literature that attests to the causal effects of depression on an array of chronic illnesses, including hypertension and coronary heart disease. In Blaine's study (2009), eating and energy expenditure are often proposed as intervening constructs in the depression-overweight/obesity relationship, which meant that depression indirectly causes behaviors as emotional eating, eating calorie-dense food, and decreased physical activity. In Blaine's study, dieters ate more when depressed. The same was applied in students who resorted to emotional eating.

The longitudinal research of 33,000 subjects conducted by Blaine (2009) and colleagues concluded that depression caused overweight/obesity, and that depressed compared with non-depressed people are significantly more likely to be obese at follow-up measurement. They also found that female adolescents are about two and a half times to be obese at follow-up measurement than are non-depressed female teens. This general vulnerability

is heightened in female adolescents; depressed female teens are about two-and-a-half times to be obese at follow-up measurement than are non-depressed female teens.

## **6.2 IPV AND DEPRESSION ARE SIGNIFICANTLY RELATED**

In the statistical analysis for this study, overweight/obesity and depression have a correlation; likewise IPV and depression also have a correlation.

Studies in the literature review found that depression symptoms among women were associated with having a history of childhood and adulthood physical or sexual abuse. The greater severity of physical violence committed against the women by their intimate partners was related to greater depression. Psychological violence could inflict higher degree of depression.

IPV can cause diseases or maladies such as suicide, physical injuries, depression, anxiety, smoking, alcohol abuse, drug abuse, sexually transmitted diseases (STDs), cervical cancer, gastrointestinal diseases, eating disorders, femicide, and posttraumatic stress disorder.

In Houry et al's (2005, p. 1474) study, they used the 21-item BDI-II instrument which yielded 78% concordance with four specific symptoms such sadness, self-dislike, suicidal thoughts, and feelings of worthlessness to have a correlation with suicide attempts. Their conclusion: African American women who are low income and victims of IPV had

higher levels of depressive symptoms than non-attempters who also had experience of IPV. “Symptoms of sadness self-dislike, suicidal thoughts, and feelings of worthlessness predicted suicide attempt status 78% of the time” (Houry et al., p. 1474).

### **6.3 OVERWEIGHT/OBESITY AND IPV ARE INDIRECTLY RELATED**

In our study, we found that the relationship between overweight/obesity and IPV is marginally significant (OR = 1.2032), however, when controlled by depression, the relationship is weakened (aOR = 1.1246), which indicate that depression and IPV are significantly related, while overweight/obesity and IPV are indirectly related.

In the literature review, we have gathered evidence that IPV can lead to overweight/obesity, or overweight/obesity is an outcome of IPV but not IPV as an outcome of overweight/obesity. Obese people do not become violent but victims of violence or abused women, women with disabilities who are victims of rape and physical assault, and children who have been victims of incest, rape and violence, do become obese as a result of the depressed mood which is overeating or physical inactivity.

Women victims of IPV suffer from anxiety, substance abuse, overweight/obesity, or headaches, among others (Edlin & Golanty, 2010, p. 509). Every two or three minutes in the United States a woman is sexually assaulted; about 28% of college women reported that they had suffered from rape or attempted rape since the age of 14 (Edlin & Golanty,

2010, p. 514). As a result, the women victims suffer from various symptoms to include headache, fatigue sleep disturbances, recurrent nausea, eating disorders resulting to overweight/obesity.

The study of Brown et al. (2008) on the estimated number of victims of rape, physical assault and stalking, is quite alarming: 359,000 rape victims, 4,955,000 victims of physical assault, and 560,000 victims of stalking for the year 2003 alone. The finding of decreased physical health of women who experienced intimate partner violence highlights the importance for health professionals of undertaking a full social history from women so that proper treatment and policies can be instituted in conformity with present government programs and strategies. Counseling can also be one of the programs or strategies that should be instituted and this should be done the earlier the better.

There are several limitations in this study. First, this study was cross-sectional which limits our ability to establish temporal sequencing of intimate partner violence and depression. Second, BRFSS does not represent persons without home telephones. It is likely that those without telephones are socioeconomically disadvantaged and may be at increased risk for IPV (Fogarty et al., 2007). Finally, BRFSS only assess physical and sexual IPV; therefore, we were unable to assess the impact of psychological IPV on depression and this may have resulted in underreporting and misclassification of IPV.

## **CHAPTER 7:**

### **CONCLUSION**

Although there was no direct association being found between overweight/obesity and IPV, overweight/obesity was significantly related to depression, while IPV is also significantly associated with depression. IPV attributes to depression results in indirectly associated with respondent's overweight/obese status. Further studies on detailed mechanisms of IPV and overweight/obesity are needed.



## REFERENCES

- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC, Am Psy Assoc, 1994.
- Astin, M. C., Lawrence, K. J., & Foy, D. W. (1993). Posttraumatic stress disorder among battered women: Risk and resiliency factors. *Violence and Victims*, 8(1), 17-28.
- Astin, M. C., Ogland-Hand, S. M., Coleman, E. M., & Foy, D. W. (1995). Posttraumatic stress disorder and childhood abuse in battered women: Comparisons with maritally distressed women. *Journal of Consulting and Clinical Psychology*, 63(2), 308-312.
- Bailey, E. J. (2006). Food choice and obesity in black America: creating a new cultural diet. *Westport, CT: Greenwood Publishing Group, Inc.*
- Banning, M. (2005). Obesity: Pathophysiology and treatment. *The Journal of the Royal Society for the Promotion of Health* 2005, 125, 163. DOI: 10.1177/146642400512500408.
- Barrio, L., & Burt, V. (2000). Depression in pregnancy: Strategies for primary care management. Dealing with an underdiagnosed and undertreated problem. *Women's Health in Primary Care*, 3, 490-498.

- Baucom, D., & Aiken, P. (1981). Effect of depressed mood on eating among obese and nonobese dieting and nondieting persons. *Journal of Personality and Social Psychology, 41*, 577–585.
- Bekker, M., van de Meerendonk, C., & Mollerus, J. (2004). Effects of negative mood induction and impulsivity on self-perceived emotional eating. *International Journal of Eating Disorders, 35*, 461–569.
- Bergman, B., Larsson, G., Brismar, B., & Klang, M. (1987). Psychiatric morbidity and personality characteristics of battered women. *Acta Psychiatrica Scandinavica, 76*, 678-683.
- Blaine, B. (2009). Does depression cause obesity?: A meta-analysis of longitudinal studies of depression and weight control. *Journal of Health Psychology, 13* (8) 1190–1197. DOI: 10.1177/1359105308095977.
- Blaine, B. E., Rodman, J., & Newman, J. M. (2007). Weight loss treatment and psychological well-being: A review and meta-analysis. *Journal of Health Psychology 12* (1) 66-82. DOI: 10.1177/1359105307071741.
- Blaum, C. S. (2007). Descriptive epidemiology of diabetes. In M. N. Munshi and L. A. Lipsitz (Eds.), *Geriatric diabetes: Aging diabetes* (pp. 1-2). New York: Informa Healthcare USA, Inc.
- Boyer, B. A. (2008). Chapter 8: Diabetes. In B. A. Boyer and M. I. Pahlaria (Eds.), *Comprehensive handbook of clinical health psychology*. New Jersey: John Wiley & Sons, Inc. pp. 179-189.

- Bradley, D. (2007). Obesity Gene. Retrieved from <http://www.sciencebase.com/science-blog/overweight/obesity-gene.html>.
- Bray, G. A. (2008). Classification and evaluation of the overweight patient. In G. A. Bray and C. Bouchard (Eds.), *Handbook of overweight: Clinical applications Third Edition* (pp. 1-25). New York: Informa Healthcare USA, Inc.
- Brown, D. S., Finkelstein, E. A., Mercy, J. A. (2008). Methods for estimating medical expenditures attributable to intimate partner violence. *Journal of Interpersonal Violence* 2008, 23 (12). DOI: 10.1177/0886260508314338.
- Burd-Sharps, S., Lewis, K., and Martins, E. B. (2008). *The measure of America: American human development report, 2008-2009*. United States of America: Columbia University Press.
- Bryman, A. and Cramer, D. (2005). *Quantitative data analysis with SPSS 12 and 13: a guide for social scientists*. New York: Routledge.
- Calder, J., McVean, A., Yang, W. (2010). History of Abuse and Current Suicidal Ideation: Results from a Population Based Survey. *J Fam Viol*, 25: 205-214.
- Calvete, E., Corral, S., & Estevez, A. (2008). Coping as a mediator and moderator between intimate partner violence and symptoms of anxiety and depression. *Violence Against Women* 2008, 14, 886. DOI: 10.1177/1077801208320907.
- Calvete, E., Corral, S., & Estévez, A. (2007). Factor structure and validity of the Revised Conflict Tactics Scales for Spanish women. *Violence Against Women*, 13, 1072-1087.

- Campbell, L. C., Clauw, D., & Keefe, F. J. (2003). Persistent pain and depression: A biopsychosocial perspective. *Biological Psychiatry*, *54*, 399-409.
- Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Technical Information and 2006 Survey Data. 1 July 2007.
- Chatterji, S. A. (2006). *Gender and conflict*. New Delhi: UBS Publishers' Distributors Pvt. Ltd.
- Cooke, L. & Wardle, J. (2007). Depression and obesity. In A. Steptoe, *Depression and Physical Illness*. Cambridge, UK: Cambridge University Press.
- Craig IW, Halton KE (2009). Genetics of Human Aggressive Behavior. *Hum Genet* (2009) 126:101–113.
- Dienemann, J., Boyle, E., Resnick, W., Wiederhorn, N., & Campbell, J. (2000). Intimate partner abuse among women diagnosed with depression. *Issues in Mental Health Nursing*, *21*, 499-513.
- Du L, Bakish D, Ravindran A, Hrdina PD (2004). MAO-A gene polymorphisms are associated with major depression and sleep disturbance in males. *Neuroreport* *15* (13): 2097–101.
- Du L, Faludi G, Palkovits M, Sotonyi P, Bakish D, Hrdina PD (2002). "High activity-related allele of MAO-A gene associated with depressed suicide in males". *Neuroreport* *13* (9): 1195–8.

- Dutton, M. A., Goodman, L. A., & Bennett, L. (2001). Court-involved battered women's responses to violence: The role of psychological, physical, and sexual abuse. In *Psychological abuse in violent domestic relations* (pp. 177-195).
- Dutton, M. A., Green, B. L., Kaltman, S. I., Roesch, D. M., Zeffiro, T. A., & Krause, E. D. (2006). Intimate partner violence, PTSD, and adverse health outcomes. *Journal of Interpersonal Violence* 2006, 21, 955. DOI: 10.1177/0886260506289178.
- Edlin, G. & Golanty, E. (2010). Health and wellness. Sudbury, MA: Jones and Bartlett Publishers, LLC.
- Ezrin, C. and Kowalski, R. (1999). *The type 2 diabetes diet book: The insulin control diet (Revised third ed.)*. Chicago, Illinois: Lowell House.
- Farooqi, I. S. & O'Rahilly, S. (2008). Genetic evaluation of obese patients. In G. A. Bray and C. Bouchard (Eds.), *Handbook of overweight/obesity: Clinical applications third edition* (pp. 45-52). New York: Informa Healthcare USA, Inc.
- Fischbach, R. L., & Herbert, B. (1997). Domestic violence and mental health: Correlates and conundrums within and across cultures. *Social Science & Medicine*, 4, 1161-1176.
- Flynn, R. J. & Cappeliez, P. (1993). An Integrative Cognitive-Environmental View of Depression. In P. Cappeliez and R. J. Flynn, *Depression and the Social environment*. Quebec: McGill-Queen's University Press.
- Fogarty, C.T., Fredman, L., Heeren, T. C., & Liebschutz, J. (2007). Synergistic effects of child abuse and intimate partner violence on depressive symptoms in women. *Prev. Med.* 2008 May;46(5):463-9.

- Folkman, S., & Moskowitz, J. (2004). Coping pitfalls and promise. *Annual Reviews of Psychology*, *55*, 745-774.
- Fonseca, V. (Ed.) (2006). *Clinical diabetes*. Philadelphia, PA, USA: Elsevier Inc. pp. 269-271.
- Frank, J. B., & Rodowski, M. F. (1999). Review of psychological issues in victims of domestic violence seen in emergency settings. *Emergency Medical Clinics of North America*, *17*, 657-677.
- Frank, J. B., Weihs, W., Minerva, E., & Lieberman, D. Z. (1998). Women's mental health in primary care: Depression, anxiety, somatization, eating disorders, and substance abuse. *Medical Clinics of North America*, *82*, 359-389.
- Frayling TM, Timpson NJ, et al (2007). A common variant in the FTO gene is associated with body mass index and predisposes to childhood and adult obesity. *Science* *316* (5826): 889–94.
- Fuemmeler BF, Agurs- Collins TD, et al (2008). Genes Implicated in Serotonergic and Dopaminergic Functioning Predict BMI Categories. *Obesity* (2008) *16*, 348–355.
- Fuemmeler BF, Agurs- Collins TD, et al (2009). Interactions Between Genotype and Depressive Symptoms on Obesity. *Behav Genet* (2009) *39*:296–305.
- Gerber, M. R., Ganz, M. L., Lichter, E., Williams, C. M., & McCloskey, L. A. (2005). Adverse health behaviors and the detection of partner violence by clinicians. *Archives of Internal Medicine*, *165*, 1016-1021.

- Gilliam, G., Kanner, A., & Sheline, Y. (2006). *Depression and brain dysfunction*. Oxon, UK: Taylor & Francis Group.
- Gillum, R. (1987). Overweight and obesity in black women: A review of published data from the National Center for Health Statistics. *Journal of the National Medical Association* 79 (1987), 865-871.
- Golding, J. M. (1999). Intimate partner violence as a risk factor for mental disorders: A meta-analysis. *Journal of Family Violence*, 14, 99-132.
- Hamen, C. (1997). *Depression*. East Sussex, UK: Psychology Press, Ltd.
- Harris, M. B., Harris, R. J., & Bochner, S. (1982). Fat, four-eyed, and female: Stereotypes of obesity, glasses, and gender. *Journal of Applied Social Psychology*, 12, 503-516.
- Hermanns, N. and Kulzer, B. (2010). Screening in Diabetes care: Detecting and managing depression in diabetes. In A. J. Mitchell and J. C. Coyne, *Screening for depression in clinical practice: An evidence-based guide*. Oxford, New York: Oxford University Press. p. 335.
- Hoffman, S., & Hatch, M. C. (2000). Depressive symptomatology during pregnancy: Evidence for an association with decreased fetal growth in pregnancies of lower social class women. *Health Psychology*, 19, 535-543.
- Holmes, R. & Holmes, S. (2005). *Suicide: Theory, practice, and investigation*. California: Sage Publications.

- Horrigan, T. J., Schroeder, A. V., & Schaffer, R. M. (2000). The triad of substance abuse, violence, and depression are interrelated in pregnancy. *Journal of Substance Abuse Treatment, 18*, 55-58.
- Houry, D., Kaslow, N. J., and Thompson, M. P. (2005). Depressive symptoms in women experiencing intimate partner violence. *Journal of Interpersonal Violence 2005*, 20. DOI: 10.1177/0886260505278529.
- Houskamp, B. M., & Foy, D. W. (1991). The assessment of posttraumatic stress disorder in battered women. *Journal of Interpersonal Violence, 6*(3), 367-375.
- Jones, L., Hughes, M., & Unterstaller, U. (2001). Post-traumatic stress disorder (PTSD) in victims of domestic violence: A review of the research. *Trauma, Violence, & Abuse, 2*(2), 99-119.
- Kemp, A., Rawlings, E. I., & Green, B. L. (1991). Post-traumatic stress disorder (PTSD) in battered women: A shelter sample. *Journal of Traumatic Stress, 4*(1), 137-148.
- Kessler RC, Chiu WT, Demler O, Walters E.E. (2005). Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry, 2005 Jun; 62* (6): 617-27.
- Koopman, C., Ismailji, T., Palesh, O., Core-Felton, C., Narayanan, A., Saltzman, et al. (2007). Relationships of depression to child and adult abuse and bodily pain among women who have experienced intimate partner violence. *Journal of Interpersonal Violence 2007, 22* (4), 438-451. DOI: 10.1177/0886260506297028.



- Koopman, C., Ismailji, T., Holmes, D., Classen, C., Palesh, O. & Wales. T. (2005). The effects of expressive writing on pain, depression and posttraumatic stress disorder symptoms in survivors of intimate partner violence. *Journal of Health Psychology, 10*, 211. DOI: 10.1177/1359105305049769.
- Kornstein, S. G. (1997). Gender differences in depression: Implications for treatment. *Journal of Clinical Psychiatry, 58* (Suppl. 15), 12-18.
- Koziol-McLain, J., Coates, C. J., & Lowenstein, S. R. (2001). Predictive validity of a screen for partner violence against women. *American Journal of Preventive Medicine, 21*, 93-100.
- Kruszynska, Y. (2002). V. Diabetes syndrome: Chapter 2: Type 2 diabetes mellitus: etiology, pathogenesis and clinical manifestations. In L. Poretsky (Ed.), *Principles of Diabetes Mellitus*. Massachusetts, USA: Kluwer Academic Publishers. pp. 179-180.
- Kuczmarski MF, Kuczmarski RJ, Najjar M. Effect of Age on Validity of Self-reported Height, Weight, and Body Mass Index: Findings from the Third National Health and Nutrition Examination Survey: 1988-1994. *J Am Diet Assoc* 2001;101: 28-34.
- Kurki, T., Hiilesmaa, V., Raitasalo, R., Mattila, H., & Ylikorkala, O. (2000). Depression and anxiety in early pregnancy and risk for preeclampsia. *Obstetrics and Gynecology, 95*, 487-490.

- Landel-Graham, J., Yount, S. E. and Rudnicki, S. R. (2003). Diabetes mellitus. In I. B. Weiner (Ed.), *Handbook of psychology: Health psychology*. New Jersey: John Wiley & Sons, Inc. p. 191.
- Latner, J., Wilson, G. T., Jackson, M. L., & Stunkard, A. (2009). Greater history of weight-related stigmatizing experience is associated with greater weight loss in obesity treatment. *Journal of Health Psychology* 2009, 14 (190). DOI: 10.1177/1359105308100203.
- Lee, H., Chapa, D. Kao, C., Jones, D., Kapustin, J., Smith, J., Krichten, C., Donner, T., Thomas, S. A., and Friedmann, E. (2008). Depression, quality of life, and glycemic control in individuals with type 2 diabetes. *Journal of the American Academy of Nurse Practitioners* 21 (2009), pp. 214–224.
- Loxton, D., Schofield, M., Hussain, R., & Mishra, G. (2006). History of Domestic Violence and Physical Health in Midlife. *Violence Against Women* 2006, 12, 715. DOI: 10.1177/1077801206291483.
- Llewellyn, A. M., Stowe, Z. N., & Nemeroff, C. B. (1997). Depression during pregnancy and the puerperium. *Journal of Clinical Psychiatry*, 58 (Suppl. 15), 26-32.
- Marcus, I. (1994). Reframing “domestic violence”: Terrorism in the home. In M. A. Fineman & R. Mykitiuk (Eds.), *The public nature of private violence: The discovery of domestic abuse*. New York: Routledge.
- Martin, S. L., Li, Y., Casanueva, C., Harris-Britt, A., Kupper, L. L., & Cloutier, S. (2006). Intimate partner violence and women’s depression before and during

pregnancy. *Violence Against Women*, 12 (3), pp. 221-239. DOI: 0.1177/1077801205285106.

McAulay, V. and Frier, B. (2009). Hypoglycaemia. In A. Sinclair (Ed.), *Diabetes in old age (Third ed.)*. New Jersey, U.S.A.: John Wiley & Sons Ltd. p. 287.

Messman-Moore, T. L., Long, P. J., & Siegfried, N. J. (2000). The revictimization of child sexual abuse survivors: An examination of the adjustment of college women with child sexual abuse, adult sexual assault, and adult physical abuse. *Child Maltreatment: Journal of the American Professional Society on the Abuse of Children*, 5(1), 18-27.

Meyer JH, Ginovart N, Boovariwala A, et al(2006). Elevated monoamine oxidase a levels in the brain: an explanation for the monoamine imbalance of major depression. *Arch. Gen. Psychiatry* 63 (11): 1209–16.

Morley, J. (2009). II The United States perspective. In A. Sinclair (Ed.), *Diabetes in old age (Third ed.)*. New Jersey, U.S.A.: John Wiley & Sons Ltd. p. 459.

Najman, J. M., Andersen, M. J., Bor, W., O'Callaghan, M. J., & Williams, G. M. (2000). Postnatal depression: Myth and reality. Maternal depression before and after the birth of a child. *Social Psychiatry and Psychiatric Epidemiology*, 35, 19-27.

Nouwen, A. and Oyebode, I. R. (2009). Depression and diabetes in older adults. In A. Sinclair (Ed.), *Diabetes in old age (third ed.)*. New Jersey, U.S.A.: John Wiley & Sons Ltd. p. 385.

- McLeod, M. N. (2005). *Lifting depression: The chromium connection*. California, U.S.A.: Basic Health Publications, Inc. pp. 103-105.
- Milberger, S., Israel, N., LeRoy, B., Martin, A., Potter, L., & Patchak-Schuster, P. (2003). Violence against women with physical disabilities. *Violence and Victims*, 18, 581-591.
- Mitchell, C. and James, L. (2009). Evolving health policy on intimate partner violence. In C. Mitchell and D. Anglin( Eds.), *Intimate partner violence: A health-based approach*, pp. 1-16. New York: Oxford University Press.
- National Institute of Mental Health. (2001). *The numbers count: Mental disorders in America* (NIMH Publication No. 01-4584). Retrieved January 15, 2001, from <http://www.nimh.nih.gov>.
- Nicolaidis, C. & Liebschutz, J. (2009). Chronic physical symptoms in survivors of intimate partner violence. In C. Mitchell and D. Anglin ( Eds.), *Intimate partner violence: A health-based approach*, pp. 134-135. New York: Oxford University Press.
- Niedhammer I, Bugel I, et al. Validity of Self-reported Weight and Height in the French GAZE Cohort. *Int J Obes Relat Metab Disord* 2000;24: 1111-1118.
- Oschwald, M., Renker, P., Hughes, R. B., Arthur, A. Powers, L. E., Curry, M. (2009). *Journal of Interpersonal Violence* 2009, 24, 795. DOI: 10.1177/0886260508317175.

- Paharia, M. I. and Kase, L. (2008). Obesity. In B. A. Boyer and M. I. Paharia (Eds.), *Comprehensive handbook of clinical health psychology*, pp. 81-83. New Jersey: John Wiley & Sons, Inc.
- Plichta, S. B. (2004). Intimate partner violence and physical health consequences: Policy and practice implications. *Journal of Interpersonal Violence, 19*, 1296-1323.
- Pyrek, K. M. (2006). *Forensic nursing*. Florida, USA: Taylor & Francis Group LLC.
- Reinecke, M. A. (2002). Alternative Treatments of Depression: Points of convergence and divergence. In M. A. Reinecke and M. R. Davison (Eds.), *Comparative treatments of depression*. New York: Springer Publishing Company, Inc.
- Roberts, R., Deleger, S., Strawbridge, W., & Kaplan, G. (2003). Prospective association between obesity and depression: Evidence from the Alameda County Study. *International Journal of Obesity, 27*, 514–521.
- Roberts RJ. *Can Self-reported Data Accurately Describe the Prevalence of Overweight?* Public Health 1995;109: 275-284.
- Schaaf, K. K., & McCanne, T. R. (1998). Relationship of childhood sexual, physical, and combined sexual and physical abuse to adult victimization and posttraumatic stress disorder. *Child Abuse and Neglect, 22*(11), 1119-1133.
- Schulze TG, Müller DJ, Krauss H, et al. (2000). Association between a functional polymorphism in the monoamine oxidase A gene promoter and major depressive disorder. *Am. J. Med. Genet. 96* (6): 801–3.

- Sharona, S. (1996). Gender and the Israeli-Palestinian Accord: Feminist approaches to international politics, *Economic and Political Weekly*, October 27-November 2, 2001, p.4101.
- Smith, J. C. (1999). *Understanding Childhood Obesity*. United States of America: University Press of Mississippi.
- Spinelli, M.G. (1998). Antepartum and postpartum depression. *Journal of Gender-Specific Medicine*, 1, 33-36.
- Stein, M. B., & Kennedy, C. (2001). Major depressive and post-traumatic stress disorder comorbidity in female victims of intimate partner violence. *Journal of Affective Disorders*, 66, 133-138.
- Stunkard, A.J., Faith M. S., Allison K.C. (2003). *Depression and Obesity*. *Biol Psychiatry* 2003, 54, 330-337.
- Stunkard, A., & Rush, J. (1974). Dieting and depression reexamined: A critical review of reports of untoward responses during weight reduction for obesity. *Annals of Internal Medicine*, 81, 526-533.
- Sutherland, C. A., Bybee, D. I., & Sullivan, C. M. (2002). Beyond bruises and broken bones: The joint effects of stress and injuries on battered women's health. *American Journal of Community Psychology*, 30, 609-636.
- Szewczyk, M., & Chennault, S. A. (1997). Women's health: Depression and related disorders. *Primary Care: Clinics in Office Practice*, 24, 83-101.

- Thomas, K., Joshi, M., Wittenberg, E., and McCloskey L. (2008). Intersections of Harm and Health: A qualitative study of intimate partner violence in women's lives. *Violence Against Women* 2008, 14. DOI: 10.1177/1077801208324529.
- Tillman, T., Kehle, T. J., Bray, M. A., Chafouleas, S. M. & Grigerick, S. (2007). Elementary school students' perceptions of overweight peers. *Canadian Journal of School Psychology* 2007, 22, 68. DOI: 10.1177/0829573507301130.
- U.S. Department of Justice. (1998). *Violence by intimates* (NCJ-167237). Washington, DC: Author.
- Üstün, T. B., 2001. The worldwide burden of depression in the 21<sup>st</sup> century. In M. Weissman, *Treatment of depression: Bridging the 21st century*. Washington DC: American Psychiatric Press, Inc.
- Vaeth, P. A. C., Ramisetty-Mikler, S., & Caetano, R. (2009). Depression among couples in the United States in the context of intimate partner violence. *Journal of Interpersonal Violence*, pp. 1-20. doi:10.1177/0886260509336957.
- Van Tilburg, M., Georgiades, A. and Surwit, R. S. (2008). Depression in type 2 diabetes. In M. N. Feinglos and M. Angelyn Bethel (Eds.), *Type 2 diabetes mellitus: An evidence-based approach to practical management*. New Jersey, U.S.A.: Humana Press. pp. 406-418.
- Wadden, T., & Stunkard, A. (1985). Social and psychological consequences of obesity. *Annals of Internal Medicine*, 103, 1062–1067.

- WHO, 2009. *Diabetes*. Retrieved November 18, 2009 from <http://www.who.int/mediacentre/factsheets/fs312/en/index.html>.
- Williams, J. B., Spitzer, R. L., Linzer, M., Kroenke, K., Hahn, S. R., deGruy, F. V., et al. (1995). Gender differences in depression in primary care. *American Journal of Obstetrics and Gynecology*, *173*, 654-659.
- Wisner, K. L., Gelenberg, A. J., Leonard, H., Zarin, D., & Frank, E. (1999). Pharmacologic treatment of depression during pregnancy. *Journal of the American Medical Association*, *282*, 1264-1269.
- Wittkamp KA, Naeije L, et al. Diagnostic Accuracy of the Mood Module of the Patient Health Questionnaire: A Systematic Review. *Gen Hosp Psychiatry* 2007;29: 388-395.
- Woods, S. J. (2000). Prevalence and patterns of posttraumatic stress disorder in abused and postabused women. *Issues in Mental Health Nursing*, *21*(3), 309-324.
- World Health Organization. (2002). *The World Health report on violence and health*. Geneva: Author.
- Wulsin, L. R., 2007. *Treating the aching heart*. United States of America: Vanderbilt University Press.
- Wu, L. T., & Anthony, J. C. (2000). The estimated rate of depressed mood in U.S. adults: Recent evidence for a peak in later life. *Journal of Affective Disorders*, *60*, 159-171.



- Young, M. E., Nosek, M. A., Howland, C. A., Chanpong, G., & Rintala, D. H. (1997). Prevalence of abuse of women with disabilities. *Archives of Physical Medicine and Rehabilitation*, 78, S34-S38.
- Yu YW, Tsai SJ, Hong CJ, Chen TJ, Chen MC, Yang CW (2005). "Association study of a monoamine oxidase a gene promoter polymorphism with major depressive disorder and antidepressant response". *Neuropsychopharmacology* 30 (9): 1719–23.
- Zink, T., Jacobson, C. J., Pabst, S., Regan, S., & Fisher, B. S. (2006). A lifetime of intimate partner violence: Coping strategies of older women. *Journal of Interpersonal Violence*, 21, 5, 635-649. DOI: 10.1177/0886260506286878.

## **APPENDIX**

## **APPENDIX 1: PHQ-8 QUESTIONS ON THE BRFS**

Now I am going to ask you some questions about your mood. When answering these questions, please think about how many days each of the following has occurred in the past 2 weeks.

1. Over the last 2 weeks, how many days have you had little interest or pleasure in doing things?
2. Over the last 2 weeks, how many days have you felt down, depressed or hopeless?
3. Over the last 2 weeks, how many days have you had trouble falling asleep or staying asleep or sleeping too much?
4. Over the last 2 weeks, how many days have you felt tired or had little energy?
5. Over the last 2 weeks, how many days have you had a poor appetite or ate too much?
6. Over the last 2 weeks, how many days have you felt bad about yourself or that you were a failure or had let yourself or your family down?
7. Over the last 2 weeks, how many days have you had trouble concentrating on things, such as reading the newspaper or watching?
8. Over the last 2 weeks, how many days have you moved or spoken so slowly that other people could have noticed? Or the opposite- being so fidgety or restless that you were moving around a lot more than usual?
9. Has a doctor or other healthcare provider EVER told you that you had an anxiety disorder (including acute stress disorder, anxiety, generalized anxiety disorder, obsessive-compulsive disorder, panic disorder, phobia, posttraumatic stress disorder, or social anxiety disorder)?
10. Has a doctor or other healthcare provider EVER told you that you have a depressive disorder (including depression, major depression, dysthymia, or minor depression)?

## APPENDIX 2: CDC DEVELOPED ALGORITHMS FOR THE PHQ-8

### Algorithm 1\*:

Score:	Depression Severity:
0 to 4.9	No depression
5 to 9.9	Mild depression
10 to 14.9	Moderate depression
15 to 19.9	Moderately severe depression
20	Severe depression

\*Scores that are greater than ten are classified as “current depression”.

### Algorithm 2:

Score	Depression Severity:
0 to 1	No depression <ul style="list-style-type: none"> <li>• Negative response (&lt; 7 days) to Questions 1 &amp; 2 OR</li> <li>• Positive response (7+ days) to &lt; 2 questions</li> </ul>
2 to 4	Minor Depression <ul style="list-style-type: none"> <li>• Positive response (7+ days) to Questions 1 or 2 AND</li> <li>• Positive response (7+ days) to between 2-4 questions</li> </ul>
5 to 8	Major Depression <ul style="list-style-type: none"> <li>• Positive response (7+ days) to Questions 1 or 2 AND</li> <li>• Positive response (7+ days) to a total of 5+ questions</li> </ul>

### Algorithm 3:

Score:	Depression Severity:
0 to 9	Depression Severity Score Less than 10
10 or greater	Depression Severity Score Greater than 10