



# HHS Public Access

Author manuscript

*Violence Vict.* Author manuscript; available in PMC 2019 March 28.

Published in final edited form as:

*Violence Vict.* 2018 December ; 33(6): 1072–1087. doi:10.1891/0886-6708.33.6.1072.

## Examining Associations between Strangulation and Depressive Symptoms in Women with Intimate Partner Violence Histories

**Mona Mittal, PhD, MsCI [Assistant Professor],**

Department of Family Science, University of Maryland, 255 Valley Drive, Room 1142EE School of Public Health Building, College Park, Maryland 20742, MMittal@UMD.edu

**Kathryn Resch, BS [Health Project Coordinator],**

Department of Emergency Research, University of Rochester, 300 Crittenden Blvd., Rochester, New York 14642, Kathryn\_Resch@URMC.Rochester.edu

**Corey Nichols-Hadeed, JD [Associate],**

Laboratory of Interpersonal Violence and Victimization, University of Rochester, 300 Crittenden Blvd., Rochester, New York 14642, Corey\_Nichols@URMC.Rochester.edu

**Jennifer Thompson Stone, MA [Associate],**

Laboratory of Interpersonal Violence and Victimization, University of Rochester, 300 Crittenden Blvd., Rochester, New York 14642, Jennifer\_Thompson-stone@urmc.rochester.edu

**Kelly Thevenet-Morrison, MS [Lead Programmer Analyst],**

Department of Public Health Sciences, University of Rochester, Rochester, NY, 14642, Kelly\_Thevenet-Morrison@URMC.Rochester.edu

**Catherine Faurot, MA, and**

Laboratory of Interpersonal Violence and Victimization, University of Rochester, 300 Crittenden Blvd., Rochester, New York 14642, crfaurot@gmail.com

**Catherine Cerulli, JD, PhD [Associate Professor]**

Department of Psychiatry, Director, Laboratory of Interpersonal Violence and Victimization, Director, Susan B. Anthony Center, University of Rochester, 300 Crittenden Blvd., Rochester, New York 14642

### Abstract

Intimate partner violence (IPV) is associated with poor mental health outcomes among women. Studies on IPV and mental health show that experiencing more than one type of IPV often enhances women's depression or depressive symptoms. However, most of these studies conceptualize IPV as physical, psychological, or sexual violence. Little is known about specific experiences of severe IPV, such as strangulation, that put victims at greater risk of lethality and serious injury, and their association with women's depression. This study examined associations

---

**Corresponding Author:** Catherine Cerulli, JD, PhD, Associate Professor, Department of Psychiatry, Director, Laboratory of Interpersonal Violence and Victimization, Director, Susan B. Anthony Center, University of Rochester, 300 Crittenden Blvd., Rochester, New York 14642, Catherine\_Cerulli@URMC.Rochester.edu.

There are no conflicts of interest to report.

**AUTHOR DISCLOSURE STATEMENT** No competing financial interests exist.

between IPV, strangulation, and depression among women using secondary data collected for a randomized clinical trial testing an integrated HIV-IPV prevention intervention for abused women. Women were recruited from healthcare service delivery organizations, Department of Health and Human Services, and family court. Women (n=175) completed assessments on IPV, strangulation, mental health, social support, and self-esteem. The majority reported strangulation (n=103) and depressive symptoms (n=101). Women who experienced strangulation also reported more severe physical ( $p < .001$ ), sexual ( $p < .001$ ), and psychological ( $p < .001$ ) abuse. However, in multivariate logistic regression with sociodemographics, violence variables, and strangulation, none of these variables were associated with a higher risk for depressive symptoms. Social support had a protective effect on depressive symptoms. Findings suggest strangulation is prevalent among abused women seeking services, warranting screening, assessment, and referral in these settings.

## Keywords

Mental Health; Domestic Violence; IPV; Strangulation; Social Support

---

## Introduction

Intimate partner violence (IPV) is a serious public health problem in the United States, and includes physical, psychological, or sexual abuse by a current or former partner. Results from the most recent national survey indicate that approximately 5.9% of women are victimized every year (Black et al., 2011). It has long been established that IPV is associated with poor mental health (Bonomi et al., 2006; Coker et al., 2002), including depression, posttraumatic stress disorder (PTSD), anxiety, suicide, and other forms of psychological distress (Dillon et al., 2013). Depression is of particular concern; in a systematic review and meta-analysis of literature exploring IPV as a risk factor for depression in adult women, the authors found a 2–3-fold increased risk of major depressive disorder, and a 1.5–2-fold increased risk of elevated depressive symptoms and postpartum depression; they also found that 9%–28% of depressive outcomes can be attributed to lifetime exposure to IPV (Beydoun et al., 2012).

Research has also shown that higher severity of violence is associated with more severe depressive symptoms and/or depression, with increases in abuse severity moving in step with increases in mental health problems (Wathen et al., 2016; Graham, Bernards, Flynn, Tremblay, and Wells, 2012; Ferrari et al., 2014; Bonomi et al., 2006; Ludermir et al., 2008). Further, experiencing more than one type of abuse is associated with higher probability of having depressive symptoms or worse symptoms (Eshelman, 2012; Pico-Alfonso et al., 2006). While these studies have illustrated the relationship between violence severity, cumulative violence and depression among abused women, less is known about specific forms of severe violence and depression. Strangulation is a severe form of IPV that puts victims at greater risk of lethality and serious injury (Campbell, Webster, & Glass, 2009; Campbell et al., 2003). In addition, strangulation carries significant cumulative weight as it rarely happens in isolation of other forms of abuse (Shields, Corey, Weakely-Jones, & Stewart, 2010), and is associated with increased fear of the abuser (Thomas, Joshi, & Sorenson, 2013).

Pritchard and colleagues describe strangulation as “a live demonstration of power and control over another individual’s life or death” (2015). One study, using a community sample of women, reported 54% of the women who indicated IPV victimization were strangled (Sutherland, Bybee, & Sullivan, 2002). In addition, more than half the women surveyed in domestic violence shelters and intervention centers in Texas and Los Angeles indicated they had experienced strangulation multiple times (Pritchard, Reckdenwald, and Nordham, 2015; Wilbur et al., 2001). A recent review of 649 IPV assaults found that 38% involved strangulation and these experiences had severe risk of lethality (Mcquown et al., 2016). Indeed, in one study, history of strangulation was present in 43% of completed homicides and 45% of attempted homicide cases compared to 10% of abused controls (Glass et al., 2008). Qualitative analysis of data collected from strangulation survivors residing in a domestic violence shelter highlighted that in the majority of strangulation cases discussed, the aggressors did not stop until the victim passed out, and many victims believed their partners were capable of killing them (Thomas, Joshi, & Sorenson, 2013). It stands to reason that victims who experience this profound threat to life may also experience profound depression. While screening for strangulation may be an important marker of severe and cumulative violence, as well as depression, equal attention should be given to social support and esteem assessments, which may be protective and can be included in strategies for survivors moving forward.

Higher levels of social support and self-esteem have been found to have positive impact on IPV victims’ depression (Roh, Burnette, Lee K., Lee Y., and Easton, 2016; Ridings et al., 2016; Carlson, McNutt, Choi, & Rose, 2002; Thompson, Kaslow, Short, & Wyckoff, 2002). A study of women seeking help for their IPV victimization found that both higher baseline levels of social support and positive growth in social support (defined as having people with whom to do activities) correlated to lower levels of depression (Suvak, Taft, Goodman, and Dutton, 2013). González-Guarda and colleagues studied the relationship between IPV victimization, depression and resource availability—self-esteem was conceptualized as an intrinsic resource—and their findings supported “the importance of incorporating self-esteem and similar constructs (e.g., self-efficacy) as resources” to reduce both IPV and related depression (p. 234, 2009). However, there is some question about whether social support and self-esteem have an impact on depression for victims of the most severe abuse. Carlson and colleagues found that social support and self-esteem were less likely to have a buffering affect on depression for IPV victims who had experienced the most severe abuse (2002).

Although there is literature on the relationship between IPV and depression, and some literature looking at social support and self-esteem as protective factors for depression and IPV, there is a gap in our understanding about how strangulation, an extreme form of IPV, contributes to depression among women. Further, it is unclear whether social support or self-esteem have any impact on IPV and depression for victims who have experienced this severe form of abuse. The present study contributes to the literature by examining the associations between strangulation and depressive symptoms among a sample of help-seeking women reporting IPV. We hypothesized women who experienced strangulation would report more serious depression, after accounting for protective factors, which include social support and self-esteem.

## Methods

This secondary analysis utilizes cross-sectional data collected between May 2010 and April 2013 as part of an exploratory randomized clinical trial aimed at developing and testing an integrated HIV-IPV prevention intervention for heterosexual women reporting IPV ( $n = 175$ ). Research assistants (RAs) recruited participants from a variety of healthcare delivery organizations (e.g., domestic violence agencies, public health clinics, mental health agencies, and substance abuse clinics, and hospitals), the Department of Health and Human Services, and family court. The RAs recruited women in person by either approaching them while they were waiting for their appointments or through presentations made during support group meetings at various organizations. Additionally, flyers and brochures containing basic study information and contact phone numbers were distributed at different locations. Interested women called the study telephone line for more information. The RAs used a short questionnaire to screen interested participants for eligibility and invited eligible women to participate in the study. Inclusion criteria included: (a) 18–49 years old, (b) experience of physical, sexual, or psychological violence in the past 3-months, and (c) self-reported risky sexual behavior in the past three months (i.e., inconsistent condom use and either self or partner having sex with multiple partners, engaging in sex with a drug injecting partner, or having sex with an HIV positive partner). Given that the women were being screened for an integrated HIV-IPV intervention in the parent study, they were screened for both IPV and HIV risk. However, their sexual risk status has no bearing on the research questions for this secondary data analysis.

Eligible women met with an RA at a scheduled time and location. During these meetings, the women provided written informed consent and completed a calendar of important events for the past three months to aid in improving their recall for a computer-based survey. The project utilized an Audio Computer-Assisted Self-Interview to administer the survey in a private room. However, an RA was always close by in case the participants had any questions or if they needed help with using a computer. Because of the sensitive nature of the survey questions, the RA debriefed with each participant after they completed the computer-based survey and provided them with a list of community-based services that included names of low to no-cost mental health care providers. Participants received \$20 for their time and parking or bus passes, depending on their mode of transportation. The Institutional Review Board at the participating institutions approved all procedures.

## Measures

**Sociodemographics.**—Participants reported age, race (recoded as African American, White, and Other or Mixed Race), education (recoded as high school or less vs. some or graduated college), and income (recoded as <\$15,000, \$15,000-\$30,000, and >\$30,000).

**Intimate partner violence.**—IPV was assessed using two measures - Abuse Behavior Inventory (ABI) (Zink, Klesges, Levin, & Putnam, 2007) and Women's Experiences of Battering (WEB) (Smith, Smith, & Earp, 1999). The ABI is a 29-item scale that measures physical, psychological, and sexual abuse experiences. However, the scale was modified to include 28 items for this analysis. Items included: "How often your partner has...Called you

a name and/or criticized you” and “Slapped, hit, or punched you” in the past three months. One item (the experience of choking or strangulation) was removed to specifically examine participants’ strangulation experiences as an independent variable. The participants responded using a 5-point scale, ranging from 0 (*never*) to 4 (*very frequently*). Scores were summed across the items to create a total ABI score. We also created sub-scales for physical (8 items), psychological (17 items), and sexual violence (3 items) since we were interested in the relationship between different types of IPV and our study outcome. Based on the scale developers’ recommendation a cutoff value of 10 or higher on the total score was used to indicate experiences of IPV. Higher scores indicated greater severity of violence. The standardized Cronbach for the total ABI scale for this sample is  $\alpha = 0.96$  and  $\alpha = .94$ ,  $\alpha = .94$ ,  $\alpha = .88$  for physical, psychological, and sexual sub-scales respectively within ABI. The physical abuse subscale was removed from the final multivariate analysis due to high correlation (.783) with the strangulation variable, despite strangulation being removed from the subscale.

The WEB is a 10-item self-report measure. Participants answered the survey using a 6-point scale ranging from 1 (*disagree strongly*) to 6 (*agree strongly*). Items included: “I feel like he keeps me prisoner” and “I tried not to rock the boat because I was afraid of what my partner might do.” The WEB continuous score ranges from 10–60; a score of 20 or higher indicates exposure to battering. Often in IPV research, it is helpful for the participants to discuss the frequency and severity of their abuse, but also their perceptions of coercive control and emotional abuse and isolation. Thus, we used two measures. The standardized Cronbach for this sample is  $\alpha = 0.95$ .

**Strangulation.**—A single item assessed participants’ strangulation experiences. Participants were asked to rate, on a 5-point scale ranging from 0 (*never*) to 4 (*very frequently*), if their partner had strangled them in the last three months. A dichotomized variable was created with categories of never or yes; this is consistent with most IPV measures, which include only one question about strangulation, such as Measure of Wife Abuse (Rodenburg & Fantuzzo, 1993), Severity of Violence Against Women Scale (Marshall, 1992), and Partner Abuse Scale – Physical (Hudson, 1992). Further, from an interpretation perspective, we were curious what risk and protective factors increase the odds of strangulation. We did run an additional model with a continuous level variable, not shown, and it did not change the outcome, thus our dichotomous model is reflected below in the findings section.

**Self-esteem.**—The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a 10-item self-report measure. Items were answered on a 4-point scale ranging from 0 (*strongly disagree*) to 3 (*strongly agree*). Positive and negative items included: “On the whole, I am satisfied with myself” and “At times, I think I am no good at all.” Negative scores were reverse scored, and scores were summed so that higher scores indicated higher self-esteem. The Cronbach alpha coefficient for internal consistency was .88 for this sample, which is quite favorable for a 10-item measure.

**Social support.**—The Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item measure of social support from friends,

family members, and significant others. Items were answered on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Items included “My friends really try to help me,” and “I can talk about my problems with my family.” Individual items were summed and the score was divided by the total number of items to calculate the mean score. The higher the mean, the greater the social support. The standardized Cronbach for this sample is  $\alpha = .95$ .

**Depression.**—The Center for Epidemiologic Studies Depression Scale (CES-D) is a 20-item self-report scale intended to assess depressive symptoms in the general population (Radloff, 1977). In the present study, we used the 9-item CES-D, which correlates strongly with the 20-item scale (Santor & Coyne, 1997). Items were answered on a 4-point scale ranging from 1 (*rarely/none of the time*) to 4 (*most/all of the time in the past week*). Items were summed to create a scale score. Next, a dichotomized variable was created using the cut point of 4 or higher to indicate depressive symptoms, as recommended by the developers of the measure. Cronbach’s  $\alpha = .88$  for the present sample.

### Data Analysis

Statistical analyses were performed using SAS/STAT software (SAS Institute Inc, 2008). Chi-square and Student’s t-tests were conducted to determine how (1) sociodemographic variables, (2) violence, (3) self-esteem, and (4) social support were related to experiencing strangulation. To check for possible multicollinearity among the independent variables, we ran and inspected a bivariate correlation matrix (Table 1).

To identify correlates of depression, we first conducted bivariate logistic regressions with demographics, violence measures, strangulation, self-esteem, and social support as independent variables. To examine the impact of strangulation on women’s depressive symptoms after accounting for their IPV experiences, we built a nested model using multivariate logistic regression. In the first model we included socio-demographics and violence measures, in the second model we added strangulation in addition to the earlier measures, and in the final model we added protective factors of self-esteem and social support. We report the adjusted odds ratios (AORs) from all the final models to characterize the relative strength of the association between each predictor variable and the outcome. Model fit was assessed using the Hosmer-Lemeshow statistic. We had 65% power to detect significant differences at  $p = .05$  in this study.

### Results

This sample was comprised of 175 women who completed the measures noted above, and who were HIV negative, despite engaging in risky sex behaviors. Table 2 shows the sample descriptives of the entire sample, as well as the examination of how those characteristics may differ based on whether the participant reported strangulation.

The sample was diverse. Forty four percent ( $n=76$ ) of the participants reported being White, 41% ( $n=71$ ) reported being African American, and 16% ( $n=28$ ) reported Other. The average age was 35.98 ( $SD=10.72$ ). The group reported higher levels of education compared to the county demographics. Twenty-five percent ( $n=43$ ) of the participants reported less than a

high school education, 23% (n=40) reported graduating high school or having a GED, 36% (n=63) had completed some college and 16% (n=28) had a college degree. The majority of the sample, 63% (n=110), reported having less than \$15,000 per year in income.

Regarding their experiences of violence, this sample reported high levels of IPV. Women reported a mean WEB score of 47.08 (SD 13.94), which was quite high. Participants' overall abuse score from the ABI was 53.63 (SD 28.57), indicating severe abuse. Table 2 provides a comparison between the participants who reported being strangled with those who had not. Education was the only sociodemographic variable that showed any significant difference between the groups ( $p < .03$ ). College graduates were more likely to report not being strangled. Women who experienced strangulation also reported high scores on the WEB ( $p < .0001$ ), total ABI score ( $p < .0001$ ), more severe physical ( $p < .001$ ), sexual ( $p < .001$ ), and psychological ( $p < .001$ ) abuse and higher depressive symptoms compared to women who did not experience strangulation in the last 3 months.

Table 3 provides the bivariate and multivariate logistic regression using depression as the dependent variable, with strangulation as an independent variable. In the bivariate analysis, some variables are associated with increasing the odds of depressive symptoms, including the total WEB score (OR 1.035, CI 1.01, 1.06) and the subscales for psychological (OR 1.025, CI 1.008, 1.043) and sexual abuse (OR 1.12, CI 1.023, 1.22). Each of these were associated with a slight increase in an abuse victim's risk for depressive symptoms. While increases in abuse scores are associated with slightly increased odds of a participant having elevated depression symptoms, being strangled increased a participant's odds of depressive symptoms by almost two and a half times (OR 2.40, CI 1.29, 4.50).

We next ran a three step multivariate logistic regression to examine sociodemographic variables in concert with violence experiences in model 1, followed by the addition of strangulation in model 2 and protective factors in model 3. Sociodemographics were included in the model, despite not being significant in the bivariate analysis, to examine potential suppression. In model 1 and 2, no variables were significant. In model two, when strangulation was added to the model, it did not increase the odds of depressive symptoms (OR 1.802, CI 0.819, 3.966). In the final model, when mitigators were introduced, social support and self-esteem, only social support was significant (OR 0.959, CI 0.932, 0.987).

## Discussion

For this secondary data analysis, we examined data collected from women seeking help at a variety of healthcare-based services and community agencies, potentially capturing a wider range of experiences than studies conducted at a single venue. This study adds to the literature by investigating whether abused women who reported strangulation also reported higher rates of physical, psychological, and sexual violence compared to those who did not report strangulation, and whether they were more likely to report greater depressive symptoms. Further, we wanted to explore whether protective factors cited in the available IPV literature, specifically social support and self-esteem, mitigated depression in this sample.

Our sample was racially diverse, with an almost equal split between White and African American women, and 52% reported having some college studies or a college degree. This sample reported high levels of violence, despite being recruited from various venues. Further, 59% of the women reported experiences of strangulation in the last three months. These high figures are similar to other studies with samples of community-based women (Sutherland, Bybee, & Sullivan, 2002).

Education was the only variable that was associated with strangulation in the sample. Participants with higher education were less likely to report being strangled. It is interesting to note that none of the sociodemographic variables in our multivariate models were significantly associated with participants' depressive symptoms; this is contrary to earlier studies (Beydoun, Beydoun, Kaufman, Lo, & Zonderman, 2012). This finding suggests that in our sample, the relationship between experiencing IPV and depression was not significantly impacted by education and higher economic status—factors that some studies have suggested are protective (Abramsky et al, 2011; Carlson, et al., 2002).

Women who reported experiencing strangulation also reported higher rates of IPV across all types: physical, sexual and psychological. This is consistent with other research marking strangulation as part of a cycle of escalating violence (Pritchard, Rachdenwald & Nordham, 2015), often accompanied by other types of severe physical violence and severe psychological abuse tactics, such as threats to kill (Wilbur, et al., 2001), and as a risk factor among homicide and attempted homicide victims (Glass et al., 2008).

Our findings also suggest that social support, which can be changed through advocacy, support groups, counseling and access to services, might be a window towards helping victims decrease the severe violence in their lives. While social support was associated with a modest reduction of depression in our sample; in national samples, reducing the odds of depression by 5% could mean improved health and help-seeking among a large number of victims.

### Screening and Intervention

Our research suggests an association between different types of violence including strangulation and depressive symptoms. In our bivariate analysis, exploring the relationships between sociodemographic characteristics, different types of abuse, and depression, women who reported more physical and sexual abuse, and coercive control were more likely to report depressive symptoms. At the bivariate level, our hypothesis was also true regarding strangulation as a risk factor for depression; the risk for depression more than doubled for those who reported strangulation. These findings are aligned with prior research. A study of help-seeking women showed that over 80% of the sampled women who reported strangulation also suffered from both depression and anxiety (Wilbur, et al., 2001). These findings underscore the need to screen for IPV and strangulation with women who report depression at health-care based services and community agencies.

Although the multivariate analysis did not support the second hypothesis, that women who experience strangulation, and thus more severe violence, would be more likely to report depression, the results do indicate social support as protective against depression. When we



examine women in the context of their sociodemographic characteristics, violence experiences and potential buffers, the role of these factors in relation to depression becomes more difficult to explain. However, these findings endorse other studies that suggest by offering greater social support, we can reduce the mental health damage abuse victims experience (Bradley, Schwartz, & Kaslow, 2005; Carlson, McNutt, Choi, & Rose, 2002; Stein, Burden, & Nyamathi, 2002; Thompson, Kaslow, Short, & Wyckoff, 2002).

### Legal and Policy Changes

While screening women for strangulation and supporting victims' healing is very important, it is imperative to have laws and policies specifically supporting the prosecution of strangulation. Research showing the increased risk of lethality associated with IPV strangulation has led to statutory changes across the United States. A 2014 report released by the National District Attorneys Association, found that 44 states had some form of strangulation or impeding breathing legislation (National District Attorneys Association, 2014). For example, New York State added an article to the penal law creating new crimes specific to the act of strangulation. (Strangulation and related offenses. NY Penal Law Article 121. 2011); additionally, these crimes were added to the list of enumerated family offenses (Procedures for Family Offense Proceedings. N.Y. F.C.A. § 812. 2013). Prior to the new legislation, crimes involving strangulation were often categorized under less serious misdemeanor assaults, which caused courts to minimize the IPV severity when presented to the court. This legislation, coupled with better evidence collection, such as alternate light source technology (Holbrook & Jackson, 2013) or medical imaging of the throat and chest (Armstrong & Strack, 2016), enhance the legal remedies available to victims of IPV strangulation. Further, as legislative efforts and technological advancements gain momentum, more training and educational efforts have emerged. The Training Institute on Strangulation Prevention has emerged as a valuable source of information about strangulation and the high risk it carries for victims of IPV and sexual assault. Increased recognition of strangulation should have a significant public health impact given the link between violence, strangulation, and mental health burden experienced by abused women.

### Study Limitations

As with all studies, these findings should be considered in light of the study limitations. This is a cross-sectional study, which relied on self-report; thus, we cannot draw causal findings. The sample consisted of women who were recruited for an integrated HIV-IPV intervention, so the findings have limited generalizability. Participants' IPV experiences were not validated with secondary data sources. Additionally, the mental health measures assessed for symptoms, and were not diagnostic in nature. It is also possible that the sample size was too small to detect significance. However, these limitations should be examined against the backdrop of the study's strengths: this community-dwelling sample had racial and economic diversity, and utilized standardized measures. This study also contributes to the literature by examining the role of protective factors, not routinely considered among a diverse sample.

## Conclusion

More research focused on the relationship between IPV victimization, strangulation, and the mental health consequences is warranted, especially as medical and legal professionals and policy makers refine their responses to this emerging issue. Victims may not seek help specifically for their strangulation experiences or disclose strangulation outside the context of a broader discussion about other forms of abuse (Pritchard et al., 2015); thus, helping professionals will need to better understand how to adequately assess women seeking services. Findings from this secondary analysis indicated an association between abuse severity and strangulation among women recruited from a variety of settings, and also a relationship between different types of violence including strangulation and depression. If providers are aware of such links they may be able to better serve their clients. Under the Patient Protection and Affordable Care Act, 42 U.S.C. § 18001 (2010) as it now stands, community providers may be able to refer women who report strangulation to mental health care more easily, including approaches such as collaborative care, which embed mental health treatment into primary care settings (Butler et al., 2008; Patient Protection and Affordable Care Act, 2010).

We were surprised at the high abuse severity and high prevalence of strangulation in our sample, given the variety of settings that women were recruited from. This underscores the need to train providers and support screening, assessment, and proper referral in a variety of healthcare and community-based settings. When women present to service providers, regardless of the setting, it is imperative that helping professionals be trained to conduct IPV screening, using evidence-based instruments, such as the Danger Assessment, and provide a basic safety plan (Morse, Lafleur, Fogarty, Mittal, & Cerulli, 2012). Further, when women share their IPV experiences with service providers, the responding professionals must be ready to act accordingly, in a non-judgmental way, offering referrals to best help victims of abuse and linking them to care.

## Acknowledgments

The authors wish to acknowledge the participants, who were willing to share their unique stories.

Funding: M.Mittal, NIH grant # K01- MH080660

## References

- Abramsky T, Watts CH, Garcia-Moreno C, Devries K, Kiss L, Ellsberg M, ... & Heise L (2011). What factors are associated with recent intimate partner violence? Findings from the WHO multi-country study on women's health and domestic violence. *BMC public health*, 11(1), 109. [PubMed: 21324186]
- Armstrong M, & Strack GB (2016). Recognition and documentation of strangulation crimes: A review. *JAMA Otolaryngology-Head & Neck Surgery*, 142(9), 891–897. [PubMed: 27308820]
- Beydoun HA, Beydoun MA, Kaufman JS, Lo B, & Zonderman AB (2012). Intimate partner violence against adult women and its association with major depressive disorder, depressive symptoms and postpartum depression: A systematic review and meta-analysis. *Social science & medicine*, 75(6), 959–975. [PubMed: 22694991]
- Black MC, Basile KC, Breiding MJ, Smith SG, Walters ML, Merrick MT, Chen J, & Stevens MR (2011). The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Summary Report

Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.

- Bonomi AE, Thompson RS, Anderson M, Reid RJ, Carrell D, Dimer JA, & Rivara FP (2006). Intimate partner violence and women's physical, mental, and social functioning. *American Journal of Preventive Medicine*, 30(6), 458–466. [PubMed: 16704938]
- Bradley R, Schwartz AC, & Kaslow NJ (2005). Posttraumatic stress disorder symptoms among low-income, African American women with a history of intimate partner violence and suicidal behaviors: Self-esteem, social support, and religious coping. *Journal of Traumatic Stress*, 18(6), 685–696. [PubMed: 16382436]
- Butler M, Kane RL, McAlpine D, Kathol RG, Fu SS, Hagedorn H, & Wilt TJ (2008). Integration of mental health/substance abuse and primary care. *Evidence Reports/Technology Assessments*, No. 173
- Campbell JC, Webster DW, & Glass N (2009). The danger assessment: Validation of a lethality risk assessment instrument for intimate partner femicide. *Journal of Interpersonal Violence*, 24(4), 653–674. doi:10.1177/0886260508317180 [PubMed: 18667689]
- Campbell JC, Webster D, Koziol-McLain J, Block C, Campbell D, Curry MA, &...Laughon K (2003). Risk factors for femicide in abusive relationships: Results from a multisite case control study. *American Journal of Public Health*, 93, 1089–1097. [PubMed: 12835191]
- Carlson BE, McNutt LA, Choi DY, & Rose IM (2002). Intimate partner abuse and mental health. *Violence Against Women*, 8(6), 720–745.
- Coker AL, Davis KE, Arias I, Desai S, Sanderson M, Brandt HM, & Smith PH (2002). Physical and mental health effects of intimate partner violence for men and women. *American Journal of Preventive Medicine*, 23(4), 260–268. [PubMed: 12406480]
- Dillon G, Hussain R, Loxton D, & Rahman S (2013). Mental and physical health and intimate partner violence against women: A review of the literature. *International Journal of Family Medicine*, 2013.
- Eshelman L (2012). Dating violence: Mental health consequences based on type of abuse. *Violence and Victims*, 27(2), 215. [PubMed: 22594217]
- Ferrari G, Agnew-Davies R, Bailey J, Howard L, Howarth E, Peters TJ, Sardinha L, & Feder G (2014). Domestic violence and mental health: A cross-sectional survey of women seeking help from domestic violence support services. *Global Health Action*, 7, 1–10.
- Glass N, Laughon K, Campbell J, Block CR, Hanson G, Sharps PW, & Taliaferro E (2008). Non-fatal strangulation is an important risk factor for homicide of women. *The Journal of Emergency Medicine*, 35(3), 329–335. [PubMed: 17961956]
- González-Guarda RM, Peragallo N, Vasquez EP, Urrutia MT, & Mitrani VB (2009). Intimate partner violence, depression, and resource availability among a community sample of Hispanic women. *Issues in Mental Health Nursing*, 30(4), 227–236. [PubMed: 19363727]
- Graham K, Bernards S, Flynn A, Tremblay PF, & Wells S (2012). Does the relationship between depression and intimate partner aggression vary by gender, victim-perpetrator role, and aggression severity? *Violence and Victims*, 27(5), 730–743. [PubMed: 23155723]
- Holbrook DS, & Jackson MC (2013). Use of an alternative light source to assess strangulation victims. *Journal of Forensic Nursing*, 9(3), 140–145. doi:10.1097/JFN.0b013e31829beb1e [doi] [PubMed: 24158151]
- Hudson WW (1992). *The WALMYR assessment scales scoring manual* WALMYR Pub. Co.
- Ludermir AB, Schraiber LB, D'Oliveira AF, França-Junior I, & Jansen HA (2008). Violence against women by their intimate partner and common mental disorders. *Social science & medicine*, 66(4), 1008–1018. [PubMed: 18178299]
- Marshall LL (1992). Development of the severity of violence against women scales. *Journal of Family Violence*, 7(2), 103–121.
- Mcquown C, Frey J, Steer S, Fletcher GE, Kinkopf B, Fakler M, & Prulhiere V (2016). Prevalence of strangulation in survivors of sexual assault and domestic violence. *American Journal of Emergency Medicine* 34(7), 1281–1285. [PubMed: 27162112]

- Morse DS, Lafleur R, Fogarty CT, Mittal M, & Cerulli C (2012). "They told me to leave": How health care providers address intimate partner violence. *Journal of the American Board of Family Medicine : JABFM*, 25(3), 333–342. doi:10.3122/jabfm.2012.03.110193 [PubMed: 22570397]
- National District Attorneys Association, Criminal Strangulation/Impeding Breathing, 11 2014, [http://www.ndaa.org/pdf/strangulation\\_statutory\\_compilation\\_11\\_7\\_2014.pdf](http://www.ndaa.org/pdf/strangulation_statutory_compilation_11_7_2014.pdf). Date Accessed: 2/1/2018
- Patient Protection and Affordable Care Act. (2010). Pub. L. no. 111–148, §2702, 124 stat 119, 318–319.
- Pico-Alfonso MA, Garcia-Linares MI, Celda-Navarro N, Blasco-Ros C, Echeburúa E, & Martinez M (2006). The impact of physical, psychological, and sexual intimate male partner violence on women's mental health: depressive symptoms, posttraumatic stress disorder, state anxiety, and suicide. *Journal of women's health*, 15(5), 599–611.
- Pritchard AJ, Reckdenwald A, & Nordham C (2015). Nonfatal strangulation as part of domestic violence: A review of research. *Trauma, Violence, & Abuse*, doi: 1524838015622439.
- Procedures for Family Offense Proceedings (2013). N.Y. F.C.A. sec. 812.
- Radloff LS (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1(3), 385–401.
- Ridings LE, Beaseley LO, Bohora SB, Daer JL, Owora A, & Silovsky J (2016). Longitudinal investigation of depression, intimate partner violence, and supports among vulnerable families. *Journal of Interpersonal Violence*, 3 27 pii: 0886260516639262
- Rodenburg FA, & Fantuzzo JW (1993). The measure of wife abuse: Steps toward the development of a comprehensive assessment technique. *Journal of Family Violence*, 8(3), 203–228.
- Roh S, Burnette CE, Lee KH, Lee YS, & Easton SD (2016). Risk and protective factors for depressive symptoms among indigenous older adults: Intimate partner violence (IPV) and social support. *Journal of Gerontological Social Work*, 7 20:1–16 doi: 10.1080/01634372.2016.1214659
- Rosenberg M (1965). *Society and the adolescent self-image* Princeton, NJ: Princeton University Press.
- Santor DA, & Coyne JC (1997). Shortening the CES–D to improve its ability to detect cases of depression. *Psychological Assessment*, 9(3), 233.
- SAS Institute Inc. (2008). *SAS/STAT® 9.2 user's guide* Cary, NC: SAS Institute Inc.
- Shields LBE, Corey TS, Weakly-Jones B, & Stewart D (2010). Living victims of strangulation: A 10-year review of cases in a metropolitan community. *The American Journal of Forensic Medicine and Pathology*, 31(4), 320–325. [PubMed: 21171201]
- Smith PH, Smith JB, & Earp JAL (1999). Beyond the measurement trap: A reconstructed conceptualization and measurement of woman battering. *Psychology of Women Quarterly*, 23(1), 177–193.
- Stein JA, Burden LM, & Nyamathi A (2002). Relative contributions of parent substance use and childhood maltreatment to chronic homelessness, depression, and substance abuse problems among homeless women: Mediating roles of self-esteem and abuse in adulthood. *Child Abuse & Neglect*, 26, 1011–1027. [PubMed: 12398858]
- Strack GB, McClane GE, & Hawley D (2001). A review of 300 attempted strangulation cases part I: Criminal legal issues. *The Journal of Emergency Medicine*, 21(3), 303–309. [PubMed: 11604294]
- Strangulation and related offenses. (2011). NY Penal Law §121.11-§121.14.
- Sutherland CA, Bybee DI, & Sullivan CM (2002). Beyond bruises and broken bones: The joint effects of stress and injuries on battered women's health. *American Journal of Community Psychology*, 30(5), 609–636. [PubMed: 12188053]
- Suvak MK, Taft CT, Goodman LA, & Dutton MA (2013). Dimensions of functional social support and depressive symptoms: A longitudinal investigation of women seeking help for intimate partner violence. *Journal of Consulting and Clinical Psychology*, 81(3), 455–66. [PubMed: 23398492]
- Thomas KA, Joshi M, & Sorenson SB (2013). "Do you know what it feels like to drown?" Strangulation as coercive control in intimate relationships. *Psychology of Women Quarterly*, 38(1), 124–137.
- Thompson MP, Kaslow NJ, Short LM, & Wyckoff S (2002). The mediating roles of perceived social support and resources in the self-efficacy-suicide attempts relation among African American abused women. *Journal of Consulting & Clinical Psychology*, 70, 942–949. [PubMed: 12182277]

- The Training Institute on Strangulation Prevention. <https://www.strangulationtraininginstitute.com/>. Accessed: 2/1/2018
- Wathen CN, Tanaka M, MacGregor JC, Ferro MA, McKee C, Boyle M, ... & MacMillan HL (2016). Trajectories for women who disclose intimate partner violence in health care settings: the key role of abuse severity. *International journal of public health*, 61(8), 873–882. [PubMed: 27392733]
- Wilbur L, Higley M, Hatfield J, Surprenant Z, Taliaferro E, Smith DJ, & Paolo A (2001). Survey results of women who have been strangled while in an abusive relationship. *The Journal of Emergency Medicine*, 21(3), 297–302. [PubMed: 11604293]
- Zimet GD, Dahlem NW, Zimet SG, & Farley GK (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30–41.
- Zink T, Klesges LM, Levin L, & Putnam F (2007). Abuse behavior inventory: Cutpoint, validity, and characterization of discrepancies. *Journal of Interpersonal Violence*, 22(7), 921–931. doi:22/7/921 [pii] [PubMed: 17575069]

**Table 1:**

Bivariate correlations of outcome and key explanatory variables operationalized as continuous variables (n=175)

	Age	Depression	WEB	Physical ABI	Psych. ABI	Sexual ABI	Overall ABI	Social Support	Self- esteem
<b>Age</b>	1.00								
<b>Depression</b>	0.0306	1.00							
<b>WEB</b>	-0.0823	0.266 <sup>***</sup>	1.00						
<b>Physical ABI</b>	-0.120	0.311 <sup>***</sup>	0.524 <sup>***</sup>	1.00					
<b>Psych. ABI</b>	0.0175	0.246 <sup>***</sup>	0.674 <sup>***</sup>	0.727 <sup>***</sup>	1.00				
<b>Sexual ABI</b>	-0.0520	0.197 <sup>**</sup>	0.420 <sup>***</sup>	0.681 <sup>***</sup>	0.684 <sup>***</sup>	1.00			
<b>Overall ABI</b>	-0.0354	0.654 <sup>***</sup>	0.654 <sup>***</sup>	0.878 <sup>***</sup>	0.961 <sup>***</sup>	0.789 <sup>***</sup>	1.00		
<b>Social Support</b>	-0.105	-0.326 <sup>***</sup>	-0.108	-0.210 <sup>**</sup>	-0.0908	-0.108	-0.141~	1.00	
<b>Self Esteem</b>	0.132~	0.129~	0.139~	0.111	0.148~	0.0570	0.137~	-0.105	1.00
<b>Strangulation</b>	-0.133	0.253 <sup>***</sup>	0.382 <sup>***</sup>	0.783 <sup>***</sup>	0.583 <sup>***</sup>	0.619 <sup>***</sup>	0.708 <sup>***</sup>	-0.084	0.112

~ p<.1

\* p<.05

\*\* p<.01

\*\*\* p<.001

**Table 2.**

## Sample Descriptives

	Total N (%) (n=175 )	Strangled N (%) (n=103, 59%)	Not strangled N (%) (n= 72, 41% )	Chi-square/T-test
<b>Race</b>				5.1327
White	76 (44%)	39 (22.29%)	21.14 (37)	
African American	71 (41%)	49 (28.00%)	12.57 (22)	
Other	28 (16%)	15 (8.57%)	7.43 (13)	
<b>Education</b>				8.5006*
< High School	43 (25%)	27 (15.52%)	16 (9.20%)	
Graduated HS or GED	40 (23%)	28 (16.09%)	12 (6.90%)	
Some college	63 (36%)	37 (21.26%)	26 (14.94%)	
Graduated college	28 (16%)	10 (5.75%)	18 (10.34%)	
<b>Income</b>				0.7556
<\$15,000	110 (63%)	68 (39.31%)	42 (24.28%)	
\$15,000–\$30,000	35 (21%)	19 (10.98%)	16 (9.25%)	
\$30,000–\$45,000	11 (6%)	6 (3.47%)	5 (2.89%)	
>\$45,000	17 (10%)	10 (5.78%)	7 (4.05%)	
	<b>Mean (SD)</b>	<b>Mean (SD)</b>	<b>Mean (SD)</b>	
<b>Age</b>	35.98 (10.72)	34.85 (10.64)	37.03 (10.33)	1.27
<b>Violence</b>				
WEB	47.082 (13.94)	50.732 (12.23)	42.178 (14.59)	4.2**
Physical ABI	12.802 (9.37)	17.797 (8.26)	5.833 (5.57)	11.44**
Psychological ABI	37.046 (18.02)	44.537 (15.41)	26.751 (16.06)	7.38**
Sexual abuse ABI	3.789 (3.81)	5.272 (3.99)	1.708 (2.30)	7.45**
<b>Mitigators</b>				
Social Support	33.237 (13.24)	32.084 (13.61)	35.211 (12.61)	–1.53
Self - Esteem	20.110 (6.24)	20.738 (5.99)	19.159 (6.56)	1.65
<b>Mental Health</b>				
Depression	4.32 (2.95)	4.88 (2.76)	3.58 (3.08)	2.91**

\* p .05

\*\* p .01

**Table 3.**

Logistic Regression with Depression as the Dependent Variable

	Bivariate Logistic Regression		Multivariate Logistic Regression					
	OR	CI	Step 1 (n=173)		Step 2 (n=172)		Step 3 (n=171)	
			OR	CI	OR	CI	OR	CI
<b>Step 1</b>								
<b>Socio-demographics</b>								
Age	1.002	.974, 1.031	1.006	0.976, 1.037	1.011	0.980, 1.043	1.004	0.972, 1.038
Race								
African American vs. White	1.009	0.414, 2.455	1.113	0.521, 2.380	0.965	0.439, 2.119	1.123	0.493, 2.554
Other Race vs. White	0.977	0.407, 2.345	1.104	0.399, 3.055	1.100	0.384, 3.151	1.179	0.388, 3.575
Education								
<= High School vs. some or Graduated College	1.424	0.776, 2.614	1.268	0.623, 2.582	1.203	0.579, 2.499	1.208	0.552, 2.644
Income								
< \$15,000 vs. \$30,000+	1.841	0.797, 4.250	1.647	0.656, 4.137	1.784	0.708, 4.492	1.689	0.660, 4.324
\$15,000-\$30,000 vs. \$30,000+	1.222	0.451, 3.306	1.353	0.446, 4.103	1.415	0.463, 4.325	1.865	0.569, 6.109
<b>Violence</b>								
WEB	1.035	1.011, 1.059	1.025	.992, 1.060	1.025	0.991, 1.060	1.022	0.988, 1.057
Psychological abuse	1.025	1.008, 1.043	1.009	0.978, 1.041	1.002	0.970, 1.035	1.007	0.975, 1.040
Sexual abuse	1.116	1.023, 1.216	1.038	0.920, 1.170	1.026	0.909, 1.159	1.011	0.892, 1.146
<b>Step 2</b>								
Strangulation - Yes vs. No	2.408	1.290, 4.495	--	--	1.802	0.819, 3.966	1.608	0.708, 3.650
<b>Step 3</b>								
<b>Mitigators</b>								
Social Support	.957	.933, .981	--	--	--	--	0.959**	0.932, 0.987
Self - Esteem	1.036	.986, 1.087	--	--	--	--	1.027	0.969, 1.087
<b>Psuedo R<sup>2</sup></b>			R <sup>2</sup> = .0808		R <sup>2</sup> = .0906		R <sup>2</sup> = .1480	
<b>GoodnessFit</b>			Chi-square= 7.7696, df=8, p = .4563		Chi-square=11.0654, df=8 p = 0.1980		Chi-square=7.1617, df=8 p = 0.5193	



100' d  
\*\*\*  
10' d  
\*\*  
50' d  
\*

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript