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## Non-fatal strangulation is an important risk factor for homicide of women

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### Abstract

The purpose of the study is to examine non-fatal strangulation by an intimate partner as a risk factor for major assault, or attempted or completed homicide of women. A case control design was used to describe non-fatal strangulation among complete homicides and attempted homicides (n =506) and abused controls (n = 427). Interviews of proxy respondents and survivors of attempted homicides were compared with data from abused controls. Data were derived using the Danger Assessment. Non-fatal strangulation was reported in 10% of abused controls, 45% of attempted homicides and 43% of homicides. Prior non-fatal strangulation was associated with greater than six-fold odds (OR 6.70, 95% CI 3.91–11.49) of becoming an attempted homicide, and over seven-fold odds (OR 7.48,

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<sup>1</sup>Although most of the collaborators of the Chicago Women’s Health Risk Study were silent partners in writing this report, they were equal partners in the project. They include Olga Becker, Nanette Benbow, Jacquelyn Campbell, Debra Clemons, James Coldren, Alicia Contreras, Eugene Craig, Roy J. Dames, Alice J. Dan, Christine Devitt, Edmund R. Donoghue, Barbara Engel, Dickelle Fonda, Charmaine Hamer, Kris Hamilton, Eva Hernandez, Tracy Irwin, Mary V. Jensen, Holly Johnson, Teresa Johnson, Candice Kane, Debra Kirby, Katherine Klimisch, Christine Kosmos, Leslie Landis, Susan Lloyd, Gloria Lewis, Christine Martin, Rosa Martinez, Judith McFarlane, Sara Naureckas, Iliana Oliveros, Angela Moore Parmley, Stephanie Riger, Kim Riordan, Roxanne Roberts, Martine Sagan, Daniel Sheridan, Wendy Taylor, Richard Tolman, Gail Walker, Carole Warshaw, and Steven Whitman. Collaborating agencies in the study were the Mayor’s Office on Domestic Violence; the Chicago Police Department Domestic Violence Unit; the Erie Family Health Center; the Chicago Department of Public Health; the Cook County Medical Examiner’s Office; the Cook County Hospital; the Chicago Abused Women Coalition; and the Illinois Criminal Justice Information Authority.

95% CI 4.53–12.35) of becoming a completed homicide. These results show non-fatal strangulation as an important risk factor for homicide of women, underscoring the need to screen for non-fatal strangulation when assessing abused women in emergency department settings.

## Introduction

The 1993 National Mortality Followback Survey (NMFS) of adults (22,957 decedents 15 years and older) shows that the percent dying from strangulation was much higher for women (11.8%) than for men (1.9%) overall and in every age group (respectively, 1.1% versus 11.7% at age 18–24 years; 1.6% versus 11.7% at age 25–39; 2.8% versus 6.7% at age 40–64; and 7.0% versus 33.0% at age 65 or older). Though there is no information about the relationship of the victim and offender in the NMFS study, the findings provide the context to examine strangulation as a risk factor for intimate partner attempted and completed homicide of women (1).

There is little research specifically examining strangulation in the context of intimate partner violence (IPV) or homicide. The prevalence of strangulation as a form of IPV and a risk factor for attempted or completed homicide has not been established. Wilbur and colleagues' in 2001<sup>2</sup> found that 68% of a convenience sample of 62 women presenting to a domestic violence advocacy program reported strangulation by their abuser (2). The Chicago Women's Health Risk Study (CWHRS) found that 24.6% of 57 adult women killed by a male intimate partner in 1995 or 1996 in Chicago were killed by strangulation or smothering (3,4). Of the 494 women sampled as they came into Chicago hospitals and clinics for any reason and who said that they had experienced IPV in the past year, 47.3% had experienced at least one incident in the past year in which her partner had tried to choke or strangle her, and 57.6% had "ever" experienced choking or strangulation by the abusive partner. There was no difference between women who were not killed and the women who were killed in having experienced prior choking or strangulation. However, strangulation was associated with lethality of incident, with almost five percent (4.8%) lethality in the 289 incidents in which a partner or ex-partner strangled the woman, compared to 1.0% of the 4,722 incidents where the abuser used other types of violence. This finding was true across racial and ethnic groups, but did not hold for women abused by a same-sex partner. African American women were significantly more likely than Latinas and other racial or ethnic groups of women to have experienced strangulation in the past year, or "ever," but were less likely to be killed by strangulation.

A study of 300 consecutive cases of female attempted strangulations seen in the San Diego Domestic Violence Unit of the city prosecutor's office found that in 89% of the cases there was a prior history of IPV (5). In a study in which women were directly questioned about symptoms, at least 85% of intimate partner strangulation victims experienced physical symptoms (such as sore throat, difficulty breathing, or neurological symptoms) and at least 83% reported one or more psychiatric symptom in the two weeks following the event (2). A different analysis of the same data found that 56% of the women had experienced more than one strangulation event (6). The frequency with which women reported some kind of symptoms, particularly neurological, increased among women who were the victims of multiple versus one strangulation event (6). In another study using police documentation of injuries, 34% of strangulation victims reported symptoms, including pain, difficulty swallowing, and breathing changes (5). Three case studies of carotid dissection resulting in cerebrovascular accidents in women who were strangled by an intimate partner have been reported (7).

In this article, we seek to achieve the following aims: 1) describe the prevalence of non-fatal strangulation and demographic characteristics in a population based sample of urban abused

women, 2) determine if non-fatal strangulation is a risk factor for completed and attempted homicide for abused women, and 3) determine how the risk represented by non-fatal strangulation varies for women according to personal and relationship factors.

## Materials and Methods

### Study design

We performed secondary analysis of data from an eleven-city case control study to identify risk factors for intimate partner homicide and attempted homicide of women (8).. Institutional review board approval was obtained by each collaborating site.

### Setting

Risk factor data were collected using a structured survey administered by researchers and interviewers trained in interviewing victims of violence.

### Selection of participants

**Completed Homicide of Women Cases**—All consecutive police or medical examiner intimate partner female homicide records from 1994 – 2000 in each study city were examined for victim-perpetrator relationship. Cases were eligible if the victim was a woman aged 18 years or older, the perpetrator was a current or ex-intimate partner, and the case was designated as “closed” by the police. Records were abstracted for data specific to the homicide and to identify potential proxy informants (i.e., mother, sister, brother or friend) who might be knowledgeable about details concerning the victim’s relationship with the perpetrator. Proxies were then sent a letter explaining the study and inviting their participation (9). Researcher telephone and address contact information was provided in the letter for proxies to find out more about the study or to request no further communication (9). Two weeks following the letter, study personnel made contact, either by telephone or in person (in the few cases where no phone contact was possible), with the proxies who had not requested non-contact. If the first proxy reported that he or she was not knowledgeable about details of the relationship, the proxy was asked to identify another willing potential proxy informant. Then, in-person or telephone interviews were conducted, following informed consent, with the proxy who was most knowledgeable about details of the victim-perpetrator relationship. In 373 of the 545 (68%) total intimate partner homicide cases abstracted, a knowledgeable proxy was identified and located. Proxies agreed to participate in 83% (310/373) of cases, therefore, 310 homicides of women are included in this analysis.

**Attempted Homicide Cases**—Attempted homicide cases were identified through the offices of the district attorney, law enforcement, community domestic violence advocacy, or trauma centers in each participating city. Attempted homicide was defined for this study as the survival of a gun-shot or stab wound to the head, neck or torso; strangulation or near drowning with loss of consciousness; severe injuries inflicted that easily could have led to death; or gun-shot or stab wound to other body part with evidence of unambiguous (additional to victim report) intent to kill on the part of a perpetrator who was a current or former intimate partner. When a woman was identified, she was sent an introductory letter inviting her to participate in a Woman’s Health Study and a statement that she would receive a follow-up telephone call in two weeks unless she contacted the investigators requesting not to be called. The follow-up telephone call established safety and privacy, further explained the study, established informed consent, and either proceeded with the telephone interview or scheduled a safe and convenient time to conduct the telephone or in-person interview. The attempted homicide cases gave us the advantage of direct rather than proxy interviews but the disadvantage of a lower location rate (56%), since a large proportion of the women had moved from the place where they were

almost killed, as would be expected. However, once we located an attempted homicide victim (n=215), almost all (90%) agreed to participate, for a sample of 194.

**Abused Controls**—Stratified random-digit dialing (up to 6 attempts per number) conducted by an experienced survey research firm was used to select English and Spanish speaking women aged 18 to 50 years who had been involved “romantically or sexually” in a relationship at some time in the past 2 years in the same cities in which the homicides occurred. A woman was considered “abused” if she had been physically assaulted or threatened with a weapon by a current or former intimate partner during the past 2 years; we identified episodes of abuse using a modified version of the Conflict Tactics Scale with stalking items added (10,11). A total of 4746 women met the age and relationship criteria and were read the consent statement. Among these women, 3637 (76.6%) agreed to participate. A total of 427 (8.5%) women had been physically abused or threatened with a weapon by a current or recent intimate partner and are included in this analysis. Thirteen abused controls were excluded because they reported that the injuries from their most severe incident of abuse were so severe that they thought they could have died.

### Methods of measurement

The interview included previously tested instruments, such as the Danger Assessment (DA), along with demographic and relationship characteristics including type, frequency and severity of any violence, psychological abuse and harassment, alcohol and drug use, and weapon availability (12–14).

The DA is a research and clinical instrument developed to assist abused women in assessing risk factors for intimate partner homicide in their relationship. The DA has the most published data on risk factors for intimate partner homicide and concurrent and predictive validity information (14). The DA item for strangulation is “did he try to choke you in the past year.” While “choking” is technically different from strangulation, it is used in this instrument as a word that is more familiar to women. The DA has been revised to the DA-2 based on the findings from the larger multi-city case control study and can be located at: <http://www.dangerassessment.org> (15).

### Primary Data Analysis

Means, standard deviations and frequencies were used to describe the demographic characteristics of the intimate partner homicides, attempted homicides and abused controls who experienced and did not experience strangulation. Within each group (abused control, attempted homicide and completed homicide) tests were conducted to examine whether there were demographic differences between women who had and had not been strangled by their partner. These differences were tested using chi-square or t-test depending on the nature of the variables being tested. Scores on the DA (excluding the strangulation item) were calculated for each group. Analysis of variance was used to test for differences in DA scores among the control, homicide/completed homicides cases who experienced strangulation. Multivariate logistic regressions were conducted to determine the risk factors for strangulation and the strength of association of strangulation with attempted and completed homicide cases. To qualitatively determine if various personal and relationship factors moderated the association between strangulation and risk for completed and attempted homicide, sub-group analyses using multivariate logistic regression were conducted within the levels of race, employment status, educational level, and relationship status, which were determined *a priori*. Within each level of the personal and relationship variables, multivariate logistic regressions were conducted to examine the degree of association between strangulation and attempted and completed homicide.

## Results

### Demographic Differences Between Women with a history of attempted strangulation and those without a history of attempted strangulation

The results are summarized in Table 1.

#### Strangulation

Women who were the victims of completed or attempted homicide were far more likely to have a history of strangulation compared to the abused control women. Further, within each group, scores on the DA (excluding the choking item) were significantly higher for women who reported strangulation than for women without such a history (see Table 2). No significant interaction between abuse group (control vs. attempted homicide/completed homicide) and strangulation was observed, thus indicating that women strangled in both abuse groups have higher DA scores.

#### Logistic Regression

We conducted two multivariate logistic regressions; the first logistic regression estimated the odds of becoming an attempted homicide versus an abused control if the partner or ex-partner had previously strangled the woman. The second logistic regression estimated the odds of becoming a completed homicide versus an abused control if their partner or ex-partner had previously strangled the woman. When conducting the logistic regressions, we entered all of the demographic and relationship predictors in the first block. Strangulation was then added in the second block to assess whether or not the addition improved the fit of the model. These results are summarized in Table 2.

Both analyses found that controlling for the demographic predictors, the odds of becoming an attempted homicide increased by about seven-fold for women who had been strangled by their partner (OR 6.7, 95% CI 3.91, 11.49 and OR 7.48, 95% CI 4.53–12.35, respectively). In both groups, in year increase in age resulted in a small increase of a woman's odds of becoming an attempted or completed homicide. African American race (compared to White) also increased women's odds of experiencing attempted and completed homicide.

#### Role of personal and relationship factors

Next, a sub-group analysis repeating the logistic regressions for all variables under consideration was conducted within racial categories since that was the only significant demographic categorical variable. Among African American women, strangulation increased odds of becoming a completed homicide by 4.65 (95% CI 2.18–9.95), but among white and Latina women the increase was much higher (13.72 for white women, and 21.16 for Latinas 5.4–34.8, and 5.8–77.8, respectively). Similar results were obtained for attempted homicide when stratifying by race/ethnicity (see Table 3).

## Discussion

Strangulation is an important form of physical violence against women who are in abusive relationships. Overall, 27% of this sample experienced non-fatal strangulation, 10% of the abused controls and 45% of the attempted, and 43% of the completed homicide cases. Non-fatal strangulation, as opposed to other severe forms of physical violence such as striking with fists or another object, frequently leaves little in the way of observable injury, yet can result in serious physical and mental health consequences (2,5)..

Among African American women, strangulation was less of a risk factor for attempted and completed homicide than for white and Latina women. This finding may be a result of one or

both of the following. Because African American women were about 4 times as likely to be killed or to become the victim of an attempted homicide by an intimate partner than were women of other race/ethnicity groups, they were generally at greater risk regardless of whether or not they had experienced non-fatal strangulation. Additionally, non-fatal strangulation was a far more common form of physical abuse for African American women vs. other race/ethnic groups whether or not they were the victim of actual or attempted homicide (40% of African American vs. 17% for white and 22% for Latina women). Nonetheless, non-fatal strangulation still increases the risk of becoming an attempted or completed homicide by about 4 times among African American women, and thus remains a significant independent risk factor for death in all the major race/ethnic groups. Given the significant sequelae associated with non-fatal strangulation, these findings indicate that it remains important to specifically screen for strangulation among African American women, despite the smaller association between non-fatal strangulation and subsequent attempted or completed homicide (2,5,7).

### **Practice Implications**

These findings indicate that strangulation is a relatively prevalent form of violence toward women who experience physical violence in an abusive relationship (a finding consistent with the sparse literature on the subject) and is a significant predictor for future lethal violence. There is an urgent need for emergency physicians and nurses to be trained in the importance of strangulation as a risk factor for homicide of women and how to thoroughly assess, document and obtain appropriate treatment (5,16, 27). The documentation of the strangulation may be particularly useful to expert witnesses in conveying the risk of lethality in cases of attempted homicide. Further, forensic nurses can play an important role in this endeavor, and training modules for forensic nurses in this arena have already been developed (16). In addition, it is important for emergency medical technicians and police officers, as first responders, to be trained on the importance of ensuring that these incidents are evaluated in an emergency department, both to document the attempt and to thoroughly evaluate the injury.

### **Research Implications**

More research is needed that specifically focuses on the context of strangulation. The marked increase in non-fatal strangulation among African American women compared to women of other racial/ethnic groups warrants further investigation to learn if there are risk factors for intimate partner homicide specific to African American women. Additionally, further research is needed to identify the long-term health implications of non-lethal strangulations by following a cohort of identified survivors of strangulation over time.

### **Policy Implications**

Based on the health consequences noted by other researchers, and given that all incidents of strangulation could potentially result in death, it would appear logical that strangulation be prosecuted as a more serious crime than simple assault and battery (usually a misdemeanor with a possible sentence of up to one year) – under statutes such as attempted homicide or malicious wounding. Because women’s injuries secondary to strangulation may not be carefully documented and because the law is not clear regarding the definition of bodily injury, prosecution of strangulation under this more serious statute is rare, and prosecution as an “attempted homicide” is unusual in all but the most severe cases (5; personal communication, Deputy Commonwealth’s Attorney Worrell, March 2005). This stands in contrast to crimes such as stabbings that may result in relatively superficial injury, but can be prosecuted as attempted homicide or even malicious wounding.

Idaho recently signed a bill into law (Senate Bill 1062-April 2005) that any person who willfully and unlawfully chokes or attempts strangulation of a household member, or a person with whom there was a dating relationship, guilty of a felony punishable by incarceration for up to

fifteen (15) years. Importantly, no injuries are required to prove attempted strangulation and the prosecution is not required to show that the defendant intended to kill or injure the victim, the only intent required is the intent to choke or attempt to strangle. To our knowledge, the Idaho law is the toughest legislation regarding strangulation in the US. Research is needed to explore how more aggressive prosecution of strangulation could be supported. Current literature suggests, however, that better attention to strangulation on the part of police officers on the scene and better documentation of the physical findings by physicians, nurses and other health care professionals could immediately improve prosecution. (5)

### Limitations

The study has some limitations to note. Specifically, our reliance on proxies for information about women who were killed by their partners, while the data for the abused controls and the attempted homicides were obtained from the women directly, is an important but inevitable limitation of this study. This limitation and related analyses were discussed in greater depth in the original report of this study (8). The most pertinent issue for this analysis is that of the missing data for the “strangulation” item. About one-third of proxies simply did not know if the victim had been strangled prior to her death and the rate of strangulation among that group could be either higher or lower than reported here. Additionally, it is possible that abused women who refused to participate in the control group may have been experiencing more severe violence than the abused women who did participate, but we have no way of verifying that. Finally, this study was limited to women living in large urban areas, and may not be generalizable to women living in other kinds of communities.

### In Retrospect

Because this was a secondary data analysis, some important information regarding strangulation was not asked. Were we to replicate this important study, we would include information about the woman’s response to the strangulation (did she seek medical attention?; did she report it to the criminal justice system?) to better understand how to improve our response to this form of violence. Additionally, we would have collected more specific information about the strangulation itself, including the number of times she was strangled, the proximity of these events to the homicide/attempted homicide, and the severity of the incidents (did she lose consciousness? Was there visible injury such as swelling, redness or bruising?) to better assess the characteristics of non-lethal strangulation most predictive of near- or actual lethality.

In summary, non-lethal strangulation is an important predictor for future lethal violence among women who are experiencing IPV. We urgently need to improve the clinical response to women reporting an incident of non-lethal strangulation to improve treatment and enhance safety planning for this high-risk group of abused women.

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**Table 1**  
 Comparisons of Demographic Characteristics Abuse Groups by Strangled verses Not Strangled

	Abused Controls						Attempted Homicide						Completed Homicide					
	Strangulation			No Strangulation			Strangulation			No Strangulation			Strangulation			No Strangulation		
	Mean (SD)	N	%	Mean (SD)	N	%	Mean (SD)	N	%	Mean (SD)	N	%	Mean (SD)	N	%	Mean (SD)	N	%
Age	27.07 (6.86)	41		30.40 (8.66)	385		32.06 (8.14)	86		34.21 (9.82)	102		31.82 (9.24)	89		35.28 (14.84)	114	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Length of Relationship		40		384		87		102		89		116		89		116		116
<= 1 Year	17.5%		30.7%		13.8%		26.5%		14.6%		24.1%		14.6%		24.1%		24.1%	
> 1 Year	82.5%		69.3%		86.2%		73.5%		85.4%		75.9%		85.4%		75.9%		75.9%	
Ethnicity		37		350		83		96		88		107		88		107		107
African American	51.4%		22.0%		67.5%		54.2%		51.1%		43.9%		51.1%		43.9%		43.9%	
Euro. American	35.1%		53.1%		19.3%		22.9%		22.7%		30.8%		22.7%		30.8%		30.8%	
Latino	13.5%		24.9%		13.3%		22.9%		26.1%		25.2%		26.1%		25.2%		25.2%	
Education		40		383		87		101		87		112		87		112		112
< High School	20%		16.2%		35.6%		33.7%		43.7%		28.6%		43.7%		28.6%		28.6%	
>= High School	80%		83.8%		64.4%		66.3%		56.3%		71.4%		56.3%		71.4%		71.4%	
Employment		41		385		85		101		89		115		89		115		115
No	26.8%		24.2%		49.4%		46.5%		32.6%		34.8%		32.6%		34.8%		34.8%	
Yes	73.2%		75.8%		50.6%		53.5%		67.4%		65.2%		67.4%		65.2%		65.2%	
Relationship Status		41		384		73		90		85		104		85		104		104
Current	70.7%		45.8%		72.6%		73.3%		65.9%		49.0%		65.9%		49.0%		49.0%	
Former	29.3%		54.2%		27.4%		26.7%		34.1%		51.0%		34.1%		51.0%		51.0%	

Age was significantly different, between those strangled and not strangled for the abused controls only,  $t(424) = 2.36, p = .02$ . Length of relationship was significantly different,  $\chi^2(1) = 4.61, p = .03$ , between those strangled and not strangled for the attempted homicides only.

Ethnicity was significantly different, between those strangled and not strangled for the abused controls,  $\chi^2(2) = 15.54, p = .000$  Education was significantly different,  $\chi^2(1) = 4.90, p = .027$ , between those strangled and not strangled for completed homicides only.

Relationship status was significantly different, between those strangled and not strangled for the abused controls,  $\chi^2(1) = 9.20, p = .002$ , and completed homicides,  $\chi^2(1) = 5.40, p = .02$ .

**Table 2**

Odds Ratios and 95% Confidence Intervals From Logistic Regression Predicting Abuse Categories

	Attempted Homicide Verses Abused Control	Completed Homicide Verses Abused Control
Age	1.06	1.05
Length of Relationship (Referent < 1 Year)	1.00	1.14
Ethnicity (Referent Euro-American)		
African American	3.35	3.08
Latino	1.78	1.91
Education (Referent < High School)	0.45	0.41
Employment (Referent Unemployed)	0.48	0.83
Relationship Status (Referent Current)	0.41	0.75
Strangulation (Referent No Strangulation)	6.70	7.48

OR = odds ratio; CI = confidence interval.

**Table 3**

Odds Ratios and 95% Confidence Intervals from Subgroup Analyses by Race of Logistical Regressions Predicting Abuse Category

<b>Models</b>	<b>Completed</b>		<b>Attempted</b>	
<b>Sub-Group Analyses by Race</b>	<b>OR</b>	<b>95% CI</b>	<b>OR</b>	<b>95% CI</b>
<i>African American</i>	n=92		n=108	
Strangulation	4.65	2.18–9.95	3.72	1.81–7.65
Age	1.04	1.00–1.08	1.04	1.00–1.08
Relationship status (referent broken up)	1.74	0.86–3.49	0.62	0.31–1.26
Employment (referent unemployed)	1.09	0.53–2.24	0.72	0.36–1.43
Education (referent no high school)	0.26	0.11–0.62	0.34	0.14–0.79
Relationship length (referent < 12 months)	1.08	0.48–2.42	1.44	0.65–3.22
<i>White</i>	n=53		n=38	
Strangulation	13.72	5.40–34.84	14.22	4.67–43.30
Age	1.06	1.02–1.09	1.1	1.04–1.16
Relationship status	0.40	0.15–1.01	0.16	0.05–0.48
Employment status	0.22	0.08–0.61	0.11	0.04–0.30
Education	0.55	0.17–1.72	0.26	0.08–0.85
Relationship length (referent < 12 months)	0.99	0.41–2.41	0.90	0.32–2.60
<i>Latina</i>	n=50		n=33	
Strangulation (referent no strangulation)	21.16	5.8–77.8	16.30	3.7–72.1
Age	1.07	1.01–1.13	1.11	1.03–1.18
Relationship status (referent broken up)	0.18	0.07–.48	0.30	0.11–0.84
Employment (referent unemployed)	1.80	0.62–5.07	0.90	0.31–2.59
Education (referent : no high school)	0.78	0.30–2.04	0.91	0.32–2.61
Relationship length (referent < 12 months)	3.73	0.98–14.3	0.54	0.17–1.76