The Oklahoma Lethality Assessment Study: A Quasi-Experimental Evaluation of the Lethality Assessment Program

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ABSTRACT This quasi-experimental field trial examined the effectiveness of the Lethality Assessment Program (LAP), a police–social service collaboration wherein social service practitioners provide advocacy, safety planning, and referral for services over the telephone during police-involved intimate partner violence (IPV) incidents for women at high risk of homicide. We conducted structured telephone interviews with survivors as soon as possible after the incident of violence and again approximately 7 months later. The majority of participants (61.6 percent) recruited during the intervention phase of the study talked to the hotline advocates, and propensity score–matched analyses indicate that women who received the intervention reported using significantly more protective strategies and were victimized by significantly less physical violence than women in the comparison group. While additional research

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needs to be conducted, this study demonstrates that the LAP is a promising evidence-informed intervention that holds the potential to increase survivors' safety and foster decisions of self-care.

INTRODUCTION

Intimate partner violence (IPV) is the systematic use of power and control by one partner in an intimate relationship in order to subordinate another, and it is often reinforced through physical or sexual violence (Stark 2007). Approximately 35 percent of women in the United States will be abused by a current or former intimate partner in their lifetimes, and IPV is defined by the Centers for Disease Control and Prevention as physical violence, sexual violence, threats of violence, coercion, psychological aggression, or stalking (Black et al. 2011). Twenty-five percent of women will be victimized by severe physical IPV (including being hurt by having their hair pulled, being hit with a fist or something hard, being kicked, being slammed against something, being strangled or suffocated, being beaten, being burned on purpose, or being abused with a knife or gun) in their lifetimes (Black et al. 2011). In 2010, IPV accounted for 22 percent of all violent crimes committed against women (Truman 2011). Although police are generally the first responders in cases of IPV, their response focuses on accountability for the offender and may not take into account the service needs of victim-survivors.

The Lethality Assessment Program (LAP), which was developed by the Maryland Network Against Domestic Violence, is a collaboration between police and social service providers and is intended to provide victim-survivors with advocacy services at the scene of police-involved IPV incidents. Police officers responding to the scene of an IPV incident use a risk assessment called the Lethality Screen to identify victim-survivors who are at high risk of homicide. Women who are determined by the screening to be at high risk are offered the opportunity to speak on the telephone with an advocate at a collaborating domestic violence agency. During the phone call, the advocate provides the victim-survivor with immediate safety-planning assistance and encourages her to come in for further services. Collaboration, self-determination, and empowerment are the foundation of this intervention.

The purpose of this quasi-experimental field trial was to estimate the effectiveness of the LAP. The study was conducted in seven police jurisdictions in Oklahoma, a state where a high proportion of women are victimized by IPV and intimate partner homicide (Black et al. 2011; Violence

Policy Center 2013). In particular, we asked the following research questions: Does the LAP (i) increase the use of safety strategies and (ii) reduce the frequency and severity of repeat IPV?

IPV RISK ASSESSMENT

IPV risk assessment instruments provide information about the likelihood that an abuser will re-assault, severely re-assault, or kill his intimate partner (Messing and Thaller 2014). Many victims of IPV, especially those who have been severely abused, are acutely aware of the possibility of homicide (Stuart and Campbell 1989; Langford 1996) but have difficulty assessing and tend to underestimate their degree of risk (Heckert and Gondolf 2000; Sharps et al. 2001; Campbell 2004). Victim-survivors of IPV should be educated about their risk and potential risk factors (Campbell 2004), particularly because victim-survivors often take protective actions when they recognize that the violence is escalating, and their concerns for their safety may motivate them to leave their abusers or take other actions to increase their safety (Gondolf and Fisher 1988; Fischer and Rose 1995; Campbell et al. 1998; Martin et al. 2000; Pape and Arias 2000; Short et al. 2000; Burke et al. 2004). As police officers are often the first responders in cases of IPV, they are in an ideal position to conduct risk assessment.

In order to predict which women are at a high risk of re-assault or homicide, the LAP uses the Lethality Screen, an 11-item version of the Danger Assessment (DA) that is intended for use by field practitioners or first responders. The DA is intended to predict femicide (Campbell et al. 2003), but it is also successful at predicting repeat assault (Messing and Thaller 2013). The Lethality Screen has shown high levels of sensitivity for predicting severe IPV (a woman's partner forced sex, abused her with a knife or gun, punched her, hit her with something that could hurt, strangled her, beat her up, burned her, kicked her, tried to kill her, or nearly killed her; 93.18 percent) and near-lethal IPV (a woman's partner tried to kill her or nearly killed her; 92.86 percent). It has shown a slightly lower sensitivity (86.96 percent) when predicting any IPV (Messing et al. 2015). However, specificity is low in all analyses (21.3–21.95 percent). The Lethality Screen has good agreement with IPV survivors' perceptions of risk and with the DA (Messing et al. 2015). The high sensitivity for predicting severe and near-lethal IPV is ideal for use with the LAP, because, on balance, it seems better to screen an IPV victim-survivor who may not be re-assaulted into a brief

advocacy intervention than to decline to provide the intervention to a woman who is at risk for future violence or homicide.

HELP-SEEKING AMONG SURVIVORS OF IPV

The Bureau of Justice Statistics indicates that approximately half of IPV victim-survivors report that the police had been called due to IPV (Bachman and Coker 1995; Rennison and Welchans 2000; Catalano et al. 2009). Up to 92 percent of women who are seeking services, such as help from the courts, assistance with orders of protection, legal assistance, or domestic violence services (e.g., advocacy, shelter), report that the police had been called due to IPV (Berk et al. 1984; Goodman et al. 2003; Goodkind, Sullivan, and Bybee 2004). The proportion of women seeking help from the police significantly increased from 1993 to 1998 (Rennison and Welchans 2000), and when the victim identifies IPV as a crime, domestic violence is reported to the police at rates equal to the reporting of other crimes (Felson et al. 2002).

As the severity or frequency of abuse increases, so do calls to the police (Johnson 1990; Gondolf 1998; West, Kantor, and Jasinski 1998; Bonomi et al. 2006). Fifty-six percent of victims of intimate partner homicide had called the police in the year before they were killed, and 24.5 percent had an order of protection (Campbell et al. 2003). Thus, the majority of victims of femicide had contact with the police, yet the police response was unable to save their lives. A call to the police does not always result in an arrest, and research is mixed on the deterrent effects of arrest (Maxwell, Garner, and Fagan 2001; Campbell et al. 2003; Campbell et al. 2005; Felson, Ackerman, and Gallagher 2005; Hirschel 2008; Cho and Wilke 2010). Across studies, recidivism rates after arrest range from 17 percent (Felson et al. 2005) to 49 percent (Hilton et al. 2008).

Women access domestic violence services much less often than they seek police help. Among samples of women not recruited from shelters or domestic violence service agencies but generally recruited after coming into contact with the police or seeking an order of protection, the percent of victim-survivors accessing domestic violence services ranges from 4.8 percent to 38 percent (Brookoff et al. 1997; Gondolf 1998; Hutchison and Hirschel 1998; Coker et al. 2000; Macy et al. 2005), and the percent of women accessing shelter services ranges from 3 percent to 8.9 percent (Brookoff et al. 1997; Gondolf 1998; Hutchison and Hirschel 1998; Wiist and McFarlane 1998). While research finds that accessing domestic violence

services (Gondolf 1998; Coker et al. 2000; Henning and Klesges 2002; Macy et al. 2005) and shelters (Gondolf 1998; West, Kantor, and Jasinski 1998) increases as the severity of physical violence increases, in one study examining homicide, only 4 percent of the women who were murdered by their intimate partners had accessed domestic violence shelters or crisis services in the previous year (Sharps et al. 2001). Shelter services are shown to be effective in reducing severe and moderate re-assault in one prospective study (Messing, O'Sullivan, et al. forthcoming).

Women who lack awareness of available resources and who encounter difficulty when accessing services are more likely to remain in abusive relationships (Patzel 2006). A collaborative response, such as the LAP, that is intended to bring together the criminal justice and social service systems is therefore expected to reduce IPV (Salazar et al. 2007). Jurisdictions with a coordinated community response find that their specialized police units make more felony arrests of IPV offenders (Bledsoe, Sar, and Barbee 2006). In addition, police–social service collaborations increase the likelihood that victim-survivors will seek help from the criminal justice system in the future (Davis and Taylor 1997; Davis, Maxwell, and Taylor 2003; Hovell, Seid, and Liles 2006; Stover 2012). However, there is insufficient evidence showing that these programs reduce victimization (Davis and Taylor 1997; Davis et al. 2003; Garner and Maxwell 2008; Hovell et al. 2006; Stover 2012).

Research suggests that low-cost, clear, simple assessments and referrals such as teaching women safety strategies over the telephone can be effective in helping women in abusive relationships enhance their safety skills (McFarlane et al. 2004; McFarlane et al. 2006). Theoretically, the optimal time for intervention may be shortly after an abusive episode, when women are likely to believe that the violence will not cease and are more likely to reach out for help (Curnow 1997). Data collected on the LAP from 100 agencies across Maryland demonstrate that a portion of IPV victim-survivors who are at high risk will seek services after the intervention occurs. In 2012, Maryland jurisdictions conducted 12,108 risk assessments, determining that 6,224 victims (51 percent) were at high risk for homicide. Of the victims who were at high risk, 3,277 (53 percent) spoke on the phone to an advocate. Of those victims who spoke on the phone to an advocate, 925 (28 percent) later sought services, such as counseling, legal assistance, or shelter from the service provider to whom they spoke (MNADV 2013). Without a comparison group, however, it is unclear whether these findings can be attributed to the LAP.

This study, which analyzes the effectiveness of the LAP in seven police jurisdictions in Oklahoma, is the first rigorous evaluation of the LAP. We hypothesize that:

H1: The LAP increases the rates of measured emergency safety planning and help-seeking both (*a*) immediately after the intervention and (*b*) at follow-up.

H2: The LAP decreases the frequency and severity of repeat IPV among women who had police contact due to IPV in participating jurisdictions during the study's time frame.

METHOD

STUDY DESIGN

The study is a non–equivalent groups quasi-experimental field trial using a historical comparison group (see also Messing, Campbell, and Wilson 2015). The comparison group was recruited into the study prior to the implementation of the LAP and received what was, at that time, the standard police response, while the intervention and intent-to-treat groups were recruited into the study after implementation of the LAP and received the LAP response. Our aim was to assess the effect of a collaborative police–social service intervention on victim-survivors who were at high risk of future violence and homicide, in light of previous research suggesting that telephone intervention and referral can lead to the adoption of safety strategies (McFarlane et al. 2004, 2006). Thus, our main analyses estimate treatment-on-the-treated effects by comparing women who were at high risk for future violence and homicide and received the standard police response (hereafter, the comparison group) to women who were at high risk for future violence and homicide and were informed of their risk status by a police officer and chose to speak to a hotline advocate at the scene of a police-involved IPV visit (hereafter, the intervention group). We additionally estimate intent-to-treat effects by examining differences between women in the comparison group and women who were at high risk for future violence and homicide and were informed of their risk status by a police officer at the scene of a police-involved IPV incident, regardless of whether or not they chose to speak to the hotline advocate (hereafter, the intent-to-treat group; see fig. 1). This research was approved by the institutional review boards of

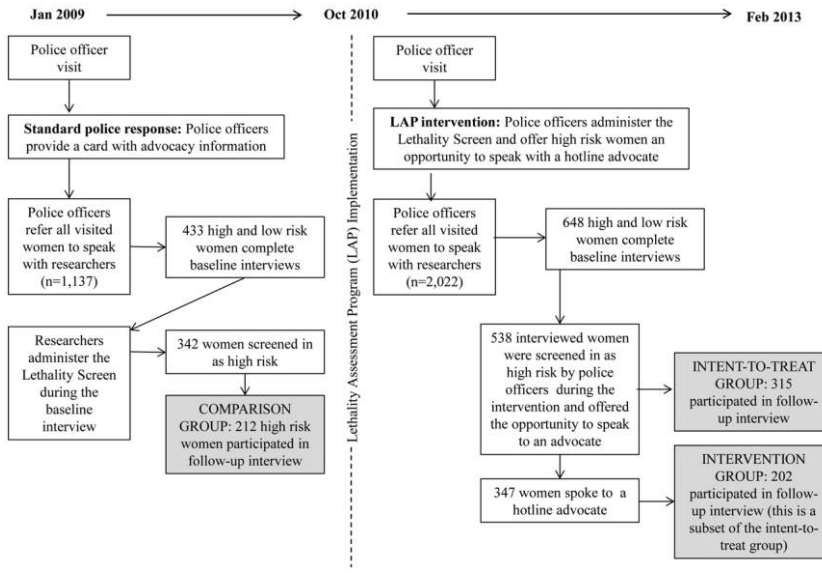


FIGURE 1. Procedure and sample flow chart

the University of Oklahoma Health Sciences Center, the Oklahoma State Department of Health, Arizona State University, Johns Hopkins University, the Cherokee Nation, and the National Institute of Justice.

STUDY SITE

The seven participating police jurisdictions in Oklahoma were primarily urban and had a total population of 1,150,000 people (see table 1). There

TABLE 1. Information about Participating Jurisdictions

Classification	Population	Number of Officers	Number of Advocates
Urban	17,000	32	Unknown
Urban*	580,000	1,029	20
Urban*,[a]	392,000	745	15
Suburban*,[a]	99,000	130	15
Urban (college town)*	46,000	71	Unknown
Rural (Indian nation)[b]	Unknown	14	Unknown
Urban (college town)[b]	16,000	30	Unknown

Note.—The population numbers for this table were obtained from the US Census Bureau, QuickFacts Beta, April 1, 2010. The numbers of advocates were provided by the advocacy organizations. Classification types having the same superscripted letters had the same advocacy organizations and therefore have the same number of advocates.

* Referred participants during the intervention and comparison phases of the research study.

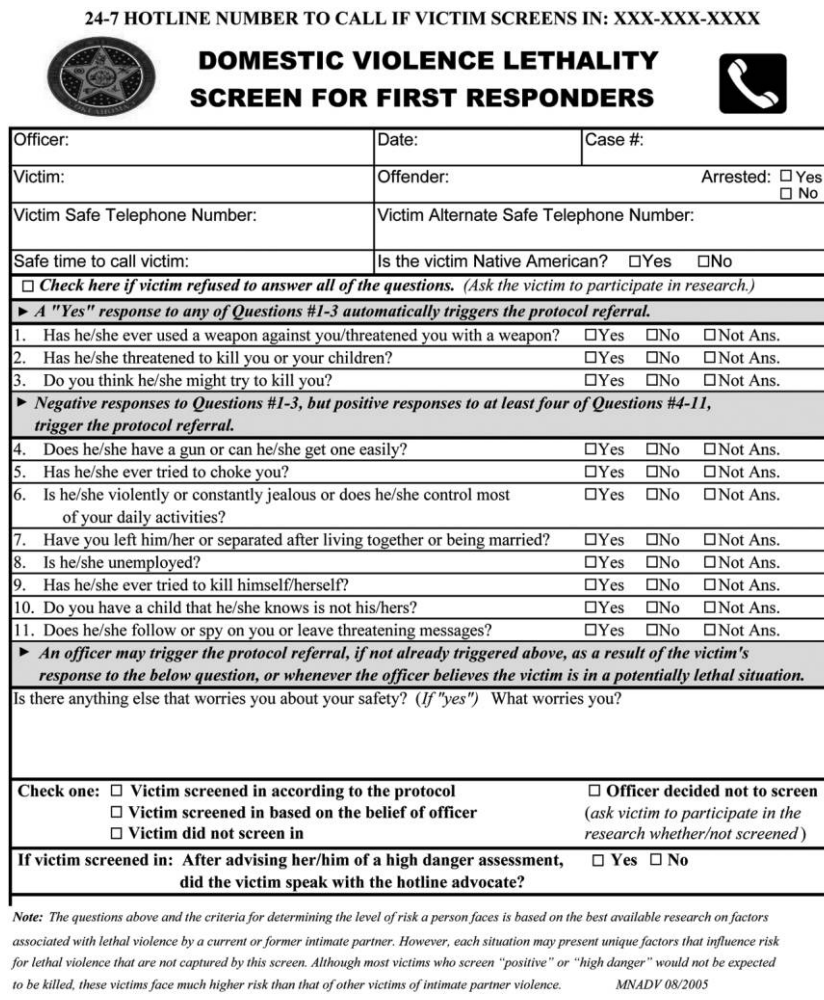
was a range in jurisdiction size, with populations of 16,000 to 580,000, and police departments ranging in size from 14 deputies to 1,029 sworn officers. Where information is known, between 15 and 20 advocates per agency assisted with the LAP intervention.

INTERVENTION TRAINING

The Maryland Network Against Domestic Violence (MNADV) provided their standard 1-day LAP train-the-trainer training to select police officers and advocates in Oklahoma. Following this, MNADV provided each police department with a PowerPoint presentation that trainers within the police departments and social service agencies used to conduct mandatory trainings with additional officers and advocates. The LAP training was also integrated into police academy training on IPV. In order to encourage officers to carry out the LAP as intended, throughout the study period, researchers (sometimes in collaboration with advocates) provided police departments with brief electronic (Mediasite, PowerPoint) and in-person roll-call refresher trainings. MNADV remained available throughout the study period to provide support and technical assistance to police departments and advocacy organizations.

Prior to the LAP training, officers conducted their police investigation and provided victim-survivors with a card that included information about IPV and a toll-free hotline number.[1] Before implementation of the LAP, officers did not conduct risk assessment during their visits, did not use risk assessment to educate victim-survivors about the risk that their intimate partners posed and risk factors for future violence and homicide, and did not actively engage with victim-survivors to reach out to advocacy services and implement safety strategies. Officers then received the LAP training on how to assess risk using the Lethality Screen, score the risk assessment, and initiate a telephone call with a hotline advocate for high-risk victim-survivors. Police officers were instructed to ask victim-survivors the 11 questions included on the Lethality Screen outside of the presence and hearing of the perpetrator (see fig. 2). Officers were taught to then score the Lethality Screen and classify victim-survivors as "high risk" or "not high risk" based on the victim-survivor's responses to the 11 questions. Officers were

1. Oklahoma has a discretionary arrest policy for domestic violence assault (OK State Statute §22–60.16).



24-7 HOTLINE NUMBER TO CALL IF VICTIM SCREENS IN: XXX-XXX-XXXX

DOMESTIC VIOLENCE LETHALITY SCREEN FOR FIRST RESPONDERS

Officer:	Date:	Case #:	
Victim:	Offender:		Arrested: ☐ Yes ☐ No
Victim Safe Telephone Number:	Victim Alternate Safe Telephone Number:		
Safe time to call victim:	Is the victim Native American? ☐Yes ☐No		
☐ ***Check here if victim refused to answer all of the questions.*** *(Ask the victim to participate in research.)*			
► ***A "Yes" response to any of Questions #1-3 automatically triggers the protocol referral.***			
1. Has he/she ever used a weapon against you/threatened you with a weapon?	☐Yes	☐No	☐Not Ans.
2. Has he/she threatened to kill you or your children?	☐Yes	☐No	☐Not Ans.
3. Do you think he/she might try to kill you?	☐Yes	☐No	☐Not Ans.
► ***Negative responses to Questions #1-3, but positive responses to at least four of Questions #4-11, trigger the protocol referral.***			
4. Does he/she have a gun or can he/she get one easily?	☐Yes	☐No	☐Not Ans.
5. Has he/she ever tried to choke you?	☐Yes	☐No	☐Not Ans.
6. Is he/she violently or constantly jealous or does he/she control most of your daily activities?	☐Yes	☐No	☐Not Ans.
7. Have you left him/her or separated after living together or being married?	☐Yes	☐No	☐Not Ans.
8. Is he/she unemployed?	☐Yes	☐No	☐Not Ans.
9. Has he/she ever tried to kill himself/herself?	☐Yes	☐No	☐Not Ans.
10. Do you have a child that he/she knows is not his/hers?	☐Yes	☐No	☐Not Ans.
11. Does he/she follow or spy on you or leave threatening messages?	☐Yes	☐No	☐Not Ans.
► ***An officer may trigger the protocol referral, if not already triggered above, as a result of the victim's response to the below question, or whenever the officer believes the victim is in a potentially lethal situation.***			
Is there anything else that worries you about your safety? (*If "yes"*) What worries you?			
Check one: ☐ Victim screened in according to the protocol ☐ Victim screened in based on the belief of officer ☐ Victim did not screen in			**☐ Officer decided not to screen** (*ask victim to participate in the research whether/not screened*)
If victim screened in: After advising her/him of a high danger assessment, did the victim speak with the hotline advocate?			**☐ Yes ☐ No**

Note: *The questions above and the criteria for determining the level of risk a person faces is based on the best available research on factors associated with lethal violence by a current or former intimate partner. However, each situation may present unique factors that influence risk for lethal violence that are not captured by this screen. Although most victims who screen "positive" or "high danger" would not be expected to be killed, these victims face much higher risk than that of other victims of intimate partner violence.* *MNADV 08/2005*

FIGURE 2. The Lethality Screen

additionally trained to use their own professional judgement; if an officer believes that a victim-survivor is at high risk but she is not classified as such based on the Lethality Screen, the officer is also able to make a determination of high risk based on his or her belief.

When a victim-survivor screens in as high risk, the officer is instructed to tell her that she is at high risk for homicide and to ask her if she is willing to speak on the telephone to a hotline advocate. If the victim-survivor agrees to speak to an advocate, the officer then calls the hotline number and

places the victim-survivor on the telephone with the advocate. The advocate is trained to keep the telephone conversation brief, express concern for the victim-survivor's well-being and the well-being of her children if applicable, reinforce the officer's message about the risk that she faces due to IPV, conduct immediate safety planning, and encourage the victim-survivor to come in for additional services. If a high-risk victim-survivor chooses not to speak on the telephone to an advocate, the officer is trained to call the advocacy hotline and obtain immediate safety planning advice to share with the victim-survivor. While on the telephone, the officer may ask the victim-survivor again if she would like to speak to the advocate. If there are any immediate safety planning steps that the officer can then take with the high-risk victim-survivor (e.g., transport to shelter), the officer is trained to do so. If a victim-survivor is not classified as high risk, the officer is trained to tell her that IPV can be dangerous, provide her with information about risk factors for homicide, and refer her to local domestic violence services.

COMPARISON GROUP

The comparison group was recruited into the study prior to the implementation of the LAP, between July 2009 and October 2010. During this time, 1,137 women were referred to researchers by police departments. Researchers were not able to contact 486 (42.7 percent) of the women who were referred, and another 47 women (4.1 percent) were not eligible to participate in the study (e.g., they were under 18 or were not victims of IPV). Of the 604 eligible referrals researchers contacted, 440 (72.8 percent) participated in a baseline interview. Seven duplicate participants were removed from the comparison group ($n = 433$). At the beginning of the baseline interview, researchers conducted the Lethality Screen with comparison group participants, referencing the victim-survivor's current situation with her abusive partner; 342 women (79.0 percent) were deemed high risk, and they make up the comparison group.

INTERVENTION AND INTENT-TO-TREAT GROUPS

Recruitment for the intervention and intent-to-treat groups, conducted after the implementation of the LAP, occurred from October 2010 through February 2013. During this time, 2,022 women were referred to

researchers by police departments. Researchers were not able to contact 1,041 (51.5 percent) of the women who were referred, and another 43 women (2.1 percent) were not eligible to participate in the study (e.g., they were under age 18 or were not victims of IPV). Of the 938 eligible referrals the researchers contacted, 657 (70 percent) participated in a baseline interview. Nine duplicate participants were removed. The intent-to-treat group consists of 563 women who were classified as at high risk based on their responses to the Lethality Screen conducted by a police officer at the scene of the IPV incident ($n = 538$) or based on officer belief ($n = 25$). The intervention group consists of the 347 women (61.6 percent of the intent-to-treat group) who both were classified as high risk by the officer and who spoke with an advocate on the telephone at the scene of the IPV incident.

PARTICIPANT RECRUITMENT

At the scene of each IPV incident, after the police officer completed the visit, he or she read an IRB-approved statement asking the victim-survivor if a researcher could contact her.[2] If the victim-survivor was willing to have a researcher contact her, the officer asked for and recorded one or two safe telephone numbers and a safe time to call. Researchers were provided with this information and called victim-survivors to explain the study and obtain informed consent.

BASELINE AND FOLLOW-UP DATA COLLECTION

Structured telephone interviews lasting approximately 45 minutes were conducted with study participants at two time points. Baseline interviews were conducted as soon as possible after the referral, and the median time between the police visit and the baseline interview was 15 days. Follow-up interviews were completed with 212 participants in the comparison group (62 percent retention rate), 315 participants in the intent-to-treat group (55.9 percent retention rate), and 202 participants in the intervention group (58.2 percent retention rate). Women who were employed full-time or part-time were more likely to participate in follow-up interviews ($X^2 =$

2. Police officers read IRB statements to women in the comparison group, women in the intervention group, women in the intent-to-treat group, and women who were not ultimately interviewed.

5.923, $p < .05$), as were participants who had higher levels of education ($X^2 = 13.535$, $p < .05$). There was a significant difference in the mean time to follow-up for the intervention and comparison groups ($t = 3.577$; df = 316.723; $p < .0001$). Participants in the comparison group averaged 8.28 months (SD = 3.72) to follow-up, and participants in the intervention group averaged 7.25 months (SD = 1.89) to follow-up. There were no significant differences in mean time to follow-up between the intervention and intent-to-treat groups, with the intent-to-treat group averaging 7.22 months (SD = 1.90) to follow-up. The median time to the follow-up interview for all participants was 7 months.

MEASUREMENT

Demographic and Relationship Characteristics

At the baseline interview, participants were asked to report their educational achievements, their employment status, their ethnic background, their immigration status, their age in years, their legal marital status, the gender of their abusive partner, whether they had children living in their households, whether they had children with their abusive partners, whether they were currently pregnant, and whether they currently lived with their abusive partners.

Protective Actions

Protective actions were assessed using an adapted version of McFarlane and colleagues' (2004) safety-promoting behavior checklist (see the appendix). At baseline, participants were asked whether they had engaged in any protective actions in the 6 months prior to the police visit or since the police visit. At follow-up, participants were asked to report any protective actions they had engaged in since they last spoke to the interviewer.

Intimate Partner Violence

Experiences of IPV were assessed at baseline (in the past 6 months) and follow-up (since the last interview) using an adapted version of the revised Conflict Tactics Scale (CTS-2; Straus et al. 1996). In order to examine the frequency and severity of physical violence, items on the CTS-2 were scored using the severity-times-frequency weighted score, as recommended by the scale developer (Straus 2004). Scores from the baseline interview were subtracted from scores on the follow-up interview in order to examine

changes (decreases/increases) in violence severity and frequency between baseline and follow-up. The CTS-2 has demonstrated median internal consistency of .82 in studies examining female IPV victimization and reports good construct validity (Straus and Mickey 2012). In this study, the CTS-2 frequency-by-severity scores demonstrated adequate internal consistency at baseline ($\alpha = .77$) and excellent internal consistency at follow-up ($\alpha = .96$).

The Danger Assessment

Researchers administered the Danger Assessment (DA) at the baseline interview, referencing victim-survivors' current situations with their abusive partners. This risk assessment was administered in addition to the Lethality Screen (which was administered by police at the scene of the IPV incident to women in the intervention and intent-to-treat groups and by researchers at the time of the baseline interview to women in the comparison group), as it has a more extensive history of validation, includes additional risk factors, and has greater specificity (Campbell et al. 2003; Campbell, Webster, and Glass 2009; Messing and Thaller 2013). Items on the DA are weighted and summed to produce an overall score, with higher numbers indicating greater risk. Weighted and summed scores can be placed into four categories of risk: variable danger (0–7), increased danger (8–13), severe danger (14–17), and extreme danger (18 or higher). In this study, the DA demonstrated adequate internal consistency at baseline ($\alpha = .76$) and at follow-up ($\alpha = .76$).

ANALYSIS

Because the main analyses focus on treatment-on-the-treated effects, participants in the comparison and intervention groups were compared on demographic and relationship characteristics using bivariate statistics. Where no differences were found, these characteristics are reported for the intervention and comparison groups combined. Where differences between groups were found, these differences are reported and the characteristics of the comparison and intervention groups are reported separately. As the intervention group is a subset of the intent-to-treat group, the demographic and relationship characteristics of these two groups are similar. Throughout, cases with missing values on any variable were dropped from the analysis. Depending on the analysis, 1.2–6.1 percent of cases had missing data, accounting for the slightly different sample sizes across analyses of similar data.

Regression Controlling for Covariates

Logistic and linear regression models (hereafter, regression models) were used to estimate the effect of intervention group status (vs. comparison group status) on protective actions and violent victimization. Covariates were included in the models to control for intervention group and comparison group baseline differences in marital status, immigration status, DA category, and time between the baseline and follow-up interviews.

Propensity Score Analysis

Given nonrandom assignment to intervention and comparison groups, significant observed differences between the groups at baseline, and jurisdictional differences in the implementation of the LAP intervention, propensity score matching was used to estimate the average treatment effect on the treated participants (Rosenbaum and Rubin 1983). By using propensity scores, we adjust for observed selection bias, thus allowing an estimation of causal inference in a study that is not a true experiment (Guo and Fraser 2015). Because propensity scores are estimated (not known), we used the "teffects psmatch" command in STATA 14 (Abadie and Imbens 2012). This command employs nearest-neighbor matching of cases with replacement. When propensity scores are tied—that is, when there is more than one match for an observation in the intervention group—the observation is matched with all tied observations. Three police jurisdictions were dropped from the propensity score analysis because they did not refer participants to both the comparison and intervention groups (n = 8–11 depending on analysis; see table 1). The standardized difference and variance ratios were used to examine group balance before and after propensity score matching, and balance was improved in the matched data. Post–propensity score matching, hypotheses were tested using linear or logistic regression.

Intent-to-Treat Analysis

Propensity score-matched analyses were also conducted using an intent-to-treat framework, as 61.6 percent of participants who were assigned to the LAP intervention (i.e., screened as high risk by a police officer) were included in the intervention group (i.e., spoke to a hotline advocate). Intent-to-treat models are conservative. Because not everyone assigned to receive the intervention receives it, an intent-to-treat analysis will consistently provide a smaller estimate of the effect of the intervention than can be

attributed to the intervention itself (Angrist 2006). In this study, a relatively low proportion of participants who were assigned to the LAP intervention received it, which would be expected to seriously attenuate any effect. Intent-to-treat analysis relies on the assumption that the proportion of people assigned to treatment and those actually treated will be similar across all implementations of the intervention (Angrist 2006). However, this proportion differed widely across jurisdictions in this study (range: from 42.1 percent to 77.8 percent). The intent-to-treat model cannot be expected to provide an accurate average intervention effect across such a wide range of compliance rates. Nevertheless, intent-to-treat analyses are another strategy for taking selection into account in estimating intervention effects, and thus they may still provide useful information.

RESULTS

DESCRIPTION OF THE COMPARISON AND INTERVENTION GROUPS (BASELINE)

Participants in the comparison and intervention groups ranged in age from 18 to 79 years, with a mean age of 32.52 (SD = 9.94). The largest racial/ethnic group was white (42.8 percent), followed by African American (29.4 percent), Native American (10.0 percent), Latina (7.9 percent), multiracial (7.5 percent), and other (2.2 percent). Less than one-fifth of participants (16.8 percent) reported that they currently lived with their partners, and 2.5 percent of participants reported that their partners were female. Sixty-five percent of participants reported that they had children living in their households, 45.7 percent of participants reported that they had children in common with their partners, and 7.1 percent of participants reported that they were currently pregnant at the time of the baseline interview. Approximately half of participants reported that they had completed high school or had a GED (51.8 percent), and less than half of participants were employed part-time or full-time (40.64 percent).

There were significant differences ($X^2 = 6.73$, $p < .05$) in marital status between the comparison group and the intervention group, with nearly twice as many participants in the comparison group reporting that they were separated or divorced. In the comparison group, 58.3 percent of participants reported that they were single, 22.8 percent reported that they were married, and 18.9 percent reported that they were separated or divorced. In the intervention group, 64.6 percent of participants reported

that they were single, 24.3 percent reported that they were married, and 10.9 percent reported that they were separated or divorced.

Few participants overall were born outside of the United States, but there were significant differences in immigration status ($X^2 = 4.7$, $p < .03$) between the intervention and comparison groups, with over twice as many women born outside of the United States in the intervention group (5.6 percent) than in the comparison group (2.4 percent). There were significant differences in DA category (the four categories being, in increasing severity, variable danger, increased danger, severe danger, and extreme danger) with significantly more ($X^2 = 18.94$, $p < .0005$) intervention group participants in the variable danger category (12.7 percent) than comparison group participants in the variable danger category (3.8 percent). A similar proportion of comparison group participants (51.8 percent) and intervention group participants (50.4 percent) fell into the extreme danger category, demonstrating that any difference was primarily at the lower end of the danger spectrum. DA category was significantly associated with immigration status ($X^2 = 10.07$, $p < .05$), with a greater proportion of immigrant women at the lower end of the danger spectrum. In propensity score–matched analyses, these variables are modeled using an interaction term, which improves group balance but leads to small cell sizes and up to nine cases being dropped in some analyses.

PROTECTIVE ACTIONS

We hypothesized that the LAP would increase women's use of protective actions (hypothesis 1), both immediately after the police contact (hypothesis 1*a*) and at the time of the follow-up interview (hypothesis 1*b*). In order to examine the immediate safety strategies that the participants engaged in (hypothesis 1*a*), we examined the protective actions that participants took between the time of police contact and the baseline interview. As shown in table 2, according to regression analyses, being in the intervention group is associated with a significant increase in the likelihood of having removed or hidden a partner's weapons and having sought formal services for domestic violence between the time when the police responded to the initial offense and the time of the baseline interview. The results of the propensity score–matched analyses are consistent with the regression results, although the parameter estimates are attenuated. Being in the intent-to-treat group is associated with a

TABLE 2. Association between Intervention Group Status and Protective Actions at Baseline

Protective Action/ Dependent Variable	Comparison Group *N* (%)	Intervention Group *N* (%)	Logistic Regression Analysis (*N* = 681); Conditional OR [95% CI]	Propensity Score Analysis (*N* = 669); OR [95% CI]	Intent-to-Treat Analysis (*N* = 884); OR [95% CI]
Removed or hid their partner's weapons	13 (3.8%)	27 (7.8%)	2.48* [1.14, 5.37]	1.04* [1.01, 1.08]	1.03^{+} [.99, 1.07]
Received services related to domestic violence	75 (21.9%)	106 (30.5%)	1.79** [1.25, 2.56]	1.11** [1.03, 1.20]	1.08* [1.01, 1.16]

$^{+}$ $p < .10$.
* $p < .05$.
** $p < .01$.

smaller, but significant, increase in having sought formal services for domestic violence and is not significantly associated with the likelihood of having removed or hidden a partner's weapons.

When examining the safety strategies that participants engaged in between the baseline and follow-up interviews (hypothesis 1*b*; see table 3), regression analyses and propensity score–matched analyses find that women in the intervention group are more likely to obtain some form of protection against an abusive partner, such as mace or pepper spray; apply for and receive an order of protection; obtain medical care from a doctor or nurse due to injuries or trauma sustained by IPV; and go someplace where an abusive partner could not find or see them (e.g., to stay with family or friends; hereafter, hiding). Additionally, in both regression and propensity score–matched analyses, being in the intervention group is associated with having a partner who went someplace where he could not find or see the participant (e.g., jail; hereafter, being detained). In the regression analyses only, being in the intervention group is associated with having established a code with family and friends to alert them of trouble and having engaged in other safety strategies such as improving home security. Being in the intent-to-treat group is associated with having obtained some form of protection against an abusive partner, having hidden, and having an abusive partner who was detained.

VIOLENT VICTIMIZATION

We hypothesized that the LAP would decrease the frequency and severity of violent victimization at follow-up (hypothesis 2). As shown in table 4,

TABLE 3. Association between Intervention Group Status and Protective Actions at Follow-Up

Protective Action/ Dependent Variable	Comparison Group *N* (%)	Intervention Group *N* (%)	Logistic Regression Analysis (*N* = 409); Conditional OR [95% CI]	Propensity Score Analysis (*N* = 397); OR [95% CI]	Intent-to-Treat Analysis (*N* = 501); OR [95% CI]
Established a code with family and friends	84 (39.6%)	97 (48.0%)	1.63* [1.07, 2.49]	1.09 [.95, 1.26]	1.10 [.97, 1.25]
Obtained something to protect yourself	50 (23.6%)	75 (37.1%)	2.17*** [1.37, 3.45]	1.14* [1.03, 1.27]	1.14** [1.04, 1.26]
Engaged in other protective actions	80 (37.7%)	90 (44.6%)	1.54* [1.01, 2.35]	1.06 [.92, 1.21]	1.06 [.94, 1.20]
Applied for an order of protection	66 (31.1%)	83 (41.1%)	1.64* [1.07, 2.53]	1.13* [1.01, 1.26]	1.09 [.99, 1.21]
Received an order of protection	50 (23.6%)	69 (34.2%)	1.59* [1.01, 2.51]	1.12* [1.01, 1.24]	1.07 [.98, 1.17]
Obtained medical care due to violence	22 (10.4%)	33 (16.3%)	1.88* [1.02, 3.45]	1.08* [1.01, 1.16]	1.05 [.98, 1.11]
Went somewhere partner could not find you (hid)	72 (34.0%)	82 (40.6%)	1.61* [1.04, 2.48]	1.11* [1.01, 1.23]	1.14** [1.04, 1.26]
Partner went somewhere he could not see you (was detained)	66 (31.1%)	92 (45.5%)	2.53*** [1.62, 3.95]	1.24*** [1.12, 1.37]	1.19** [1.06, 1.33]

* $p < .05$.
** $p < .01$.
*** $p < .001$.

TABLE 4. Association between Intervention Group Status and the Frequency and Severity of Violence at Follow-Up

	Comparison Group Mean (SD)	Intervention Group Mean (SD)	Linear Regression Analysis ($N = 405$); B [95% CI]	Propensity Score Analysis ($N = 389$); B [95% CI]	Intent-to-Treat Analysis ($N = 497$); B [95% CI]
Subtracted frequency by severity CTS-2 score	−34.38 (67.87)	−43.59 (77.91)	−14.71 [−28.60,−.81]*	−16.59 [−31.52, −1.65]*	−12.63 [−25.09, −.18]*

* $p < .05$.

being in the intervention group is associated with less severe and frequent IPV, with a subtracted CTS-2 frequency-by-severity score between 12.63 and 16.59 fewer points at follow-up. This difference is significant in the regression, propensity score–matched, and intent-to-treat analyses. As an example, 17 points on the severity-by-frequency scale could be translated into a participant's partner beating her up on two separate occasions, punching her on an additional two occasions, and slapping her on yet another occasion.

POST HOC ANALYSES

In order to examine whether the protective strategies that the intervention group engaged in were associated with decreases in IPV, we conducted post hoc one-tailed *t*-tests (shown in fig. 3). Among women in the intervention group, removing or hiding their partner's weapons, receiving formal services for IPV, establishing a code with family and friends, applying for an order of protection, obtaining medical care, and hiding are associated with significantly less IPV at follow-up.

DISCUSSION

Our findings show that the Lethality Assessment Program (LAP) is associated with an increase in protective actions and a decrease in the frequency and severity of violence among this sample of IPV survivors, particularly among those who chose to speak to a hotline advocate. The majority of protective actions engaged in by intervention group participants were associated with decreases in the severity and frequency of self-reported violence at follow-up. This demonstrates a potential mechanism by which the LAP

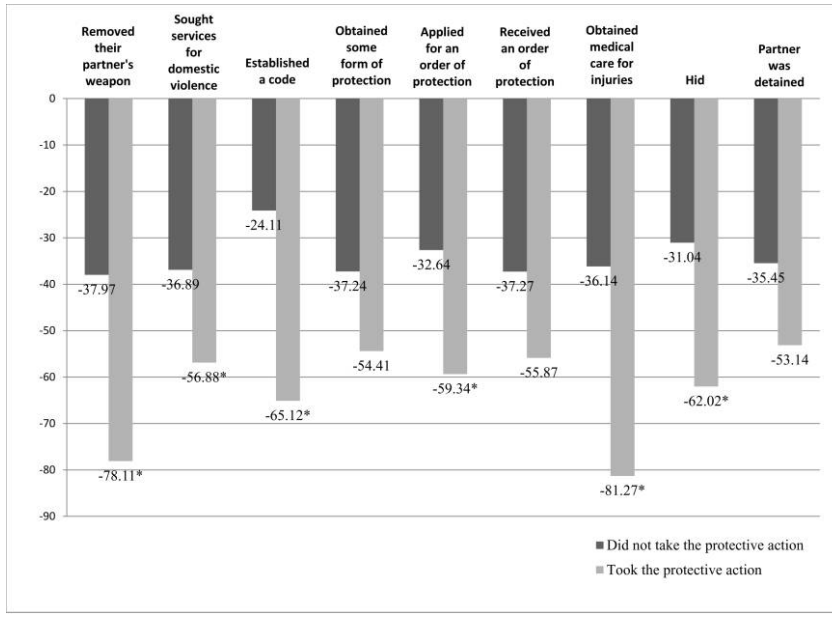


FIGURE 3. Subtracted CTS-2 frequency-by-severity score by protective actions taken/not taken among women in the intervention group. *$p < .05$.

appears to reduce IPV risk. The LAP is a collaborative police–social service intervention with an emerging evidence base that has the potential to change the response to IPV and to prioritize social work goals of survivor safety and empowerment within the context of criminal justice intervention.

Victim-survivors in the intervention and intent-to-treat groups experienced less IPV at follow-up than victim-survivors in the comparison group, but even women in the intervention and intent-to-treat groups continued to experience violence after their contact with police officers conducting the LAP. When women leave abusive relationships, the violence is likely to continue (and may even increase) whenever the violent partner manages to gain access to the survivor. Leaving is never a static event, and women who have successfully disengaged from abusive partners have reported that this process involves stages of reclaiming life, self, and safety (Wuest and Meritt-Grey 2001; Messing, Mohr, and Durfee 2012). As such, violence did not cease in the short (approximately 7 months) time between the baseline and follow-up interviews. It is important to note that IPV was defined, for the purposes of this analysis, as actual acts of violence against an intimate partner. Unlike definitions used by the Centers for Disease Control and

Prevention (e.g., Saltzman et al. 2002; Black et al. 2011), threats of violence were not included in our definition. Intimate partner sexual violence—a common and devastating form of violence against women (Bagwell-Gray, Messing, and Baldwin-White 2015)—was measured, but it was reported infrequently and therefore was not assessed separately.

Being in the intervention group (i.e., engaging in the risk assessment process and speaking to the hotline advocate) is associated with having taken immediate protective actions and having engaged in a variety of protective actions over the approximately 7 months between the baseline and follow-up interviews. When examining protective actions, propensity score–matched analyses find consistently smaller odds ratios than regression analyses, suggesting selection bias. That is, women who engaged in the intervention and made the choice to speak with the hotline advocate (represented in this study by the intervention group) are different in measured, and likely in unmeasured ways, from the broader group of women who came into contact with the police as part of an IPV incident (represented in this study by the comparison group). For example, women in the intervention group may have been engaging in more protective actions pre-intervention. Nevertheless, while the average treatment effect on the treated is small in propensity score–matched analyses, it is statistically significant. Further, the findings over two time points demonstrate some durability of the intervention, albeit over a relatively short time frame. Thus, engaging in the risk assessment process and speaking to a hotline advocate is associated with increases in a wide variety of protective actions over multiple time periods. Women engaging in the LAP intervention sought help from formal systems, including the social service system (through the use of formal domestic violence services) and the civil court system (through applying for and receiving orders of protection). Partners of women in the intervention and intent-to-treat groups were more likely to be detained. This may indicate that women receiving the LAP were more likely to engage the criminal justice system and that the system saw these perpetrators as more dangerous. This may also partially explain the lower levels of IPV observed among those participating in the LAP, although a reduction in violence is not associated with having a partner who was detained in post hoc intervention group analyses. Future research should explicitly examine whether the LAP affects victim-survivors' engagement in the criminal justice system and criminal justice system outcomes for their abusive partners (e.g., arrest, bond, conviction, and sentencing).

Being in the intervention group is also associated with having engaged in several informal protective actions, demonstrating that the LAP provides a variety of intervention strategies and that women may have chosen those that were best suited to their situations. Women who engaged in the risk assessment process and spoke with a hotline advocate were significantly more likely to remove or hide their partners' weapons, although only a small proportion of women used this protective strategy. Given that the majority of intimate partner homicides of women are committed with a firearm in Oklahoma and nationally and, further, given that Oklahoma state law does not prohibit known domestic violence offenders from possessing guns (state law only prohibits the purchase of firearms by those who have been arrested for domestic violence or by those with an order of protection against them), this is an important safety strategy. Prohibiting the possession of firearms by known domestic violence offenders reduces intimate partner homicides (Vigdor and Mercy 2006; Zeoli and Webster 2010). Future research should examine why some protective strategies were used more by women in the intervention group and whether this is a function of the safety-planning strategies suggested by hotline advocates, a function of survivor choice among myriad strategies offered, or a function of the police visit being more effective when the LAP is used.

In addition to future experimental research conducted in additional geographic locations, perhaps employing random assignment to control and treatment conditions, mixed-methods research is important to understand and contextualize the findings presented here. Qualitative and observational research could play a role in understanding implementation fidelity and provide insight into women's experiences of the LAP. Important questions remain about the consistency of police officers' implementation of the LAP and whether officers implement the intervention differently based on features of the situation, the offender, or the victim-survivor. The influence of officer and advocate characteristics (e.g., gender, empathy, and cooperation) should be examined in future studies, as should police and advocate perceptions of the LAP. Survivors could provide information about their perceptions of the utility of the Lethality Screen and telephone call, as well as their experiences of adopting (or not adopting) safety strategies post-LAP. An exploration of how the intervention could be improved is also warranted. The LAP provides an opportunity for victim-survivors to engage in an advocacy intervention, but women choose whether or not to respond to the questions on the Lethality Screen, speak to the hotline advocate,

and engage in protective actions. The LAP is intended to encourage survivors to take action for self-care and should in no way be coercive or compromise women's autonomy. Understanding women's choices would assist in the development of interventions that could reach a broader spectrum of victim-survivors.

STRENGTHS AND LIMITATIONS

This study's findings should be understood in the context of its limitations. The research was conducted with a sample of women in Oklahoma and is not representative of all women. Further, women who chose to participate in the research study may have been different from women who chose not to participate. Having police officers refer women to researchers was novel, and police were trained to emphasize safety, participant choice, and collaboration with social service agencies, but this referral process undoubtedly introduced selection bias. While over 70 percent of participants who were contacted by researchers agreed to participate, many more women who provided contact information were unable to be reached. Baseline interviews were retrospective and were conducted a median of 15 days after the police visit. Participating in the LAP may have affected participants' memories or awareness in ways that the usual police response does not, thus creating differences in the responses of the intervention, intent-to-treat, and comparison groups that do not reflect actual differences between these conditions.

Attrition introduced another limitation into this research study. Across all groups, approximately 40 percent of participants dropped out between the baseline and follow-up interviews, primarily because interviewers were unable to reach participants on follow-up. High attrition rates are consistent with previous research on IPV survivors (Campbell et al. 2005) and may have been exacerbated in this study given that the women had experienced high levels of violence and were at heightened risk. Nevertheless, women who did not complete the follow-up interviews may have had different experiences of violence and safety at the time of the follow-up than the women who were interviewed.

Women who went to shelters were generally not able to be reached due to confidentiality constraints. Although we had only one participant who reported that she had been to a shelter between the baseline and follow-up interviews, data collected by one participating advocacy agency indicate

that, in a single jurisdiction, 49 women who participated in the LAP entered shelters. It is reasonable to expect that a small but important subset of the intervention group who were never interviewed or were lost to follow-up had gone into shelters.

When balancing the challenges of engaging in quasi-experimental field research against the requirements of a tightly controlled, true experimental design, we determined that random assignment of high-risk victims of IPV would have presented insurmountable logistical and ethical issues (see Messing, Campbell, and Wilson 2015). Propensity score matching was used to match the intervention and comparison groups on observed differences, including important measures of risk. Propensity score matching also guards against bias due to differences that are unobserved but related to measured indicators. Nonetheless, given the use of a quasi-experimental design and historical comparison group in this study, the most concerning threat to internal validity is the threat of history effects, as an event may have occurred (e.g., a high-profile domestic homicide, the closing of a local shelter) between recruitment of the comparison and intervention groups that affected research outcomes. Throughout the study, therefore, we were particularly attentive to changes in participating communities by engaging with local police departments and domestic violence services, developing advisory committees, and building relationships with state policy makers. We did not note any events that may have affected research outcomes, yet there were observed differences between intervention and comparison groups.

Pragmatic trials, or intervention tests in the real world, are difficult to implement. We enlisted the cooperation of police officers and advocates in a number of police jurisdictions in Oklahoma, including the two largest population centers in the state. Although implementation fidelity may have been compromised because practitioners implemented the LAP, training and implementation of the LAP was consistent with implementation in police departments throughout the United States. Few true or quasi-experimental field trials of this size and scope have been conducted to examine innovative police practices or police–social work collaborations. This study examined a relatively well-established intervention with training and technical assistance available for police departments and social service organizations interested in implementing it. The sample included a substantial number of Native American women, who are at higher risk for experiencing IPV and intimate partner homicide (Black et al. 2011). We also used an outcome

measure for repeat violence that took into account the frequency and severity of IPV, not just the presence or absence of different forms of violence. This allowed us to offer a more nuanced picture of the changes associated with intervention and intent-to-treat group status.

CONCLUSION

Social workers have an ethical obligation to determine the best intervention for each client, taking into account the best available research evidence, practitioner knowledge, and client self-determination (Gambrill 2006). The preponderance of evidence, albeit in a quasi-experimental design with some important limitations as discussed above, is that the LAP is associated with increased use of safety strategies and reduced violent victimization. Social workers collaborating with law enforcement agencies have a unique opportunity to provide survivors who interact with the police holistic interventions that address a range of domains. This may include, for example, assisting women in creating safety plans that respect their choice to sever or remain in their relationships or providing services that respect survivors' self-determination and take into account the many ways in which women are connected to their intimate partners (Davies 2009). The primary role of an advocate in the LAP intervention is to provide women with safety tips and information on available resources; survivors may or may not choose to make use of this information. Our findings suggest that receiving this type of consultation enhances the chances that women will pursue formal and informal protective strategies, thus decreasing the IPV that they experience.

Appendix

Protective Actions

Participants could answer "yes" or "no" as to whether they had taken any of the following actions (McFarlane et al. 2004):

1. Hidden money, an extra set of house keys, car keys, or another belonging or object that may help you to flee your relationship
2. Established a code with family or friends (to let them know when you are in trouble)
3. Asked neighbors to call the police if violence begins

4. Removed or hidden their partner's weapons
5. Made available paperwork such as [their own and/or their children's] Social Security numbers, rent and utility receipts, birth certificates, bank account numbers, driver's license or identification, insurance policies or numbers [to facilitate fleeing the relationship]
6. Hid valuable jewelry
7. Hid extra money
8. Hid a bag with extra clothing

We added the following dichotomous (yes/no) questions:

9. Have you applied for an order of protection/restraining order against your partner?
10. Have you received an order of protection/restraining order against your partner?
11. Have you received services related to domestic violence in this relationship?
12. Have you gone someplace where your partner couldn't find you or see you?
13. Has your partner been someplace where he couldn't find you or see you?
14. Has there been a period of time when you didn't see your partner for a while because one or both of you chose not to?
15. Have you been treated by a doctor or nurse for injuries or trauma that your partner caused in this relationship?
16. Have you obtained something to protect yourself against your partner, such as mace, pepper spray, or a weapon?

NOTE

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