Preventive Medicine 114 (2018) 168–179

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

Review Article

Violence against women increases cancer diagnoses: Results from a meta-analytic review

Jennifer M. Reingle Gonzalez[a,*], Katelyn K. Jetelina[a], Stefany Olague[a], Jordan G. Wondrack[b]

[a] University of Texas School of Public Health, Department of Epidemiology, Human Genetics and Environmental Sciences, United States of America
[b] University of Texas School of Public Health, United States of America

ARTICLE INFO

Keywords:
Violence
Intimate partner violence
Uterine cervical neoplasms
Neoplasms
Papanicolaou test

ABSTRACT

The purpose of this project was to assess the magnitude of the relationship between violence against women and cancer; to identify the exposures and cancers for which this relationship was particularly robust; to identify the effect of violence exposure on cancer screening. We conducted a meta-analysis of 36 studies to determine the relationship between violence against women and cancer outcomes, including screening, in 2017. Results from this review provide evidence of a significant, positive relationship between violence and cancer diagnoses, particularly for cervical cancer. Women who were victims of intimate partner violence and sexual abuse were more likely to be diagnosed with cancer compared with non-victims. Violence against women did not appear to be related to cancer screening practices and routine clinical service utilization; however, violence was associated with greater odds of abnormal pap test results. Victims of intimate partner violence and women who suffered physical abuse were more likely to have abnormal pap test results. In conclusion, use of screening tools for violence against women in clinical settings may improve the breadth and quality of research on violence against women and cancer. Investigators should consider how to creatively apply case-control and retrospective cohort designs to investigate the complex mechanisms and moderators of the relationship between violence against women and cancer.

1. Background

Cancer remains the second leading cause of death for United States (U.S.) women (Centers for Disease Control and Prevention, 2017). Projected estimates suggest that 843,820 new cases of cancer will be diagnosed among U.S. women; these incident diagnoses are expected to cause 281,400 deaths (Siegel et al., 2016). Of these, 246,660 cases of breast cancer were expected to cause 40,450 deaths, and nearly thirteen thousand cases of cervical cancer were expected to cause 4120 deaths in 2016 (Siegel et al., 2016). Low rates of healthcare utilization and screening are well-established drivers of cancer mortality (Berry et al., 2005; Last, 1998; Youlden et al., 2012), particularly among minorities and women of lower socio-economic position (Nelson, 2002).

For 100 years, researchers have studied the relationship between traumatic exposures, and more commonly intimate partner violence, and cancer incidence (Phelps, 1910). Research findings have been mixed. Hindin found women who were victims of any type of intimate partner violence were more than twice as likely to have abnormal pap smear results, 60% more likely to have cervical dysplasia and 4.5 times more likely to have cervical cancer, than women with no intimate partner violence exposure (Hindin et al., 2015). Gandhi found that women who suffered from sexual and physical abuse were 87% less likely to have pap smears than women who suffered emotional abuse (Gandhi et al., 2010). However, other studies detected no evidence of a relationship between intimate partner violence history and cancer screening (Hathaway et al., 2000; Modesitt et al., 2006).

Several mechanisms have been identified to explain the relationship between violence against women, screening, and cancer. First, screening tests, particularly breast exams, mammograms, and pap smears, may be perceived as invasive and re-traumatizing to abuse victims, especially victims of sexual abuse (Farley et al., 2002; Robohm and Buttenheim, 1997; Watson, 2016). Second, victims of violence are likely to have unhealthy coping behaviors, like drug and alcohol use (Gerber et al., 2005), sexual risk taking (Coker, 2007b), and inconsistent condom use (Coker, 2007b), which have been related to cancer incidence (Hathaway et al., 2000; Norman et al., 2012). Third, a number of biological mechanisms—primarily, stress-related—have been speculated to drive the observed elevated rates of chronic disease among women victims of violence, as children and adults exposed to violence have high levels of C-reactive protein, an inflammation

* Corresponding author at: University of Texas School of Public Health, 6011 Harry Hines Blvd, Dallas, TX 75390, United States of America.
E-mail address: Jennifer.Reingle@utsouthwestern.edu (J.M. Reingle Gonzalez).

https://doi.org/10.1016/j.ypmed.2018.07.008
Received 22 February 2018; Received in revised form 26 May 2018; Accepted 4 July 2018
Available online 06 July 2018
0091-7435/ Published by Elsevier Inc.

biomarker (Broyles et al., 2012; Heath et al., 2013; Out et al., 2012).

The purpose of the present study is to quantitatively synthesize the literature on the relationship between violence exposure and cancer, including routine screening, among women. Several narrative reviews of the literature on violence and cancer (Holman et al., 2016), and violence and cancer screening, exist. These existing reviews were focused on adverse childhood experiences (ACEs), such as childhood sexual assault or neglect (Holman et al., 2016) and intimate partner violence (Coker, 2007b; Hindin et al., 2015). In this study, we seek to extend published results by comprehensively synthesizing the literature to identify whether a direct link between violence exposure, cancer screening, and cancer diagnoses exists. The goals of this study were three-fold:

1. To assess the magnitude of the relationship between violence against women and cancer.
2. To identify the exposures and cancers for which this relationship was particularly robust.
3. To identify the effect of violence exposure on cancer screening.

2. Methods

2.1. Criteria for inclusion and exclusion of studies in the review

Studies investigating the relationship between violence, victimization, or abuse and cancer or cancer screening were included. Violence and victimization exposure, defined as firsthand experiences of assault, child abuse or neglect, intimate partner violence, physical/sexual/emotional abuse at any point during the life-course, stalking, or firsthand witnessing of family violence were eligible for inclusion. Studies of exposure to neighborhood violence or living in a high crime area were not sufficient for inclusion. Many studies included ACEs summary scores, which include—but are not limited to—violence and victimization. These effect sizes were coded, and sensitivity analyses were conducted to examine whether inclusion of ACEs studies caused variable results.

Cancer included self-reported diagnoses or abnormal test results (for pap tests only) at any point during the life-course and cases abstracted from diagnostic records. Cancer screening included self-reported screening compliance with recommended guidelines (at the time of data collection) or lifetime screening uptake.

All eligible studies were coded, regardless of the study design. Eligible studies included samples of women in industrialized countries, and only studies published in English or with an English translation. Studies must have included a direct exposure measure of firsthand abuse, victimization, or witnessed violence in childhood or adulthood. An outcome measure of cancer diagnosis, cancer history, abnormal test result, or screening must have been provided. The study had to provide adequate data for calculating an effect size if one was not provided (i.e., means and standard deviations, *t*-tests, *F*-tests, *p*-values, etc.). The time frame was not restricted, and both published and unpublished reports were considered. The search was conducted between March and May 2017. This study was exempt from IRB review because no primary data were collected.

2.2. Search strategy for identification of relevant studies

Several strategies were used to search the literature for published and unpublished manuscripts: (1) A keyword search across online databases (PubMed, EBSCOHost, Ovid/PsychInfo, ProQuest, Scopus, Web of Knowledge); (2) The reference lists of previous reviews and eligible studies; (3) a search of the first 40 pages of Google Scholar (after 40 pages, results became increasingly irrelevant); (4) communication with experts in the field. The following keywords were used:

(Violen* or abuse or neglect or victim* or assault or trauma or stalking) AND (cancer or malignan* or tumor*).

Full-text versions of each study were requested from the authors' library. If the journals were not available at the university library, the Interlibrary Loan System (ILL) was used to request the document from other institutions. When ILL was not successful in obtaining full-text copies, the author searched the Internet extensively and contacted the author directly on academic social networking sites. Using this process, only two manuscripts were not successfully obtained (Rose, 2006; Bosch, 2017).

2.3. Details of study coding categories

All eligible studies were coded on a variety of criteria such as reference information (publication year), sample, country, outcomes and exposure measurement, study design and response rates, sample size; including effect sizes. Each study was coded by author JMG and independently verified by author KKJ, a researcher with meta-analytic coding experience. All discrepancies were reconciled before the coding phase was completed.

2.4. Analytic procedures

Because all outcomes were dichotomous, pooled odds ratios were calculated to standardize effect sizes for this quantitative review. The main source of information for calculating pooled odds was the adjusted odds ratio, but in situations where odds ratios and confidence intervals were not provided, relative risk or incidence rate ratios, *f*-values, *p*-values, or proportions were used to calculate the effect sizes (Lipsey and Wilson, 2001). All analyses were conducted using Comprehensive Meta-Analysis software version 3.0 (Biostat, n.d.). Although a random effect model was hypothesized a priori, both random and fixed effect models were fit to test the assumption that effect sizes were drawn from the same distribution (Cochrane's Q statistic). Kendall's test and Egger's test were used to identify evidence of publication bias. Two sets of effect sizes are reported in this project: 1) an overall pooled effect size per study across domain of measurement and source of information (e.g., cancer overall, violence exposure overall); and, 2) stratified effect sizes by exposure and outcome type (e.g., child abuse, cervical cancer screening, cancer diagnosis, etc.). In > 95% of cases, analyses at the study-level (e.g., mean effect size for each study) and analyses at the effect size level (e.g., all effect sizes for each study are considered independent of one another) produced the same result; therefore, pooled mean effect sizes at the study level are reported to avoid violating the assumption of statistical independence.

3. Results

The electronic database search resulted in 24,637 hits; eight additional studies were identified as potentially relevant through examination of review articles' reference lists (see Fig. 1). After duplicates were removed, titles and abstracts of 13,062 studies were screened for relevancy. Ninety-seven studies were identified as having potentially relevant titles and abstracts. Two studies could not be located, and the authors did not respond to requests for full-text manuscripts. The 95 full-text manuscripts were examined and 36 were identified as eligible.

and had sufficient information to quantitatively synthesize (e.g., an effect size and error term) effect sizes, thus were included in this review. Of the 36 studies, only two were not peer-reviewed (these two studies are denoted by ** in the reference list). A description of included studies is available in Table 1.

3.1. Violence against women exposure and cancer diagnoses

Appendix A includes a funnel plot depicting effect sizes and z-test results for each of the 16 studies examining the relationship between violence against women and cancer diagnoses. No evidence of publication bias was detected.