

# Measuring the impact of intimate partner violence on the health of women in Victoria, Australia

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**Objective** Using burden of disease methodology, estimate the health risks of intimate partner violence (IPV) among women in Victoria, Australia.

**Methods** We calculated population attributable fractions (from survey data on the prevalence of IPV and the relative risks of associated health problems in Australia) and determined health outcomes by applying them to disability-adjusted life year estimates for the relevant disease and injury categories for Victoria, Australia for 2001.

**Findings** For women of all ages IPV accounted for 2.9% (95% uncertainty interval 2.4–3.4%) of the total disease and injury burden. Among women 18–44 years of age, IPV was associated with 7.9% (95% uncertainty interval 6.4–9.5%) of the overall disease burden and was a larger risk to health than risk factors traditionally included in burden of disease studies, such as raised blood pressure, tobacco use and increased body weight. Poor mental health contributed 73% and substance abuse 22% to the disease burden attributed to IPV.

**Conclusion** Our findings suggest that IPV constitutes a significant risk to women's health. Mental health policy-makers and health workers treating common mental health problems need to be aware that IPV is an important risk factor. Future research should concentrate on evaluating effective interventions to prevent women being exposed to violence, and identifying the most appropriate mental health care for victims to reduce short- and long-term disability.

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يمكن الاطلاع على الملخص بالعربية في صفحة 744.

## Introduction

Reliable and comparable analysis of risks to health is essential for informing efforts to prevent disease and injury.<sup>1</sup> The burden of disease methodology provides a tool for estimating the impact of health problems and risky behaviours across a population, taking into account both illness and premature death.<sup>2</sup>

Previous burden of disease studies have been criticized for failing to provide an accurate and comprehensive picture of the burden of disease and injury among women by excluding some reproductive health conditions associated with significant rates of morbidity, and by omitting to measure the contribution of important risk factors, such as intimate partner violence (IPV), to burden of disease.<sup>3,4</sup>

Increasing evidence indicates that IPV is highly prevalent globally and has serious and long-lasting health conse-

quences.<sup>3,5</sup> These include many disorders for which significant gender disparities in prevalence exist, such as depression, anxiety, eating disorders and reproductive and physical health problems.<sup>6–9</sup> To decrease gender disparities in health outcomes it is essential that the associated risk factors be clearly identified, measured and recognized as a priority for intervention.

Globally, evidence on the prevalence and the health consequences of IPV is growing steadily but, to date, the contribution of IPV to the burden of disease has not been estimated. The overall aim of our study was to estimate the contribution of IPV to the total burden of disease for women living in Victoria, Australia, in 2001. We were able to carry out this study due to the availability of good prevalence data on exposure to IPV and survey data on the health consequences of IPV in Australia,

combined with a keen interest among government and nongovernmental organizations in Victoria. The first estimates of burden of disease for Victoria were developed for 1996 and updated to 2001 including IPV as a risk factor for the first time.<sup>10,11</sup>

## Methods

Using the comparative risk assessment methods, we estimated the disease burden attributable to a particular risk factor by comparing current health status with a theoretical minimum counterfactual status.<sup>1,12</sup> For IPV, the theoretical minimum was defined by the counterfactual status of no past or current exposure to IPV in a population. The attributable fraction of disease burden in the population was determined by the prevalence of exposure to the risk factor and the relative risk of disease occurrence attributed to exposure. We then applied the

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attributable fractions to overall population estimates of mortality or disability burden for each of the health outcomes causally linked with the risk factor.

### Prevalence

The national Women's Safety Survey (WSS) constitutes the most recent, comprehensive measurement of the prevalence of IPV in Australia.<sup>13</sup> We used two categories of exposure to IPV — physical or sexual violence by a partner in the past 12 months and physical or sexual violence by a partner more than 12 months ago (Table 1). We opted to use the Australian prevalence as the Victorian age-specific estimates had wide confidence intervals.

### Health outcomes

We based most of our estimates of the risk of adverse health outcomes on the Australian Longitudinal Study on Women's Health (ALSWH).<sup>14</sup> Three representative cohorts of Australian women aged 18–23, 45–50 and 70–75 years when first surveyed in 1996, have been re-surveyed at three-year intervals.<sup>15</sup> We obtained data from the first two surveys from the study custodians (1996 and 2000 for the youngest cohort; 1996 and 1998 for the middle-aged cohort). The sample sizes for each cohort at first interview were 14 739 and 14 011 for the youngest and middle-aged cohorts, respectively. For the youngest cohort we defined exposure to IPV by combining separate questions on “being pushed, grabbed, shoved, kicked, or hit”, “being forced to take part in unwanted sexual activity” and “ever having been in a violent relationship with a partner/spouse”. The first two questions were reported for the past 12 months and more than 12 months ago similar to our estimates of prevalence from the WSS. The questionnaires for the middle-age cohort did not include the third of the above questions and hence we could not distinguish IPV from violence perpetrated by others. The surveys of the older cohort in 1996, 1999 and 2002 did not include these specific questions on violence.

The self-reported health outcomes in the ALSWH included psychological disorders such as depression, anxiety disorders and deliberate self-harm; reproductive health conditions; sexually transmitted infections; and harmful health behaviours including smoking, drinking and illicit drug use. We chose the combined response to the questions

Table 1. Prevalence of intimate partner violence by age from Women's Safety Survey 1996, Australia

Age group (years)	Physical or sexual violence	
	In past 12 months % (95% CI) <sup>a</sup>	More than 12 months ago % (95% CI)
18–24	5.2 (3.5–6.9)	9.0 (6.7–11.3)
25–34	4.6 (3.3–6.0)	19.1 (16.7–21.5)
35–44	3.2 (2.1–4.4)	22.7 (20.2–25.3)
45–54	2.0 (1.0–3.0)	23.0 (20.2–25.9)
>55+	0.8 (0.3–1.2)	11.7 (10.0–13.4)
<b>Total</b>	<b>2.9 (2.4–3.3)</b>	<b>17.0 (16.3–17.7)</b>

<sup>a</sup> CI = confidence interval.

on “vaginal discharge” or “herpes” as a proxy for all sexually transmitted infections; the question on “abnormal Pap smear” as a proxy for cancer of the cervix; the question on deliberate self-harm as a proxy for suicide; and the combined response to questions “eating unusual amounts in last month” and “lost control over eating” as a proxy for eating disorders.

We used multinomial logistic regression to compute the relative risk of reporting such health outcomes comparing women exposed to previous or current IPV with those reporting no such exposure to violence following a method developed by others in a previous analysis.<sup>16</sup> All statistical analyses were performed using Stata 8.0 and systematically controlled for socioeconomic variables (level of education, employment status, occupation, marital status, language spoken, indigenous status, place of residence) as well as smoking and drinking status.

### Relative risks

The magnitude of the relative risks between IPV and all health outcome categories were comparable between the first and second survey and between the youngest and middle-age cohorts. As we could not evaluate outcome data in the middle-age cohort specifically for partner violence and the second survey had greater detail on the health outcomes of interest we decided to use the relative risks from the second survey of younger women and assumed these apply to women of all ages (Table 2). The only exception was tobacco smoking for which we assumed an exponential decrease between the higher relative risk in the youngest age cohort and the lower estimate in the middle-age cohort.

As we found no significant association between violence and premature birth we decided not to include low birth weight in our list of health outcomes affected by violence.

On examining the coronial database, the Australian Institute of Criminology found that 57.6% of femicides were perpetrated by a partner and we applied this proportion to the total number of femicides recorded in Victoria in 2001.<sup>17</sup> For physical injuries, we took the average of the relative risks reported for having sustained bruises (2.86; 95% confidence interval (CI): 1.20–6.97), lacerations (2.03; 95% CI: 0.92–4.55) and fractures (2.62; 95% CI: 0.98–7.25) in the past five years reported from a Brisbane (Queensland, Australia) Emergency Department.<sup>18</sup>

### Population attributable fractions

Population attributable fractions by age and cause were calculated in Excel using the formula:

$$PAF = \frac{\sum_{i=1}^k p_i (RR_i - 1)}{\sum_{i=1}^k p_i (RR_i - 1) + 1}$$

where  $p_i$  is the prevalence of exposure level  $i$ ,  $RR_i$  is the relative risk of disease in exposure level  $i$  and  $k$  is the total number of exposure levels.<sup>19,20</sup> The population attributable fractions (Table 3) were then applied to the 2001 burden of disease estimates in disability-adjusted life years (DALYs) for the relevant disease and injury categories.<sup>11</sup>

We used simulation-modelling techniques and present uncertainty ranges around point estimates that reflect all the main sources of uncertainty in the calculations. For this purpose, the @RISK

software (Palisade Corporation, New York) allowed multiple recalculations of a spreadsheet, each time choosing a value from distributions defined for input variables. The probability distributions around the input variables were based on standard errors of the prevalence and relative risk estimates. We calculated 95% uncertainty ranges for our output variables (bounded by the 2.5th and 97.5th percentiles of the 2000 values generated).

## Findings

Our findings suggest that IPV has a significant impact on the health of Victorian women (Table 4). The largest contribution to the burden of disease associated with IPV was poor mental health. We found that depression, anxiety and suicide together contributed to 73% of the total disease burden associated with IPV, while harmful health-related behaviours (tobacco, alcohol and illicit drug use) accounted for another 22%.

Our results indicate that the impact was most marked among women below 45 years of age, where physical and sexual violence occurring within the context of an intimate relationship accounted for 7.9% (95% uncertainty interval 6.4–9.5%) of the total burden of disease. The impact decreased substantially among women above 45 years to 1.5% (95% uncertainty interval 1.3–1.8%) in accordance with the decrease in prevalence of IPV among older women. For the total population of women (i.e. all ages combined), IPV accounted for 2.9% (95% uncertainty interval 2.4–3.4%) of the total burden of disease.

Table 2. Relative risk estimates for the association between intimate partner violence (IPV) and health outcomes from survey round two of youngest age cohort of the Australian Longitudinal Study on Women's Health, 2000

Condition	IPV in past 12 months % (95% CI <sup>a</sup> )	IPV more than 12 months ago % (95% CI)
Smoking	2.98 (2.09–4.25)	2.79 (2.33–3.34)
Alcohol abuse	1.82 (1.04–3.18)	1.47 (1.03–2.10)
Illicit drug use	2.27 (1.63–3.17)	1.23 (1.02–1.48)
Depression	3.05 (2.18–4.28)	1.96 (1.59–2.42)
Anxiety	2.59 (1.59–4.20)	1.83 (1.36–2.47)
Eating disorders	1.87 (1.39–2.51)	1.22 (1.04–1.43)
Sexually transmitted infections	2.24 (1.40–3.58)	1.54 (1.15–2.08)
Abnormal Pap-smear	1.43 (1.03–2.00)	1.46 (1.22–1.75)
Deliberate self-harm	7.05 (4.55–10.93)	2.53 (1.81–3.56)

<sup>a</sup> CI = confidence interval.

We found that IPV was a greater risk for ill-health among women 15–44 years of age than seven other major risk factors that traditionally have been included in burden of disease studies (Fig. 1). It was more than twice the risk of the next most important factor, illicit drug use, which contributed to less than 4%. For all ages combined, IPV caused more disease among women than alcohol and illicit drugs.

## Discussion

The disease burden attributable to violence against women by intimate partners has not been estimated before. Our findings indicate that in Victoria IPV is an important risk to the health of women, particularly younger women. While the impact of IPV on the occurrence of particular health problems is being increasingly reported, the major

advantage of the burden of disease methodology is that it allows a comprehensive measurement of all health risks including mortality and disability. Our estimates were facilitated by the availability of a well-conducted population survey on the exposure to IPV and survey data from a longitudinal women's health study, thus allowing an analysis of the association between exposure and health outcomes. However, our estimates required a large number of assumptions and extrapolations.

### Study limitations

The prevalence data date from 1995, while our estimates of health outcomes relate to 2001. While there is some more recent information available on prevalence,<sup>21</sup> we chose the 1995 WSS because it is representative for the Australian population and contained more detailed and sensitive questions than other surveys. The implicit assumption was that the prevalence of IPV had not changed between 1995 and 2001. A limitation of WSS was that indigenous women and women from non-English-speaking backgrounds were under-represented. Also, because the survey only addressed women it was not possible to estimate the disease burden among men. Moreover, there were no comparable data on the health risks of IPV among men.

The ALSWH was the best source to estimate the magnitude of the association of IPV and major health outcomes, as it was representative of the whole of Australia and had a large enough sample size to examine the health consequences of reported violence. However, the ALSWH also had important limitations.

Table 3. Population attributable fractions for health outcomes associated with intimate partner violence, Australia

Health outcome	Age group (years)	
	18–44	45
Femicide	0.58	0.58
Suicide	0.35	0.27
Physical injuries	0.06	0.01
Depression	0.21	0.16
Anxiety	0.17	0.15
Eating disorders	0.06	0.03
Tobacco	0.23	0.06
Alcohol	0.10	0.07
Drug use	0.08	0.06
Sexually transmitted infections	0.13	0.10
Cervical cancer	0.10	0.07

First, the response to the initial invitation to participate in the study was low (41%) and the retention rate was 71% between the first and second survey among the youngest cohort, which we chose for our analyses. Women reporting IPV in the first survey were more likely to be non-responders in the second survey, raising the question of whether non-response was related to severity of exposure to violence and subsequent health outcomes. To explore this possibility, we conducted an independent analysis, comparing the association between exposure to IPV and health outcomes in the first survey between those who did and did not respond to the second survey. There was no difference in the magnitude and direction of these associations. Moreover, for the health outcomes assessed during both the surveys, we found that the association with IPV had similar similar magnitude and direction. We concluded that there was no evidence of selection bias caused by the lower retention rate in the second survey and thus based our estimates on analyses of the second survey because of its more detailed health status information.

Second, exposure to violence in the ALSWH was not defined as in the WSS. Therefore, we could only use a set of proxy questions from the survey to approximate the exposure categories as defined in the WSS replicating previous analyses based on the same data.<sup>16</sup> The only way to distinguish IPV from violence perpetrated by others in ALSWH was to assume that anyone reporting “ever having been in a violent relationship with a partner” was abused by their partner if also reporting current or past,

Table 4. Burden of disease in disability-adjusted life years (DALYs) by cause and age attributable to intimate partner violence, Victoria, Australia, 2001

Health outcome	Age group (years)		Total	Total IPV burden, %
	18–44	≥45		
Femicide	134	91	225	2.4
Suicide	763	243	1006	10.7
Physical injuries	39	14	53	0.6
Depression	2169	1086	3255	34.7
Anxiety	2027	532	2559	27.3
Eating disorders	48	0	48	0.5
Tobacco	177	1159	1336	14.2
Alcohol	215	254	468	5.0
Drug use	210	19	228	2.4
Sexually transmitted infections	100	9	109	1.2
Cervical cancer	29	61	90	1.0
<b>Total</b>	<b>5911</b>	<b>3468</b>	<b>9380</b>	<b>100</b>

physical and/or sexual violence even though these were separate, unlinked questions. We explored whether we could include estimates of the health impact of emotional violence perpetrated without physical or sexual abuse. As the WSS recorded emotional violence in the past year only and the ALSWH asked about emotional violence that had ever been experienced, we decided not to include this aspect of IPV. This has led to some underestimation in our estimates. However, emotional violence only is much less common than physical or sexual violence which often occur together with emotional violence.<sup>22</sup>

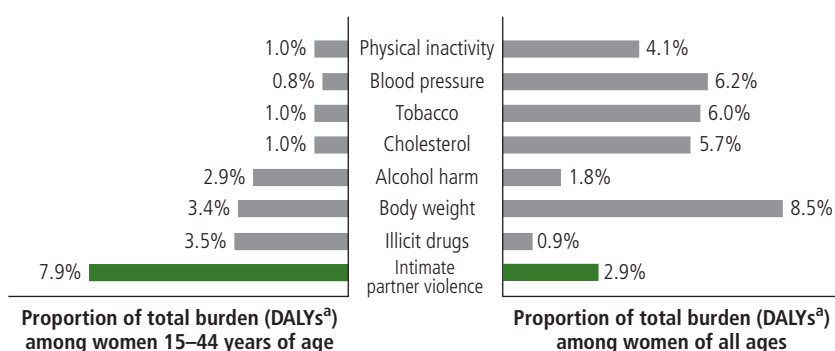
Third, data on violence against women were available for the youngest and middle-age cohorts only, at the time of the second survey. Only the youngest cohort was asked about ever having been in a violent relationship with a partner.

Hence, the analyses of the middle-age cohort could not distinguish IPV from violence perpetrated by others. Nevertheless, the relative risk estimates were similar in the youngest and middle-age cohorts for all health outcomes apart from smoking. We therefore decided to use the relative risk estimates derived from the youngest cohort and applied these across all ages. Only for smoking we applied a gradient by age between the relative risk estimates of the young and middle-age cohorts.

Fourth, measurements of outcomes are based on limited self-reported health status questions. While we acknowledge that these measurements are inadequate proxies for the prevalence of formally diagnosed disorders we nevertheless assumed that the difference in frequency of these proxy measures between women exposed and women not exposed to violence reflects differentials in the occurrence of more objectively defined health states. Finding a similar magnitude of relative risk estimates for different proxies for the same health state gave us more confidence in the validity of this approach.

Fifth, a cross-sectional analysis is a weak design to examine the relationship between a risk factor and disease outcomes because it cannot indicate whether exposure to the risk factor preceded the health outcome, a necessary condition to prove causality. A longitudinal study design would be better suited to study this issue. Despite the large overall study size of ALSWH the number of women who newly reported IPV between the first and second survey was too small and

Fig. 1. The proportion of burden of disease attributable to eight major risk factors among women aged 15–44 years and women of all ages, Victoria, Australia, 2001



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the health status information too limited to examine temporality. However, we decided that a causal relationship between IPV and health outcomes was much more plausible than a health outcome being the cause of IPV.

In burden of disease studies researchers often face the problem of imperfect data. As burden of disease results are intended to contribute to policy decision-making, abandoning the analyses due to imperfect data would convey the message that health problems for which this imperfect information exists are not important. The general approach to address this problem is to make estimates if they have at least some degree of plausibility. We argue that our data sources had enough strength to warrant completing the analyses. The similarity in the direction and magnitude of the relative risk estimates in the two age groups, for recent and previous exposure,

and for different proxy questions on the same health problem in the ALSWH, as well as the similarity of our relative risk estimates with those in the international literature, swayed the argument towards completing and presenting the attributable burden of IPV.<sup>7,8</sup> It does mean, however, that some caution is warranted in interpreting the magnitude of the estimates.

## Conclusion

The implications of our findings are manifold. First, IPV is documented as a priority health problem as well as a human rights issue and social problem, particularly among younger women. Second, health staff treating mental health and substance abuse problems in women should become more aware of how often IPV is associated with common disorders. Third, the awareness of IPV as a significant risk to health needs to be

extended to the media and the general public in support of population-wide and community-based interventions aiming to decrease violence. Fourth, a concerted effort is required to establish a knowledge base of the effectiveness and cost-effectiveness of the different ways of intervening because in addition to social and economic adverse consequences IPV also significantly impacts health. ■

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## Résumé

### Mesure des effets de la violence du partenaire sexuel sur la santé de la femme dans l'Etat de Victoria (Australie)

**Objectif** Estimer les risques pour la santé de la violence du partenaire sexuel chez les femmes de l'Etat de Victoria en utilisant la méthodologie de la charge de morbidité.

**Méthodes** L'étude a consisté à calculer les fractions attribuables dans la population (à partir de données d'enquête sur la prévalence de cette forme de violence et les risques relatifs de problèmes de santé qui lui sont associés en Australie) et à déterminer les issues sanitaires en les appliquant aux estimations des années de vie perdues ajustées sur l'incapacité pour les catégories pertinentes de maladies et de traumatismes, dans l'Etat de Victoria (Australie), en 2001.

**Résultats** Chez les femmes de tous âges, la violence du partenaire sexuel est à l'origine de 2,9 % (intervalle d'incertitude à 95 % : 2,4-3,4 %) de la charge totale de morbidité et de traumatismes. Chez les femmes âgées de 18 à 44 ans, la violence du partenaire sexuel est associée à 7,9 % (intervalle d'incertitude à 95 % : 6,4-9,5 %) de la charge de morbidité globale et constitue un

risque plus important pour la santé que les facteurs de risque traditionnellement observés dans les études sur la charge de morbidité tels que l'hypertension, le tabagisme et l'excès pondéral. La charge de morbidité attribuée à la violence du partenaire sexuel est due pour 73 % à des problèmes de santé mentale et à 22 % à l'abus de tabac, d'alcool ou de substances illicites.

**Conclusion** Les résultats montrent que la violence du partenaire sexuel constitue un risque important pour la santé de la femme. Les responsables de la politique de santé mentale et les agents de santé appelés à soigner les problèmes de santé mentale courants doivent être conscients de l'importance que constitue cette forme de violence en tant que facteur de risque. De nouveaux travaux de recherche devraient porter sur l'évaluation d'interventions efficaces pour éviter que les femmes soient exposées à la violence et sur la détermination des soins de santé mentale les plus appropriés pour les victimes afin de réduire l'incapacité à court et à long terme.

## Resumen

### Medición del impacto de la violencia de la pareja en la salud de la mujer en Victoria (Australia)

**Objetivo** Estimar los riesgos que supone para la salud de las mujeres del estado de Victoria (Australia) la violencia de la pareja (VP), utilizando para ello la metodología de la carga de morbilidad.

**Métodos** A partir de los datos de encuestas realizadas en Australia sobre la prevalencia de la VP y los riesgos relativos de los problemas de salud conexos, calculamos las fracciones poblacionales atribuibles y determinamos los resultados sanitarios, aplicándolos a las estimaciones de los años de vida ajustados en función de la discapacidad que se perdieron en Victoria, en el año 2001, por las enfermedades y lesiones pertinentes.

**Resultados** En las mujeres de todos los grupos de edad, la VP fue responsable de un 2,9% (intervalo de incertidumbre del 95%: 2,4 a 3,4%) de la carga total de enfermedad y lesiones. En las mujeres de 18 a 44 años, la VP se asoció al 7,9% (intervalo de incertidumbre del 95%: 6,4 a 9,5%) de la carga general de morbilidad, y representó para la salud un riesgo más importante que los factores de riesgo incluidos tradicionalmente en los estudios sobre la carga de morbilidad, tales como la hipertensión arterial, el consumo de tabaco y el peso corporal excesivo. Los problemas de salud mental representaron un 73% de la carga de morbilidad atribuida a la VP, y el abuso de sustancias psicotrópicas el 22%.

**Conclusiones** Los datos obtenidos indican que la VP supone un riesgo importante para la salud de la mujer. Los planificadores de las políticas de salud mental y los profesionales sanitarios que atienden los problemas de salud mental comunes deben tomar conciencia de que la VP es un factor de riesgo importante. Las

investigaciones futuras deberían centrarse en la evaluación de intervenciones eficaces que eviten la exposición de las mujeres a la violencia y en la identificación de los cuidados de salud mental más apropiados para reducir la discapacidad de las víctimas a corto y a largo plazo.

## ملخص

### قياس أثر عنف القرين الحميم على صحة المرأة في فيكتوريا، أستراليا

**الهدف:** تقدير المخاطر الصحية لعنف القرين الحميم على المرأة في فيكتوريا، باستخدام منهجية تقدير عبء الأمراض.

**الطريقة:** حسنا الأجزاء من المعطيات التي تعزى للسكان في مسح أجري حول معدل انتشار عنف القرين الحميم والمخاطر المتعلقة به للمشكلات الصحية المرافقة له في أستراليا، وتعرفنا على الحاصلات الصحية بتطبيق هذه المعطيات على التقديرات الخاصة بسنوات العمر المصححة باحتساب مدد العجز الناجمة عن المرض المدروس وفتات الأذيات في فيكتوريا، أستراليا في عام 2001.

**الموجودات:** يُعد عنف القرين الحميم مسؤولاً عن 2.9% (بفترة عدم ثقة مقدارها 95% إذ تراوحت القيم المقاسة بين 2.4% و3.4%) من مجمل عبء الأمراض والأذيات لدى المرأة في جميع الأعمار. أما لدى النساء بين 18 و44 عاماً، فقد ترافق عنف القرين الحميم مع 7.9% (بفترة عدم ثقة مقدارها 95% إذ تراوحت القيم المقاسة بين 6.4% و9.5%) من مجمل

عبء الأمراض، وكان الخطر على الصحة أكبر من عوامل الخطر التي تدرج في العادة ضمن دراسات عبء الأمراض، مثل ارتفاع ضغط الدم وتعاطي التبغ وزيادة وزن الجسم. بينما ساهم سوء الصحة النفسية في 37% من عبء المرض المعزو إلى عنف القرين الحميم، وساهم تعاطي مواد الإدمان في 22% منه.

**الاستنتاج:** تشير الموجودات التي وصلنا إليها إلى أن مكونات عنف القرين الحميم تمثل تهديداً خطيراً لصحة المرأة. ولا بد أن يدرك أصحاب القرار السياسي في الصحة النفسية والعاملون الصحيون الذين يعالجون المشكلات الشائعة في الصحة النفسية أن عنف القرين الحميم من الأخطار الهامة؛ ولا بد أن تركز البحوث في المستقبل على تقييم التدخلات الفعالة لوقاية النساء من التعرض للعنف وللتعرف على أكثر السبل الملائمة لرعاية الضحايا في الصحة النفسية، للإقلال من العجز الطويل الأمد والقصير الأمد.

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