

## **Title**

Title: Trends in hospital admissions for intimate partner violence in Australian mothers with children born from 1990 to 2009

## **Introduction**

Violence against women is a global social and public health issue (World Health Organisation (WHO), 2002) of epidemic proportion (WHO, 2013). In Australia, as seen in many other countries, the most common perpetrator of assault against women is a current or previous spouse or domestic partner (Australian Institute of Health and Welfare (AIHW), 2018; WHO, 2013), this violence is termed as intimate partner violence (IPV). The World Health Organisation (2012) defines IPV any behaviour within an intimate relationship that causes physical, psychological or sexual harm to those in the relationship. From a West Australian perspective IPV has been defined as: physical assault, sexual assault, physical assault, verbal abuse, emotional/psychological abuse, social isolation, financial abuse, and spiritual abuse, or the threat of these acts, carried out by a current or former partner (Department of Child Protection and Family Support, 2015). While IPV can occur in same sex relationships and be perpetrated by women against men, it is acknowledged as a gendered issue that is disproportionately perpetrated by men against women (Morgan and Chadwick, 2009; WHO, 2014). IPV occurs in all cultural, religious and socioeconomic groups (WHO 2012), with approximately one in four Australian women experiencing IPV in their lifetime (ABS, 2017).

The experience of IPV is not exclusively concurrent and the impact may last a long time after the violence. For instance, it is acknowledged that women experiencing IPV have higher rates of adverse health outcomes. The women have an increased risk of physical health conditions such as chronic pain (Dillon, Hussain, Loxton, & Rahman, 2013), cardiovascular

problems, and respiratory problems (Loxton, Schofield, Hussain, & Mishra, 2006). IPV also impacts psychological health status with women at increased risk of chronic episodic conditions such as depression (Vos et al. 2006), anxiety (Dillon et al. 2013) and substance misuse (Bacchus, Ranganathan, Watts, & Devries, 2018). An association between IPV and an increased risk of suicidal behaviours has also been acknowledged (Devries et al. 2011). Globally, lifetime exposure to violence is the second most common risk factor for disability-adjusted life years in young women (Mokdad, et al, 2016).

Previous research has reported greater use of health services by women who are victims of violence (Bonomi 2009; Ansara, 2010; Black, 2001). In Western Australia (WA), population-based data have been used to investigate hospitalisations due to violence against women (Meuleners & Lee, 2008; Meuleners, Lee, Hendrie & Fraser, 2010; Meuleners, Lee, Janssen & Fraser, 2011). Meuleners et al. (2008) determined that women of child bearing age were more likely to be hospitalised for assault than women of non-child bearing age. Despite a greater use of health services women are reluctant to disclose they are victims of IPV to health professionals, for a multitude of reasons such as stigma, fear, and the lack of a safe place to disclose (Garcia-Moreno, Jansen, Ellsberg, Heise, & Watts, 2005; Keeling & Fisher, 2015).

While researchers disagree about the prevalence of IPV during pregnancy, past research has shown that this time period is associated with an increased risk for IPV for some women (Brownridge, Tailieu, Tyler, Tiwari, & Chan 2011). In Australia nearly half (48%) of women who reported violence in a relationship had experienced violence during pregnancy (Australian Bureau of Statistics (ABS) 2017). IPV in pregnancy is a particular concern as the woman is at risk of both fatal and non-fatal adverse health outcomes. IPV exposure has been associated with delayed entry to antenatal care (Islam, Brody, Baird, Mazerolle, 2017) and

increased risk of adverse birth outcomes (Coker, 2004; Heaman, 2005). The direct trauma of violence to the pregnant woman's body through physical assault to the abdomen or sexual trauma can increase the risk of preterm birth, and low birthweight (Campbell, 2002), spontaneous abortion, or neonatal death (Coker, 2004). Adverse birth outcomes may also be compounded by the behaviour of the mother in response to the violence such as poor nutrition, or missing prenatal healthcare appointments (Coker, 2004).

The 2016 Australian Personal Safety Survey (ABS, 2017) reported that of women who were victims of assault, in 65% of cases the most recent incident was most likely to be in their home. Furthermore, 49% of women assaulted had children in their care.

Gartland et al's (2014) study of Australian first-time mothers found that 20% had been victims of IPV in the first post-partum year rising to 29% by the time the child was four-years old. Due to the time they spend in the family home, younger children are particularly vulnerable and disproportionately exposed to IPV (Fantuzzo, 2007; Gjelsvik, 2001). Substantial research has found that when mothers are victims of IPV their children can be adversely affected (Holt, Buckley, & Whelan, 2008). Children exposed to IPV have a higher risk of poorer outcomes in the areas of physical health, psychological, emotional, behavioural, social, and academic achievements (Artz, Jackson, Rossiter, Nijdam-Jones & Géczy, Porteous, 2014; Howell, Barnes, Miller, & Graham-Bermann, 2016).

Aboriginal and Torres Strait Islander (hereafter referred to as Aboriginal) women have been identified in previous research as having a higher risk of being a victim of violence than non-Aboriginal women (Meuleners et al, 2010; Meuleners et al, 2011). Aboriginal women are 32 times more likely to be hospitalised due to violence than non-Aboriginal women (Steering Committee for the Review of Government Service Provision, 2016). Higher levels of violence in Aboriginal communities than in the general population is acknowledged

as both a cause and effect of social disadvantage and intergenerational trauma (AIHW, 2018), attributed to the legacy of colonization. Further demographic groups who have been identified at higher risk of IPV are socioeconomically disadvantaged women (Khalifeh, 2013; WHO, 2004), and younger women (ABS, 2017).

In conjunction with the community the Australian Commonwealth, State and Territory Governments developed a 12-year 'National Plan to Reduce Violence against Women and their Children 2010-2022' (Australian Government, 2010). The National Plan is now in its third stage. The plan stresses the need for research to fill gaps and increase an understanding of health issues experienced by women and children exposed to IPV.

Given that women of child bearing age are more likely to be admitted to hospital due to assault, an understanding of the prevalence of assault hospitalisations of mothers is important. Therefore, this study used administrative data to gain an understanding of the prevalence of IPV in both Aboriginal and non-Aboriginal mothers, and patterns over time. As pregnancy has been identified as a period of heightened risk for IPV (Deveries et al. 2010) and the potential impact of IPV on young children, we focused on the key stages of 12 months prior to birth and up to 36 months of age.

## **Method**

### Study design

A retrospective population-based cohort study was undertaken that included all mothers of children born in WA in the period 1990-2009. We used de-identified linked data from the WA Data Linkage System. Data were extracted from the Midwives Notification System (MNS), Birth Registry, and Hospital Morbidity Data Collection (HMDC); all

statutory data collections. Best-practice probabilistic matching (Kelman, Bass, & Holman, 2002) was used for linkage across the datasets. The MNS contains data for all babies born >400 grams in weight or of at least 20 weeks gestation. This study used MNS and the Birth Registry from 1990-2009. The HMDC includes all separations from public and private hospitals. To capture admissions 12 months prior to birth and 36 months after birth, we used HMDC data from 1989-2012. The HMDC contains diagnosis and external cause codes according to the International Classification of Diseases (ICD-9:1979 to June 1999, ICD-10: July 1999 to present).

### IPV Categories

Mothers who had an IPV hospitalisation were principally identified through ICD codes (*Table 1*) used in previous studies which capture the external cause of admissions due to assault and abuse (Meuleners, 2010; Meuleners, 2011). While assault-related ICD codes do not specifically indicate the relationship to the perpetrator, there are specific Z-codes related to partner relationships. These codes represent factors that influence a person's health state, and we used the Z-code relating to partner conflict that impacts health status: Z63.0 and its predecessor V61.1. The Z63.0 code captures victimisation of multiple forms of violence which are important to the understanding of hospitalisations due to IPV (Olive, 2018). We focused on hospitalisations of mothers in two time periods: i) those occurring 12 months prior to birth; and ii) those occurring 12 months prior to birth and up to 36 months after birth. For both groups, classifications were grouped into:

- Assault (Assault) included homicide, purposeful inflicted injury; physical, emotional, psychological and sexual abuse (ICD-9: E960 to E969, 995.81, V71.5; ICD-10-AM: T74.1, T74.2, T74.3, and Z04.4, X85 to Y09).

- Partner Conflict Impacting Health Status (Conflict) included counselling for marital and partner problems; problems in relationship with spouse or partner that influence health status (ICD-9: V61.1; ICD-10-AM: Z63.0 - Discord between partners resulting in severe or prolonged loss of control, in generalization of hostile or critical feelings or in a persisting atmosphere of severe interpersonal violence (hitting or striking). Z-codes are acknowledged as a conceptually discreet category (WHO, 2016; Olive, 2018), therefore, it was important to acknowledge them in their own specific category.
- All IPV (All) included all codes for Assault and Conflict and additional codes for external cause of injury and poisoning including undetermined intent (ICD-9: E980 to E989 and ICD-10-AM: Y10 to Y34).

For inclusion in the cohort the mothers were required to have one or more of the ICD codes in one of the three categories. Each mother with a hospitalisation for IPV was counted once in each category, even if they had more than one hospitalisation. The mothers could be in one or more of the classification groups Assault, Conflict, and All.

Neighbourhood-level socioeconomic status (SES) was determined by the Index of Relative Social Disadvantage from the Australian Bureau of Statistics (ABS, 2013b) using the Birth and Midwives data. Five levels of disadvantage were assigned to census collection districts (~200 households) ranging from 1 (high disadvantage) to 5 (low disadvantage). Aboriginal mothers were identified using birth and midwives' data. Aboriginal Australians have higher levels of socioeconomic disadvantage compared with non-Aboriginal Australians (Australian Government, 2014). Therefore, we stratified our analysis by Aboriginality.

## Ethics

Ethics approval for this study was obtained from the WA Department of Health Human Research Ethics Committee (#2012/37), the WA Aboriginal Health Ethics Committee, and the University of Western Australia Human Research Ethics Committee.

### Statistical analysis

Prevalence of hospitalisations for IPV in mothers of children born in the period 1990-2009 (per 1000 births) was calculated for each birth year using the number of children with mothers who had a hospital admission for each birth year as the numerator, and total births as the denominators. As rates of violence differ between Aboriginal and non-Aboriginal women analyses were stratified by ethnicity. For analysis by Aboriginality we calculated prevalence using Aboriginal mothers who had a hospital admission for each birth year as the numerator and the total population of mothers with Aboriginal children as the denominator. This was replicated for non-Aboriginal mothers. Separate analysis was conducted for the three categories of Assault, Conflict, and All. Time trends in IPV admissions were evaluated using Poisson regression (Kuhn, Davidson, & Durkin, 1994). All trends are presented as effect sizes with 95% Confidence Intervals (CI) and associated p-values (statistically significant at  $p < 0.05$  level). As a cautionary note, some of the ICD codes are rarely used and there may be an effect that is undetected due to low sample size (O'Donnell, Sims, MacLean, Gonzalez-Izquierdo, Gilbert & Stanley, 2017). Therefore, consideration of effect sizes and CI of trends should be given. Due to the significant increase in admissions in 1999, corresponding with the implementation of ICD-10-AM coding, we analysed the data with a break in series, grouped into two periods 1990-1998 and 2000-2009 to determine if there was an upward or downward trend in each series. Odds ratios and 95% CIs for maternal hospitalisations were calculated for Aboriginality, maternal age, and SES, using logistic regression. Analyses were

stratified by birth year group (1990-1994, 1995-1999, 2000-2004, and 2005-2009). All analyses were conducted using SAS® statistical software (SAS Institute Inc., 2013).

## Results

Of the 524,534 live births in WA during 1990-2009, 3,065 (0.6%) children were born to mothers admitted to hospital 12 months prior to their child's birth in one of the three classification groups Assault, Conflict, and All. This number increased to 8,368 (1.6%) when admissions 12 months before birth to 36 months after birth were included.

### 12 months prior to birth

The overall prevalence of hospital admissions increased from 1990-2009 for all three categories (*Figure 1*). All increased from 2.7 to 7.7 per 1000 births from 1990-2009 respectively, while Assault increased from 2.7 to 3.8 per 1000 births over this period. No admissions were recorded for Conflict prior to 1999 but from 1999 there was an increase from 3.7 to 4.2 per 1000 births. Hospital admissions, for the All category in the 12 months prior to birth, for births from 1990-1998 increased by 6.4% per year (95% CI: 3.4 to 9.4%,  $p < 0.001$ ). However, the trend did not continue in the second series (2000-2009) where there was a non-significant decrease (IRR: -0.5%, 95% CI: -2.0% to 1.1%,  $p = 0.53$ ). The Assault category also had significant increases in 1990-1998 by 5.9% per year (95% CI: 2.7% to 9.2%,  $p < 0.001$ ). Like the All category, this trend did not continue into the second series, where there was a significant decrease of -2.9% per year (95% CI: -4.5% to -1.2%,  $p < 0.001$ ). The Conflict trend data are only available from 2000 onwards where there was a non-significant increase per year (IRR: 1.8%, 95% CI: -1.3% to 4.9%,  $p = 0.26$ ).

### 12 months prior to birth and 36 months after birth



When the analysis was expanded to include admissions from 12 months prior to 36 months post-birth, the overall prevalence of hospital admissions increased between 1990-2009 for all three categories (*Figure 2*). The All category increased from 8.9 per 1000 births in 1990 to 19.4 per 1000 births in 2009. Assault increased from 8.7 per 1000 births to 10.8 per 1000 births in 2009. There were no admissions for Conflict until 1996, after which an increase from 0.4 to 9.5 per 1000 births in 2009 was observed. Within the Conflict category, the Z63.0 code, introduced in ICD-10-AM, was associated with psychological admissions, 16.9% had an acute stress reaction at admission; 13.9% a depressive episode; 8.2% had poisoning by benzodiazepines, antidepressants, or non-opioid analgesics.

The All category had a significant increase in admissions of 7.1% (95% CI: 4.8% to 9.4%  $p < 0.001$ ) per year from 1990-1998. This trend did not continue in the second series with a non-significant decrease (IRR= -0.1%, 95% CI: -0.6% to 0.5%  $p = 0.75$ ). Similarly, the Assault category had a significant increase in the first series (1990-1998) of 2.8% (95% CI: 1.7% to 4.0%  $p < 0.001$ ) per year but did not continue in the second series with a significant decrease of -1.9% (95% CI: -3.2% to -0.6%  $p = 0.006$ ) per year. The Conflict category only commenced being used from 1996 and had a substantial significant increase from 1996 to 1998 of 251% (95% CI: 156% to 480%  $p < 0.001$ ) per birth year. The second series had a non-significant increase (IRR= 1.6%, 95% CI: -0.1% to 3.3%  $p = 0.07$ ).

#### Factors associated with a child born to a mother with admission

The results of multiple logistic regression analysis for factors associated with a child born to a mother with an admission between 12 months prior and first 36 months post birth are shown in *Table 2*. Being Aboriginal, <30 years of age, and of low SES significantly increased the odds of having a mother with an admission. Importantly, the risk for Aboriginal children being born to a mother with a hospital admission (*Table 2*) dropped considerably

from 39.6 (95% CI: 33.1 to 45.0) in the period 1990-2004 to 8.7 (95% CI: 7.9 to 9.6) in the period 2005-2009.

### Aboriginality

When we analysed the data by Aboriginality, the prevalence in each of the three categories was substantially higher in Aboriginal mothers than non-Aboriginal mothers. This disparity continued through the 20-year observation period (Figures 3a & 3b). In 1990, the prevalence of All in Aboriginal mothers was 112.56 per 1000 births compared to 2.26 per 1000 births of non-Aboriginal mothers. By 2009 the prevalence had increased in both Aboriginal and non-Aboriginal to 152.20 per 1000 births and 11.73 per 1000, respectively. Focusing on the endpoints of the two series we see the prevalence rates of Conflict in Aboriginal mothers climbed from 22.27 per 1000 births in 1998 to 35.08 per 1000 births in 2009, a 35% increase. However, the prevalence for Conflict in non-Aboriginal mothers climbed 100% from 3.98 per 1000 births in 1998 to 8.01 per 1000 births in 2009. Again, focusing on the endpoints, the Assault category in Aboriginal mothers was 131.19 per 1000 births in 1998 and reduced marginally to 129.01 per 1000 births in 2009. However, the non-Aboriginal Assault category increased from 2.88 per 1000 births in 1998 to 3.99 per 1000 births in 2009.

### Discussion

This is the first time that linked population data have been used to determine the prevalence of hospital admissions for IPV, against mothers of children born in WA. Importantly, analysis of the data has given us a new understanding of IPV trends over time for both Aboriginal and non-Aboriginal mothers.

Our findings suggest that, overall, there has been an increase in the prevalence of IPV admissions for mothers of children born from 1990-2009 in WA. With the increased level of prevalence remaining persistent for the last decade. These findings are in contrast to the 2012 Australian Personal Safety Survey (ABS, 2013a) who reported a decrease in women experiencing violence from 1996 to 2012. A possible explanation for the disparity is that our study focused specifically on mothers and not women. Furthermore, our cases are women who have been hospitalised and do not necessarily represent victims of IPV that are not hospitalised.

The overall trends highlight a significant increase in All admissions in 2000. A possible explanation, in part, for the increase could be the introduction of the decade long 'Freedom from Fear' campaign that launched in 1998. This campaign raised awareness of IPV through television, radio, press, and outdoor advertising. The raised awareness in the general public is likely to flow through to healthcare professionals leading to better recording of IPV.

A further possible explanation for the increase in admissions in 2000 is the implementation of the ICD-10-AM codes. The implementation had a significant impact on the Conflict category, specifically with the introduction of the Z63.0 code. To accommodate this increase, we analysed trends pre-1999 and post-1999, finding a marked difference. In the 12 months prior to birth admissions in the All category there was a significant increase pre-1999, and some volatility post-1999 resulting in a non-significant decrease. The dissimilarity was also reflected in 12 months prior to birth and 36 months after birth All admissions. These findings were unexpected but could be a reflection that the practice of coders may have changed with the implementation of ICD-10. We therefore recommend that trends continue to be monitored to inform service providers and clinicians, and to support implementation of

evidence-base interventions. The increase in prevalence in the Conflict category appears to be directly linked to the introduction of the Z63.0 code. The previous related ICD-9 code was not widely used and as it was developed in the 1970s, it has become less relevant (Lalandoe, & Taylor, 2000) with new understandings of IPV. While Z-codes have been described as general and overly vague (Whisman, & Beach, 2013), the use of Z63.0 provided the ability to analyse psychological harm of IPV that are difficult to capture, such as stress and depressive disorders. Our use of separate categories for Assault and Conflict demonstrated similar trends in both these categories post 1999 (*Figures 1 and 2*). Therefore, we recommend that future research on IPV utilise Z-codes to capture psychological harm and also investigate the reliability of these codes.

Characteristics that were associated with mothers being hospitalised included, being <30 years of age, low SES and Aboriginal. Our findings that maternal age <30 years was associated with increased risk of being hospitalised is consistent with the Australian Personal Safety Study (ABS, 2013a) where young women (18-24 years) reported higher rates of violence than other age groups. Therefore, mothers <30 years of age continue to be an important target group for violence prevention and intervention strategies.

Our study found that being from a low socioeconomic background was associated with increased risk of a mother being hospitalised. This differs from an Australian population-based study (Meuleners et al, 2008) which found hospitalisations for violence were evenly distributed in all SES groups, although differences in readmission rates within SES groups were noted. However, the Meuleners et al. study included males and females, and given differences in gender experiences of victimisation, this could explain inconsistencies between respective results. Due to the multidimensional nature of socioeconomic status the association between low socioeconomic household status and

increased risk of interpersonal violence, including IPV, has not been reflected within all literature (Taillieu, & Brownridge, 2010) and requires further research.

We found that Aboriginal mothers are at higher risk of hospital admissions, which is consistent with previous research that Aboriginal people are disproportionately affected by IPV (ABS, 2016). Reducing violence against Aboriginal women is a priority in The National Plan to Reduce Violence against Women and their Children (Australian Government, 2010).

An unanticipated finding was the increasing prevalence of the Conflict category in non-Aboriginal mothers compared to Aboriginal mothers. This could be partially explained by the Z63.0 code. The code focuses on intimate partner relationships (spouse/partner) which does not take account of other familiar relationships that are included in Aboriginal understandings of ‘family and domestic violence’ and included as part of the formal response to the issue in WA. As such, behaviours included in Z63.0 code may be too narrow to reflect the broader experiences of Aboriginal people (Olsen & Lovett, 2016). Additionally, it has been acknowledged that Aboriginal women are less likely to disclose partner violence than non-Aboriginal women (Willis, 2011). The women’s decision not to disclose partner conflict could be attributed to the lack of cultural safety, for example lack of Aboriginal health workers or culturally trained non-Aboriginal staff, and lack of trust due the absence of a relationship with their health care provider (Spangaro, Herring, Koziol-McLain, Rutherford, Frail, & Zwi, 2016). There may also be distrust of authority figures due to past negative experiences, including racism and forced removal of children (Willis, 2011).

Our findings highlight an association with Z63.0 and psychological admissions. Therefore, it is important that mental health-related admissions for Aboriginal mothers take into account whether family violence is a factor which would benefit clinicians and service providers in devising appropriate intervention and support programs. Furthermore, the Z63.0

admissions may provide an opportunity to identify and support all women who are not necessarily physically assaulted but have had their health status affected by their partners behaviour.

When we analysed hospitalisations by Aboriginality we found, for children born in 2009, that Aboriginal mothers were more 32 times more likely to be admitted for an Assault category compared to non-Aboriginal mothers. These findings are in keeping with existing literature that highlights Aboriginal women are 32 times more likely to be hospitalised due to violence than non-Aboriginal women (Steering Committee for the Review of Government Service Provision, 2016). While there is a disproportionate burden of violence against Aboriginal mothers it is important to acknowledge that violence is not customary in Aboriginal culture (Olsen & Lovett, 2016). Higher rates have been attributed to intergenerational trauma and the social disadvantage caused by the legacy of colonisation (AIHW, 2018). The National Plan to Reduce Violence against Women and their Children 2010-2022 (Australian Government, 2010) acknowledges that Aboriginal women are more likely to experience violence than non-Aboriginal women and highlights the need for interventions to be place-based and developed in partnership with communities. In highlighting the prevalence differences between Aboriginal and non-Aboriginal mothers our research extends the knowledge of violence experienced by Aboriginal mothers and can contribute to collaborative interventions that strengthen Aboriginal communities and prevent violence.

Although we have addressed them where possible there are some limitations with the study. Firstly, while most violence against women is perpetrated by a male intimate partner, we acknowledge that some of the cases may have been perpetrated by someone other than a male intimate partner. Secondly, data are reliant on clinical coding of hospital morbidity

records and an undetermined intent code is utilised where information is insufficient to confirm assault, self-harm or accidental injury. Thirdly, HMDC data were only available for women who were admitted to hospital, therefore, the data are an under-estimation of IPV in mothers and not generalisable to women who did not require hospitalisation or report their assault. Future research should utilise linked datasets from Emergency Departments and/or Police records to improve ascertainment of IPV.

The National Plan to Reduce Violence against Women and their Children 2010-2022 (Australian Government, 2010) recognised that health professionals are often an early point of contact for women who are victims of IPV. Therefore, the hospitalisation of mothers offers an opportunity for health professionals to provide targeted interventions. It is important that the complexities of over representation of Aboriginal women are acknowledged and interventions are developed with partnerships between health services and Aboriginal communities. As the first response is pivotal to women's safety and support it is essential that health care professionals are educated on violence against women and the consequences of such violence on not only the women but their children. To support holistic care health professionals need to be aware of appropriate services to which they can refer mothers and families. It is important to acknowledge that due to the hidden nature of IPV mothers may not have disclosed that they are victims of IPV. Therefore, targeted screening using an appropriate tool for women who are hospitalised for assault and partner discord/conflict should be utilised to ensure that mothers and children have appropriate care and support. Despite the limitations, the use of population level data reduces the difficulties associated with research methods where mothers may be reluctant to disclose that they are a victim of IPV due to stigma (Murray, Crowe, & Akers, 2016). These findings should be used to highlight priority groups for targeted early intervention and prevention as well as the need for culturally appropriate strategies to reduce the burden of IPV. While this study has described

the prevalence and trends in IPV admissions in mothers, further research is required to investigate the impact this has on their children's health and wellbeing.

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