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Full Length Article

Intimate partner violence and sexual and reproductive health outcomes of women: An Australian population cohort study

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ABSTRACT

Objective: To examine sexual and reproductive health outcomes of women who report intimate partner violence (IPV) and compare these outcomes to women who did not report IPV.
Methods: Utilising the Cohort of women born in 1973–1978 and aged 18–23 years when recruited to participate in the National Australian Longitudinal Study on Women's Health, we conducted an analysis in 2022–2023 of the relationships between exposure to IPV and reproductive and sexual health outcomes for this cohort over a decade (1996 to 2006). Logistic regression analyses were undertaken, mixed effects regression models were applied where feasible.
Results: The current study indicates exposure to IPV significantly increases the likelihood of forced sex, reporting endometriosis, infertility, miscarriage, pregnancy termination, along with greater odds of infertility, termination, and miscarriage increasing with greater exposure to IPV. Women reporting IPV also report a greater likelihood of STIs such as chlamydia, herpes, and genital warts, in addition to a higher incidence of abnormal Pap tests. Women reporting IPV were also more likely to have a larger number of births, with births occurring earlier than those who did not report IPV.
Conclusion: Addressing the global issue of IPV, healthcare organisations must offer robust support, including clear guidelines and protocols for managing IPV and the associated health risks among women. This should extend to providing access to resources and referral systems among those identified as experiencing IPV. Interdisciplinary collaboration remains essential to create a holistic approach to managing IPV and the associated health consequences to promote positive sexual and reproductive health outcomes for women.

Introduction

Intimate Partner Violence (IPV) is a significant public health concern responsible for a wide array of detrimental physical, psychological, social, and economic sequelae [1]. Globally, one in four adolescent girls who have been in a relationship have experienced IPV at some point within their lives [1]. Similarly in Australia, approximately one in four women have also experienced IPV since the age of 15 years [2]. It is known that IPV is associated with physical health consequences, mental illness, and adverse sexual and reproductive health outcomes [2]. For example, research has found that IPV is linked with an increase in developing chronic illnesses such as diabetes and exacerbates symptoms of for example menopause and HIV, in addition to increasing the risk of HIV acquisition (3). A recent systematic review has suggested that IPV is associated with an increased likelihood of women experiencing post-traumatic stress disorder, depression and suicide ideation [4].

Other research confirms IPV is associated with unintended pregnancies, pregnancy termination, sexually transmitted infections (STIs) [5] and the need for access to emergency contraception [6]. Meta-analytic evidence confirms a lifetime prevalence of IPV of 47.2 % amongst infertile women, with psychological violence most prevalent (51.5 %) over their lifetime [7]. Whilst there is some literature evidencing an association between IPV and sexual health outcomes, a 2022 systematic review of the physical health effects of IPV only

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identified four studies that examined the connection between STIs and IPV, noting that 3 of these studies reported increased rates of STIs (excluding HIV) in women reporting IPV exposure [3]. In the 52 studies included in this review, no other reproductive outcomes were examined. These cohort studies were also of short duration (1–2 years).

Globally, it is recognised that IPV is a persistent problem in society that must be addressed, yet the magnitude, prevalence and impact remain underreported (1). Recognising the impact exposure to IPV can have on women's reproductive and sexual health outcomes can assist with developing a greater understanding of the sexual and reproductive health sequelae of IPV over time [8]. However, there remains a dearth of insight regarding the features and magnitude of exposure to IPV on reproductive and sexual health outcomes among Australian women, with one of the few Australian studies examining reproductive and sexual health outcomes for women aged 18–23 [9].

Within this context, the Australian Longitudinal Study on Women's Health (ALSWH) is a population-based study investigating a broad range of topics on women's health, their health service use, and demographic and lifestyle factors. Since 1996, the ALSWH survey has repeatedly collected data from cohorts of women at different age points to explore their health and well-being across the lifespan [10]. Employing data from the ALSWH the aim of this study was to investigate the nature of any effect of IPV exposure (lifetime prevalence) on reproductive and sexual health outcomes among a cohort of Australian women compared with their peers who reported no exposure using mixed effects regression models on the same individuals across the three surveys. We hypothesised that:

1) Women who report IPV exposure would be at an increased risk of adverse sexual health and reproductive outcomes, with continued exposure magnifying this risk.
2) Compared to women of the same age who did not report experience of IPV, women reporting IPV at a specific time point would have poorer sexual health and reproductive outcomes.

Materials and method

Since 1996, the Australian Government has funded the ALSWH, which is based at two Australian Universities. At inception, three cohorts (born 1921– 1926, 1945–1951, and 1973–1978) were randomly selected from the Australian National Health Insurance database and invited to participate in repeat self-report questionaries approximately every 3 years. This health insurance database covers all Australian citizens and permanent residents [11]. Following a nationwide publicity campaign, more than 100,000 women were sent an invitation to participate in the study along with a 24-page self-reported questionnaire and consent. The questionnaire included questions on multiple dimensions of physical and emotional health, socio-demographic status, health service use, lifestyle behaviours, life events, IPV, and other variables designed to provide a broad understanding of women's health. A free call number for inquiries was also available, and women could ring this number to indicate they did not wish to enrol in the study or to complete the survey via phone [11]. Using the Dilman method [12], one week after the initial contact, all women received a card thanking respondents who had completed the questionnaire and reminding those who had not yet responded. At week 3, a replacement package was sent to non-responders. With over 40,000 enrolled participants, the broadly representative sample of the ALSWH affords the opportunity to examine the health of Australian women across different age cohorts and over time [11].

The sample

The current study utilised the Cohort from the ALSWH comprising individuals born between 1973 and 1978. This cohort was selected due to the availability of longitudinal data across the reproductive life period. The cohort was Initially recruited and surveyed in 1996 aged 18–23 (Mean age 20.8 years, n = 14,247). Due to the variation in topics covered in each wave of the ALSWH, the current analysis utilized survey waves 1 (aged 18–23 years), wave 2 in 2000 (aged 22–27 years), and wave 4 in 2006 (aged 28–32 years). The analytic sample for this study was women who responded to at least two surveys across the three waves (n = 11,980). Enrolled women were invited to complete a survey reporting on various physical and emotional health items, social characteristics, health behaviours such as diet, preventive health and alcohol/substance use, reproductive and sexual health, and life events such as major illness and IPV.

Measures

Demographics: Items included age, relationship status and sexual orientation for example exclusively heterosexual, mainly heterosexual, bisexual and lesbian.

Partner violence: The IPV item "Have you ever been in a violent relationship with a partner/spouse?" was used to measure IPV exposure. A variable, "IPV exposure", was derived from the responses to this item for the three survey waves. Those women who responded "No" on each occasion were coded "None" (0). Those who responded "Yes" were recorded based on the timing of their first affirmative response. The decade IPV prevalence rate was determined by calculating the proportion of survey participants who answered positively to the question, relative to the total number of participants over the period. Consistency of self-report over time was not evaluated.

Forced sex: One item focused on recent sexual abuse. Participants were asked if they had been "forced into unwanted sexual activity" in "the last 12 months" and/or "More than 12 months ago". Positive responses to these questions were summed to create a new variable. Women who responded "No" on each occasion were coded "None" (0). Those who responded "Yes" were recorded based on the timing of their first affirmative response.

Reproductive outcomes: Reproductive outcomes encompassed the number of live births, miscarriages, terminations of pregnancy, abnormal Papanicolaou (Pap) tests, endometriosis, and infertility. The number of miscarriages and terminations was quantified using a value ranging from 0 to 5+, and responses were then recoded into a binary variable, with 1 indicating "Yes" and 0 indicating "No". For abnormal Pap tests, a yes or no response was provided to the question of ever having an abnormal Pap test and data were also coded into a binary variable. Responses to being asked if they had been diagnosed or treated for endometriosis in the last 4 years or more than 4 years ago, were combined into a single Yes/No variable noting that a question about a diagnosis of endometriosis was given only at Surveys 2 and 4. Fertility was assessed at survey 2 and 4 using a question that asked "Have you and your partner (current or previous) ever had problems with infertility (that is, tried unsuccessfully to get pregnant for 12 months or more", with several response options. These included "No, never tried to get pregnant" And "No problem with infertility". Two "Yes" options were also provided, related to whether or not the respondent had sought treatment. To create a binary variable, the two "No" responses were combined into one "No" response, and the two "Yes" responses were combined.

Sexual health outcomes: Items related to STIs varied across the three surveys. Specifically, survey 1 items addressed specific infections, such as "Have you ever been told by a doctor that you have Chlamydia?" To gain an overall STI result, responses for Chlamydia, Genital Warts, and Genital Herpes were combined. Any respondent endorsing any of these items was scored as having an STI; otherwise, they were scored as having no STI. For survey 2, the same questions were asked for both the previous four years and for more than four years ago. To maintain consistency with Survey 4, only data from the previous four years were included in the STI score, and responses for the three conditions were amalgamated as in Survey 1. Lastly, for survey 4 there was a single item, "In the past three years, have you been diagnosed or treated for a sexually transmitted infection?" without separate items for each condition and was used as the STI variable.

Data analysis

For each of the analyses, the effects of IPV on outcomes related to reproductive and sexual health were analysed over the three survey waves. Due to the binary nature of most of the variables, logistic regression analyses were conducted. Mixed effects regression models were fitted where possible to account for correlations due to repeated measures on the same individuals across the three surveys. For STIs and endometriosis in the regression model participant id (idalias) was the random effect. For some variables, the model failed to converge. In these situations, individual one-way analyses were conducted to test for differences between the levels of IPV (No IPV and IPV) at each survey time. Several of the variables were treated as counts (number of live births, miscarriages and terminations). For these, where possible, a negative binomial regression analysis was conducted. Lastly, for the examination of births, age was used as the exposure variable.

The effect of the predictor (IPV) on reproductive or sexual health outcomes was measured using Odds Ratios (OR). A higher odds ratio indicated a greater likelihood of the reproductive event of interest occurring based on IPV exposure. Graphs are presented as probabilities. Where the model did not converge, the coefficient used in these analyses is the Incidence Rate Ratio (IRR), which compares the incidence of an event (e.g., a birth) for women experiencing IPV to those who did not, and graphs are displayed as incidence rates (e.g., number of births/total for each condition combination).

Results

Demographic characteristics of the sample are reported in Table 1. The IPV prevalence ranged from 12.0 % – 14.3 %, with 85.6 % (n = 7,765) of women reporting no to the IPV question across all three waves. Of the women who answered the IPV question over the three surveys, 1707 reported IPV at least once. Consistent responses to the IPV question were given by 1408 women; 77 % of women who reported IPV at wave 1 provided subsequent consistent responses, whereas 74 % of women who first reported IPV at wave 2 subsequently provided a consistent response.

Reproductive and sexual health

Several reproductive and sexual health variables were included in the analysis. The frequency of exposure for each of the three survey waves is presented in Table 2. The effect of IPV exposure on each of these variables is detailed in the following sections. Fig. 1 illustrates these trends over time.

Forced sex in the last 12 months

Table 1
Demographics of participants over three study periods.

	Survey wave					
	1 Age 18–23		2 Age 22–27		4 Age 28–33	
Marital Status						
Married	1265	(8.9)				
Defacto	1928	(13.50)				
Separated	124	(0.9)				
Divorced	5	(0.0)				
Widowed	5	(0.0)				
Single	10,850	(76.2)				
Sexual Orientation						
Exclusively heterosexual	–	–	8531	(88.1)	–	–
Mainly heterosexual	–	–	579	(6.0)	–	–
Bisexual	–	–	70	(0.70	–	–
Mainly Lesbian	–	–	29	(0.3)	–	–
Exclusively Lesbian	–	–	57	(0.6)	–	–
I don't know	–	–	103	(1.1)	–	–
I don't want to answer	–	–	167	(1.7)	–	–
IPV exposure						
No	12,468	(88.0)	8443	(87.1)	7765	(84.9)
Yes	1704	(12.0)	987	(10.2)	1306	(14.3)

Table 2
Frequencies of responses to the three individual STIs and for the combined variable according to IPV exposure.

		Survey Wave		
		1 Age 18–23	2 Age 22–27	4 Age 28–33
Any STI	**IPV**	14,093	7,876	7,067
No	No	11,843 (88.8)	7368 (90.5)	7067 (85.9)
	Yes	1494 (11.2)	802 (9.5)	1157 (14.1)
Yes	No	557 (73.8)	717 (80.4)	236 (74.4)
	Yes	198 (26.2)	97 (19.1)	81 (26.6)
Chlamydia				
No	No	12,229 (98.5)	8131 (89.8)	–
	Yes	185 (1.5)	921 (10.2)	
Yes	No	1631 (96.2)	435 (95.6)	–
	Yes	64 (3.8)	20 (4.4)	–
Herpes				
No	No	12,304 (88.2)	8143 (89.9)	–
	Yes	1651 (11.8)	918 (10.1)	–
Yes	No	113 (72.0)	212 (78.2)	–
	Yes	44 (28.0)	59 (21.8)	–
Genital Warts				
No	No	12,103 (88.5)	7945 (90.5)	–
	Yes	1578 (11.5)	88 (10.0)	–
Yes	No	314 (72.7)	410 (80.9)	–
	Yes	118 (27.3)	97 (19.1)	–

The mixed effects logistic regression model showed a significant main effect of IPV (OR = 5.28, 95 %CI 4.44–6.28, $p < 0.001$) for the risk of experiencing forced sex in the previous 12 months, with the overall odds of experiencing forced sex increasing by 428 % for those also reporting experience of IPV.

Sexually transmitted infections

The number of women diagnosed with an STI according to IPV exposure for each wave of the survey is shown in Table 2. The report of IPV at either survey time increased the probability of reporting an STI. At survey 1 the probability of reporting an STI was almost three times higher (OR 2.82, 95 % CI 2.38–3.34, $p < 0.001$) for the IPV group than for those reporting no IPV. At Survey 4 the odds of reporting an STI was two times higher (OR 2.09, 95 %CI 1.62–2.72, $p < 0.001$) for the IPV group.

Endometriosis

A question about a diagnosis of endometriosis was given only at Surveys 2 and 4. The number of women diagnosed with endometriosis for each combination of Survey Number and IPV is shown in Table 3. These data were analysed using a mixed effects logistic regression model with participant ID as the random effect. A significant main effect of Survey 4 was obtained (OR = 0.55, 95 % CI inf, $p = 0.001$), and for IPV (OR = 2.03, 95 %CI inf, $p < 0.004$). Consequently, the probability of new reports of endometriosis decreased over time for women experiencing IPV and those who do not; however, regardless of the decrease, those reporting IPV at both survey times had a higher probability of having a recent diagnosis of endometriosis.

Number of live births

A negative binomial model was fitted to assess differences in incidence ratios of births for women who reported IPV at each survey, compared to those who did not. Using age as the exposure variable, there was a significant main effect of women reporting IPV having a larger number of births than women who did not report IPV ($\chi 2 = 138.6$, $p < 0.001$). There was also a significant interaction between survey time and IPV, with women reporting IPV having a higher incidence of births earlier, than those who did not report IPV. This is shown in Fig. 1. The incidence rate of live births was 3.21 times higher for women who reported IPV at Survey 1 than those who did not.

Reproductive outcome variables

The frequency of exposure for each of four reproductive outcome variables for the three survey waves is presented in Table 3. The effect of IPV exposure on each of these variables is detailed. Fig. 2 illustrates

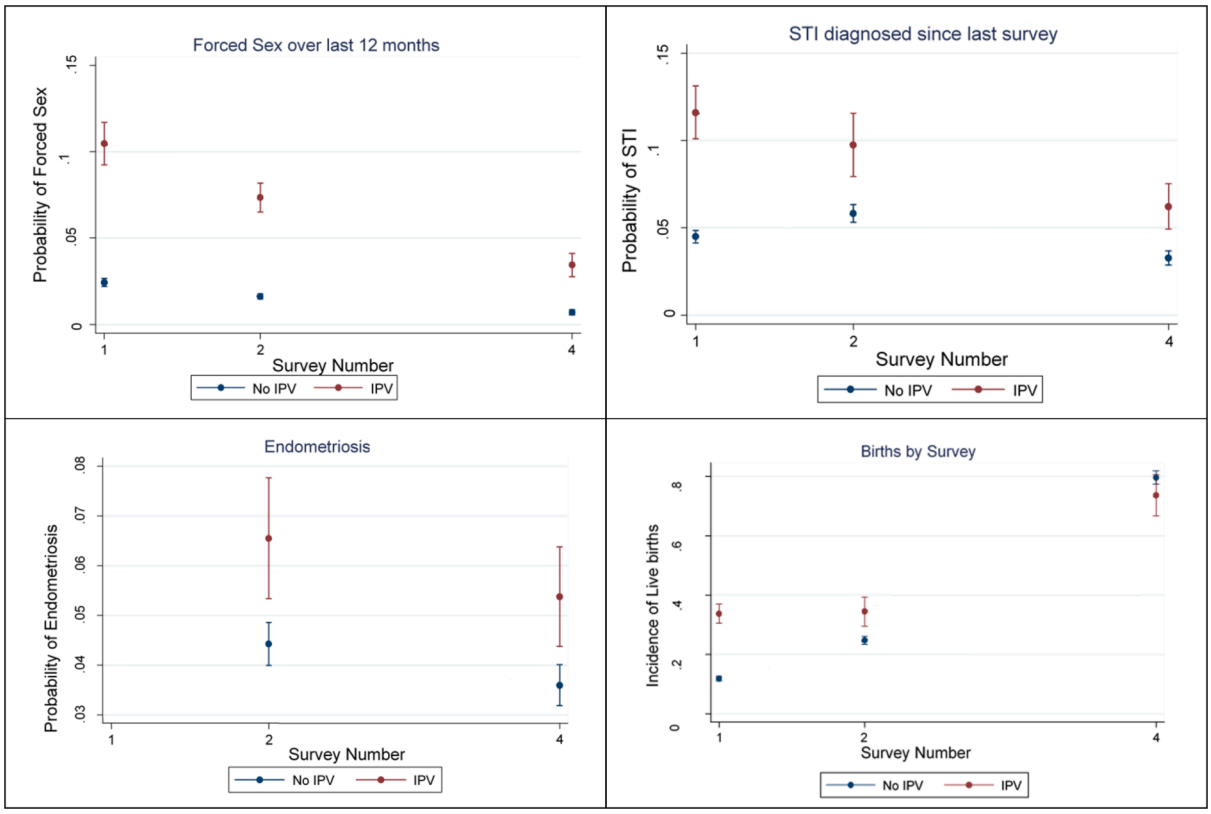

Fig. 1. Incidents and probability of reproductive outcomes across survey collection times.

these trends over time.

Miscarriage

A Mixed effects Negative Binomial regression model could not be accurately fitted to the data due to a failure to converge. To compare the incidences of miscarriages at each survey, separate negative binomial regression analyses were conducted at each. There was a significant effect of IPV for Survey 1 (IRR = 5.20, $p < 0.001$), Survey 2 (IRR = 2.80, $p < 0.001$) and Survey 4 (IRR = 1.66, $p < 0.001$). At wave 1, the incidence of miscarriage was 5.2 times higher among women reporting IPV than for the women who did not report IPV. Reducing to 2.5 times as wave 2, and 1.6 at wave 3.

Terminations.

As for miscarriages, a Negative Binomial regression model could not be accurately fitted to the data. Consequently, separate Negative Binomial regression analyses were conducted at survey time. There was a significant effect of IPV for Survey 1 (IRR = 3.307, $p < 0.001$), Survey 2 (IRR = 2.51, $p < 0.001$) and for Survey 4 (IRR = 2.15, $p < 0.001$). Fig. 2 shows the incidence of terminations in the two groups of women over the 3 survey waves. As observed in the figure, the incidence of terminations is 3.31 times higher at Survey 4, for the women reporting IPV than for the women who did not report IPV.

Abnormal Pap test

The question for this item was, "Have you ever had an abnormal Pap test?" Unsurprisingly the number of women responding "yes" increased over the three survey times. The mixed effects logistic model indicated that there was a significant main effect of survey 4 (OR = 2.81, 95 %CI, 2.19–3.56, $p < 0.001$). There was also a significant main effect of IPV (OR = 4.00, 95 %CI 3.34–4.96, $p < 0.001$), with the odds of a report of an abnormal pap test being 300 % higher for women who reported IPV overall. There was also a significant interaction. As shown in Fig. 2, the probability of having an abnormal pap test was higher for women with IPV at the time of survey 1 than it was at the time of survey 4.

Infertility

Table 3 shows the number of women in each condition who responded "Yes" or "No". The mixed effects logistic regression failed to converge. The effects of IPV on fertility were therefore tested at each of Surveys 2 and 4. There was a significant effect of IPV on fertility at Survey 2 (OR = 3.40, 95 %CI 2.64–4.39, $p < 0.001$), and at Survey 4 (OR = 1.25, 95 %CI 1.05–1.50p = 0.011). There was an increase in the probability of endorsing the "Yes" infertility option from Survey 2 to Survey 4, but the effect of IPV was lower at Survey 4 than at Survey 2.

Discussion

This study contributes to the limited body of longitudinal research examining the relationship between IPV and sexual and reproductive health outcomes among women. Consistent with previous studies that indicated women experiencing IPV or forced sex may have a diminished capacity to engage in safer sex practices due to unequal power dynamics that exist within IPV [13], these findings reveal that women reporting IPV have a significantly higher likelihood of reporting any STI. Notably, a greater proportion of these women report STIs such as chlamydia, herpes, and genital warts, along with higher incidences of abnormal Pap tests. These findings support previous research that indicates women who experienced reduced autonomy within the context of sexual violence and rape are afforded little protection from unwanted sexual outcomes including STIs placing them at great risk of experiencing sexual health adversity [13]. Importantly, our findings demonstrate that over time, there is little change in the prevalence of STIs among women reporting IPV, which underscoring the persistent nature of this health burden [14,15]. These results support the hypothesis that exposure to IPV increases the risk of adverse sexual and reproductive health outcomes, with these effects enduring over the long-term.

Further supporting evidence indicates that awareness of IPV in healthcare settings has not significantly improved the sexual health outcomes of women experiencing IPV [16,17]. The results underscore the critical need to enhance accessibility and access to STI testing and treatment for women experiencing IPV, given their limited choices

Table 3
Frequencies of responses to reproductive outcome variables according to IPV exposure.

	Survey Wave					
	1 (Age 18–23)		2 Aged (22–27)		4 (Age 28–33)	
Number of miscarriages	13,997		9,406		9,042	
None No IPV	12,009	(85.8)	7,943	(84.4)	6,529	(72.2)
IPV	1,430	(10.2)	796	(8.5)	896	(9.9)
One No IPV	295	(2.1)	391	(4.2)	920	(10.2)
IPV	163	(1.2)	135	(1.4)	264	(2.9)
Two No IPV	36	(0.3)	62	(0.7)	205	(2.3)
IPV	38	(0.3)	34	(0.4)	86	(1.0)
Three No IPV	9	(0.1)	11	(0.1)	49	(0.5)
IPV	10	(0.1)	10	(0.1)	31	(0.3)
Four or more No IPV	3	(0.0)	14	(0.1)	38	(0.4)
IPV	3	(0.0)	8	(0.1)	20	(0.2)
Number of terminations	13,990		9,404		9,003	
None No IPV	11,646	(83.2)	7,623	(81.0)	6,598	(73.0)
IPV	1,355	(9.7)	711	(7.6)	833	(9.2)
One No IPV	623	(4.5)	647	(6.9)	855	(9.5)
IPV	246	(1.8)	201	(2.1)	284	(3.1)
Two No IPV	66	(0.5)	114	(1.2)	195	(2.2)
IPV	34	(0.2)	55	(0.6)	115	(1.3)
Three No IPV	10	(0.1)	29	(0.3)	42	(0.5)
IPV	8	(0.1)	9	(0.1)	36	(0.4)
Four or more No IPV	0	(0.0)	8	(0.1)	24	(0.3)
IPV	2	(0.0)	7	(0.1)	21	(0.2)
Abnormal Pap test	14,096		9,337		8,457	
No No IPV	11,387	(80.8)	6,843	(73.3)	5,081	(60.1)
IPV	1,346	(9.5)	667	(7.1)	702	(8.3)
Yes No IPV	1,027	(7.3)	1,509	(16.2)	2,091	(24.7)
IPV	335	(2.4)	316	(3.4)	579	(6.8)
Infertility			9,188		9,049	
No No IPV	–		7,982	(86.9)	6,918	(76.5)
IPV	–		882	(9.6)	1,130	(12.5)
Yes No IPV	–		234	(2.5)	827	(9.1)
IPV	–		88	(1.0)	170	(1.9)
Endometriosis			9,334		8,545	
No	No IPV	–	7,992	(85.6)	7,037	(82.3)
	IPV	–	907	(9.7)	1,176	(13.7)
Yes	No IPV	–	363	(3.9)	266	(3.1)
	IPV	–	70	(0.8)	62	(0.9)
Forced sex No	14,126		9,412		8,972	
No IPV	12,096	(88.9)	8344	(85.8)	7609	(85.9)
IPV	1506	(11.1)	929	(14.2)	1239	(14.1)
Yes						
No IPV	332	(63.5)	91	(61.9)	68	(0.8)
IPV	191	(36.5)	56	(38.1)	8972	(99.2)

around safer sex practices and the increased barriers they face in accessing healthcare [18]. Early STI testing, treatment and interventions among women experiencing IPV may have a long-term impact on improving STI and sexual health outcomes [19].

The current study indicates exposure to IPV increases the likelihood of reporting forced sex, endometriosis, infertility, pregnancy termination, and miscarriage, with risk of infertility, termination, and miscarriage increasing with greater exposure to IPV. The association between IPV and pregnancy termination supports existing evidence linking IPV to pregnancy termination, miscarriages, and abortions [20,21]. These findings also support the hypothesis that sexual health and reproductive outcomes are poorer among women experiencing continued IPV exposure, which aligns with previous studies [17,22]. Further, these findings are particularly salient considering the health burden of persistent IPV exposure is substantial, with women reporting out-of-hospital healthcare costs that are 20 %-40 % higher than those of non-exposed women [23].

In the current study, women who reported IPV were more likely to have larger number of births compared to women who did not report IPV, with women who reported IPV having a higher incidence of births earlier than those who did not report IPV. This finding is suggested to be associated with limited access to family planning services, coercive control, and reduced autonomy that exist within IPV relationships inclusive of experiences of forced sex. It has been postulated that IPV leads to unintended and early pregnancies due to forced sexual activity and lack of negotiation power regarding the timing and spacing of children [24].

It may be suggested that recognizing women with earlier timing and short spacing of children may be high risk IPV candidates, which may trigger further assessment or detection among healthcare professionals. Given pregnancy may be the only time where women have access to or have the ability to engage with healthcare services, it is a critical for health professionals to screen for IPV, particularly as IPV has a propensity to escalate throughout the ante- and post-natal period [25]. Addressing IPV and providing comprehensive support services remain essential in improving the overall reproductive health and autonomy of women impacted by IPV [26].

Literature has suggested that healthcare professionals often lack awareness regarding IPV impacting on an increased risk of STIs [27]. This gap in knowledge underscores the need to enhance clinicians' understanding of the intricate relationship between IPV and STIs. Improving their readiness to inquire about both IPV and STIs is crucial for addressing the persistent harms identified in current research [28]. To effectively mitigate these issues, it is vital for healthcare professionals to receive comprehensive training and organisational support. Educational programs should be implemented to provide the necessary skills and knowledge to identify and manage cases of IPV and associated health risks. These programs should emphasise the importance of sensitive and non-judgmental inquiry about IPV and sexual and reproductive health ensuring that healthcare professionals are well-prepared to address these issues in their practice [25,29].

Limitations

This study has several limitations. Whilst the data from the ALSWH survey is a national population survey, the data is based on self-reporting, which can lead to non-disclosure, particularly associated with sensitive questions, and is also subject to recall bias. The reliance on self-reported data for IPV and forced sex may lead to underreporting due to the sensitive nature of these topics, resulting in an underestimation of their true prevalence and impact on reproductive and sexual health outcomes. Further, a major limitation is the single item used to assess IPV, likely leading to under-reporting compared to more comprehensive assessments. We note that it is now considered best practice to employ multi-item measures such as the Composite Abuse Scale (CIS) to capture the nuances of IPV and reduce non-disclosure [30]. Additionally, the consistency of self-reported IPV exposure over time was not evaluated, given the data was from ALSWH and not collected by the authors. This limitation constrains the ability to determine the longevity of violence exposure and may introduce potential false positives if participants subsequently changed their reporting over time. It is also not possible to distinguish any change in a partner as a feature of variation in IPV reporting over time. The assessment of STIs also varied across the three surveys, affecting the comparability of STI data. Although the ALSWH survey is national, the findings may not be generalisable to all Australian women, particularly those from diverse cultural backgrounds.

The smaller sample sizes for subgroups like bisexual and lesbian women reduced the power for comparison of STI exposure and the relationship between IPV and sexual and reproductive health outcomes across sexual orientations, preventing discrete analysis for these groups. Lastly, the study did not verify health outcomes through clinical assessment or medical records, limiting the accuracy of the reported data, along with the reliance on unadjusted analysis without accounting for potential confounders, such as age, may introduce bias. However, this study has a number of strengths including the use of a national

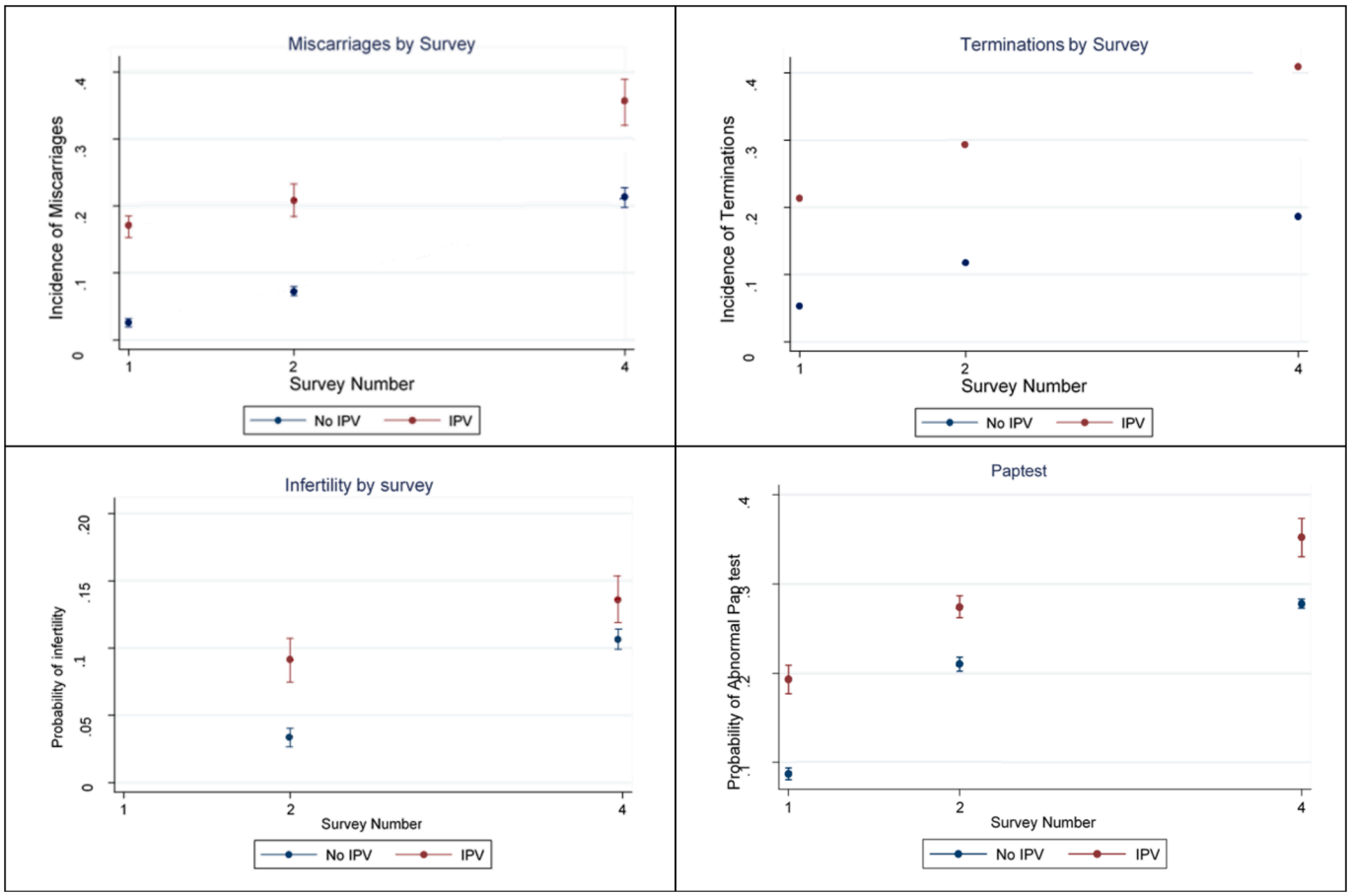

Fig. 2. Incidents and probability of reproductive outcomes across survey collection times.

sample which is documented to be representative of an Australian sample [10] enhancing generalisability. The longitudinal examination of the data that at present is limited, and results that indicate the long-term sexual and reproductive sequalae experienced by women exposed to IPV among an Australian cohort is also considered a strength.

Conclusion

IPV has a significant impact on women's sexual and reproductive health outcomes. Findings from this study indicate that ongoing IPV exposure increases the sexual and reproductive outcomes specifically STI acquisition, pregnancy termination, miscarriage, and endometriosis. To address the global issue of IPV healthcare organisations must offer robust support, including clear guidelines and protocols for managing IPV and their associated health risks among women, which should extend to providing access to resources and referral systems for women identified as experiencing IPV. Interdisciplinary collaboration among healthcare providers and related services are also essential to create a holistic approach to managing IPV and its health consequences to promote positive sexual and reproductive health outcomes for women.

CRediT authorship contribution statement

Leah East: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Daniel Terry:** Writing – review & editing, Writing – original draft, Formal analysis. **Bianca Viljoen:** Writing – review & editing, Writing – original draft. **Marie Hutchinson:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization.

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