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Landscaping the evidence of intimate partner violence and postpartum depression: a systematic review

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ABSTRACT

Objective To assess the evidence of the association between exposure to intimate partner violence (IPV) and postpartum depression. IPV during pregnancy can have immediate and long-term physical and mental health consequences for the family. Therefore, it has been hypothesised that IPV may affect the risk of developing postpartum depression.

Methods A systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. PubMed, Embase, Global Health Library, Scopus and Google scholar were searched for published studies without restrictions on language, time or study design (up to May 2020). Studies were included if they assessed postpartum depression using the Edinburg Postnatal Depression Scale (cut-off≥10), among women who had been exposed to IPV (emotional, physical and/or sexual abuse). The quality of studies was judged according to the Newcastle-Ottawa scale.

Results A total of 33 studies were included in the review (participants n=131 131). The majority of studies found an association between exposure to IPV and the development of signs of postpartum depression. Overall, studies measured both exposure and outcome in various ways and controlled for a vast number of different confounders. Thirty percent of the studies were set in low-income and lower-middle-income countries while the rest were set in upper-middle-income and high-income countries and the association did not differ across settings. Among the studies reporting adjusted OR (aOR) (n=26), the significant aOR ranged between 1.18 and 6.87 (95% CI 1.12 to 11.78). The majority of the studies were judged as 'good quality' (n=20/33).

Conclusion We found evidence of an association between exposure to IPV and the development of signs of postpartum depression. Meta-analysis or individual patient data meta-analysis is required to quantify the magnitude of the association between IPV and postpartum depression.

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STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Our review used a uniform definition of postpartum depression (Edinburgh Postnatal Depression Scale ≥10), allowing for a meaningful comparison across trials.
⇒ We conducted an appropriate quality assessment of all included studies using the Newcastle-Ottawa scale.
⇒ A limitation is the lack of a strictly uniform method for detection of intimate partner violence and postpartum depression, which make data in the field very heterogeneous.
⇒ Another limitation is the broad range of confounders adjusted for in the 33 studies, which may limit meaningful comparison and affect the association between postpartum depression and intimate partner violence.

INTRODUCTION

Intimate partner violence (IPV)—also known as domestic violence—is defined as any behaviour by a current or former partner that causes physical, emotional or sexual harm.[1] Women are most often the victims of IPV,[2–4] and it is a global health issue, which affects one in three women during their lifetime, according to The WHO.[1]

IPV has several immediate and long-term mental and physical health consequences for the victims, such as depression and physical impairment.[5–7] Further, IPV is adversely associated with several obstetric outcomes, including preterm birth, low birth weight and miscarriage.[8–10] It may also have a negative effect on a child's development, for example, delayed cognitive and language development, problems with emotional attachment and behaviour problems.[11 12] However, the biochemical and psychological pathway between IPV and health is complex, and numerous factors influence this association, including sociodemographic and economic factors.[13]

Studies provide varied and imprecise estimates when examining the association between IPV and postpartum depression (PPD).[14–17] As an example Tho Tran *et al* found no association between exposure of physical IPV and PPD (adjusted OR, aOR

0.64; 95% CI 0.30 to 1.35),[18] while Chaves *et al* reported a significant association between physical IPV and PPD (aOR 2.53; 95% CI 1.76 to 3.63).[17] These diverse findings may be due to complexities in both the case definition of IPV, which ranges from physical, emotional and sexual harm, and PPD, which is diagnosed according to different measurement scales. The Edinburgh Postnatal Depression Scale (EPDS) is a well-known and validated tool for the measurement of PPD, and it is based on a 10-item questionnaire with four response categories ranging from zero to three. Even though it is a validated tool for PPD, it is applied in different ways across studies and countries. The EPDS has been validated in at least 37 languages[19] and studies from different countries have found different cut-off values, for example, 7 in Lithuania[20] and 13 in the English language version.[21] The many different validated cut-off values may be explained by different cultures and different expressions of mental difficulties. Previous reviews have aimed to provide an overview of the evidence between IPV and PPD.[5 22 23] However, we assess the methodologic quality of these reviews to be low according to the 'A MeaSurement Tool to Assess systematic Review'[24] as most reviews did not adhere to key domains of review quality, that is, following a prospectively specified or registered protocol, performing a comprehensive search by exploring more than three databases, performing searches without language restrictions, undertaking duplicate study selection or considering the quality of included studies. Hence, there is a need for a systematic review of the latest evidence of the field across countries and economic conditions. The aim of this systematic review was to landscape the evidence of IPV and PPD in both high-income countries and low-income countries and synthesise the evidence taking confounders and quality into consideration.

METHODS

We conducted a protocol-driven systematic review, which is reported according to the 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) guidelines online supplemental appendix I.

Search strategy and selection criteria

We searched PubMed, Embase, SCOPUS, Global Health Library, and Google scholar without any restrictions on language, study design or time from 27 April 2020 to 10 May 2020. The search strategy was developed in collaboration with a librarian from the University of Southern Denmark. A comprehensive search, using search terms such as "pregnancy" OR "mother" OR "maternal" AND "intimate partner violence" OR "gender-based violence" OR "domestic violence" AND "mental health" OR "postpartum depression" (online supplemental appendix II).

We included original publications with women exposed to IPV compared with non-exposed women that reported outcomes on PPD. We only included studies, which reported risk ratios (RR) or OR. We defined IPV in accordance with the WHO definition, that is, any behaviour an intimate partner can cause; physical harm (eg, slapping, hitting, kicking and beating), emotional harm (eg, controlling behaviours, monitoring their movements, insults, belittling, constant humiliation, intimidation) or sexual harm (eg, forced sexual intercourse and other forms of sexual coercion). We included studies with women who had ever been exposed to IPV by a current partner or former partner during index pregnancy or in the postpartum period. To increase the homogeneity of the outcome, we only included studies using the EPDS with a cut-off threshold of 10 or above as a measurement of PPD as this has shown to be a reliable and valid cut-off for PPD.[19]

The postpartum period was defined as >1 week to 12 months post partum. Studies were excluded if the postpartum population was restricted to a subgroup, for example, mothers with HIV or mothers who had newborns that were ill. Additionally, we excluded case reports, case series, conference abstracts and reviews.

Studies were selected in a two-stage process using Covidence.[25] First, two authors (LBSA and SNL) independently screened titles and abstracts to identify eligible studies. Second, eligible studies were independently full text screened by two authors (LBSA and SNL). Disagreements were resolved after discussion and if an agreement was not reached a third author was consulted (DSL or AKN). One author (LBSA) extracted data from the included studies into a standardised Excel temple. Data extraction included: title, first author, publication year, country, journal name, study quality, area of health, number of participants, population, risk factors in the population, age, setting and site, economic status of country, inclusion criteria, exclusion criteria, time for exposure, time for IPV screening, time for measure PPD, abuse tool, EPDS cut-off, the prevalence of IPV and/or prevalence of PPD among the IPV exposed women, type of IPV, confounders adjusted for, as well as primary and secondary outcomes. Outcome data were verified by a second author (AKN) and disagreements were resolved through discussions.

Quality assessment

The methodological quality of included studies was assessed using the Newcastle-Ottawa Scale (NOS) for cohort studies[26] and a modified version of NOS for cross-sectional studies. Two authors independently assessed the quality (LBSA and KA) and judged the following domains: selection process, comparability and outcome. Item number one within the outcome domain, 'Assessment of outcome' was not judged as the diagnosis of PPD is always self-reported and cannot be measured by medical records or independent blind assessment. According to the NOS scoring system[27 28] cohort studies that scored three or four stars in the selection, one or two in comparability, and two or three stars in the ascertainment of the outcome were regarded to be of 'good quality'. Further, cohort studies that scored two or three

in the selection, one in the comparability, and two stars in the outcome ascertainment were considered to be of 'fair quality'. Finally, cohort studies that scored one star in selection or outcome ascertainment or scored zero stars in any of the three domains were judged to have 'low quality'. According to the NOS guidelines for cross-sectional studies, studies were regarded as 'good quality' if rewarded ≥seven stars; 'fair/satisfactory' if rewarded five to six stars, and 'poor/unsatisfactory' if rewarded zero to four stars.

Data synthesis

In the descriptive analysis, we summarised study findings according to the economic status of the country where the study had been conducted. We defined the economic status according to The World Bank using the gross national income (GNI) of the country in 2019, that is, low-income economies are those with a GNI per capital of US$1035 or less; lower-middle economies are those with a GNI per capital between US$1036–US$4045; upper-middle-income economies are those with a GNI per capital between US$4046 and US$12 535, and high-income economies are those with a GNI per capital of US$12 536 or more.[29] We further categorised the countries in 'low-income and lower-middle-income countries' (LMICs) and 'high and upper-middle-income countries' (HMICs).

Confounders were categorised within the following ten domains: maternal sociodemographic, childbirth-related, child-related, economic, family-related, maternal-mental health, maternal physical health, partner-related factors, type of violence and pregnancy related. In tables 1 and 2, the domains are listed for each study and the number of confounders reported for each domain is listed as 'n=x'. In table 3, the specific confounders for each domain are clustered for the LMIC and HMIC countries.

To create a stringent and more homogenised overview of the association between IPV and PPD, we highlighted results that were reported as either aOR or aRR. These results were summarised in a forest plot according to the results of any IPV, physical IPV and emotional IPV with descending quality in the vertical axis. If studies reported more than one type of IPV, results for 'any IPV' was included in the forest plot. If studies did not report 'any IPV', the results reported in the forest plot were prioritised as follows: physical IPV, emotional IPV or sexual IPV. The results of all the cross-sectional studies and cohort studies of both HMIC and LMIC reporting OR or RR were all reported in tables 1 and 2, respectively.

Patient and public involvement

No patients involved.

RESULTS

A total of 3097 citations were imported for screening, 286 duplicates were removed and 2811 studies were title-abstract screened. A total of 2411 studies were found irrelevant based on title or abstract, while 400 studies were full-text screened. The majority of the studies were excluded due to wrong outcomes, for example, antepartum depression or wrong exposure, for example, violence from a family member or stranger. Finally, 33 studies—13 were cross-sectional and 20 cohort studies—were found eligible to be included in the review (figures 1 and 2). Among the cross-sectional studies, 8 were set in HMIC[14 15 30–35] and 5 in LMIC[36–40] while 15 were set in HMIC[17 41–54] and 5 in LMIC,[6 7 18 55 56] among the cohort studies. Among the HMIC, most studies were set in Canada (n=4),[14 31 42 46] Australia (n=3)[17 45 50] and the USA (n=2)[41 52] while the most frequent LMIC countries were Ethiopia (n=3),[36 38 40] Bangladesh (n=2)[37 39] and Vietnam (n=2).[6 18] A total of 131 131 women were included in the studies, and the sample size varied from 72[55] to 52 509 women[17] (median: 1128). Population age was either reported as mean age, in interval categories or as a range. The mean ages ranged from 24.6 to 29.6 years in LMIC and 25.0–34.5 in HMIC.

Tools to measure the exposure, IPV, varied among the studies. Most of the studies (n=20) used well-known and/or validated IPV screening tools, such as the Abuse Assessment Screen (n=5),[17 32 40 43 49] the Composite Abuse Scale (n=1),[50] the Severity of Violence Against Women Scale (n=1),[54] the Conflict Tactics Scale (n=2),[15 33] Hurt, Insult, Threaten, Scream tool (n=2),[41 52] Index of Spouse Abuse (n=1),[34] Violence Against Women Survey (n=1),[31] Antenatal Psychosocial Health Assessment (n=1),[42] NSW routine Domestic Violence Screening (n=1)[45] or WHO questionnaire based on the domestic violence module in the WHO Multicountry Study on Women's Health and Life Events (n=6).[6 18 35 37 39 47] While the 12 studies used unspecified questionnaire tools.[7 14 30 36 38 44 46 48 51 53 55 56]

Overall, studies reported IPV in various ways; 16 studies measured 'any IPV', defined as women exposed to at least one type of IPV (physical, emotional, sexual)[14 30 31 36 38 40 41 44 46 48 51–54 56 57] while 10 studies reported exposure to separate types of IPV, that is, either physical, emotional and/or sexual violence.[6 17 18 32 33 42 43 45 50 55] Further, seven studies reported both an outcome for 'any IPV' and separate IPV types.[7 15 34 35 37 47 49] The primary outcome, PPD, was diagnosed using EPDS, diagnosed at a cut-off threshold of 10 or above, and the majority of the studies used EPDS with a cut-off at ≥13.[7 14 15 17 30 31 38 40 42 44 45 49 50 52 53 55] Additionally, nine studies used a cut-off ≥10,[6 6 8 32 36 37 39 41 46 54] two studies used cut-off ≥11[43 56] and six studies used cut-off ≥12.[33–35 47 48 51]

Overall, the 33 studies adjusted for 48 different confounders. Both LMICs and HMICs were represented in the ten confounder domains where the confounders are clustered (table 3).

Study quality

Figure 2 sums up the study quality of the 20 HMIC and LMIC cohort studies according to the NOS. The first line represents how many studies were judged with an overall good or fair/poor quality and the following lines

Table 1 Overview of cohort studies on post-partum depression among IPV victims set in upper-middle and high-income countries

Author, year	Country	Study size	Mean age (cat./ range)	Time of exposure	Measurement of postpartum depression	EDPS cut-off point	Confounders adjusted for (n=no of factors)*	Risk of PPD (95% CI)	Subgroup analysis, risk of PPD	Prevalence of IPV (prevalence of PPD among IPV exposed)†	NOS score
Cohort studies											
Adynski[41] 2019	USA	2510	25.6	Lifetime	1 months, 6 months, 12 months, 18 months, 24 months	≥10	Economic factors (n=5); Maternal sociodemographic (n=2)	aORanyIPV: 1.18 (1.12 to 1.25)			Good
Chaves[17] 2019	Australia	52 509	(<20, 20–39, >40)	<12 months	<6 weeks	≥13	Birth-related (n=1); Economic factors (n=1); Maternal physical health (n=4); Maternal mental health (n=1); Maternal sociodemographic (n=2)	aORphyIPV: 2.53 (1.76 to 3.63)	aORfearIPV: 3.53 (2.50–5.00)	phyIPV: 1.8%, fearIPV: 1.4%(phyIPV: 6.9%, fearIPV: 9.4%)	Good
Dennis[42] 2013	Canada	634	28.5	Lifetime, current	8 weeks	≥13	Unadjusted	cORphyIPV: 2.59 (1.21 to 5.53) cORsexIPV: 2.23 (1.28 to 3.89)	cORemo/humIPV: 2.46 (1.37–4.42) cORemo/fearIPV: 3.21 (1.74–5.90)	phyIPV: 7.7 %	Poor
Escribá-Agüir[43] 2013	Spain	140	(<27, 27–34, >34)	Lifetime,<12 months	5 months, 12 months	≥11	Economic factors (n=2); Maternal mental physical health (n=1); Maternal sociodemographic (n=2)	aORemoIPV: 4.11 (1.23 to 13.73)		anyIPV: 11% emoIPV <12 months: 1.7% (emo: 54.1%)	Good
Flach[44] 2011	UK	13 617	27	Antenatal	2 months, 8 months, 21 months, 33 months	≥13	Birth-related (n=1); Child-related (n=1); Economic factors (n=2); Maternal physical health (n=2); Maternal mental health (n=1); Maternal sociodemographic (n=1)	aORanyIPV: 1.29 (1.02 to 1.63)		emoIPV: 6% phyIPV: 2% emo/phyIPV: 7%	Good
Gaillard[48] 2014	France	264		Lifetime	6–8 weeks	≥12	Unadjusted	cORany: 3.0 (1.1 to 8.6)			Fair
Ludermir[47] 2010	Brazil	1045	(18–24,≥25)	Antenatal	3–6 months	≥12	Economic factors (n=2); IPV-type (n=1); Partner related (n=1); Maternal sociodemographic (n=3); Maternal mental health (n=2); Length of follow-up (n=1)	aORanyIPV: 1.76 (1.05 to 2.93) aORemoIPV: 1.58 (1.04 to 2.39) aORphyIPV: 0.91 (0.54 to 1.54) aORphy/sexIPV: 0.77 (0.27 to 2.14)	aORemo,serIPV: 2.29 (1.15–4.57) aORemo,modIPV: 1.40 (0.88–2.22)	emoIPV: 28.1% phyIPV: 11.8% sexIPV: 5.7% (phyIPV: 48 %)	Good
Malta[46] 2012	Canada	1319	(<25, 25–34, 35+)	Lifetime	8 weeks	≥10	Economic factors (n=1); Maternal sociodemographic (n=2); Maternal mental health (n=4)	aORany: 1.66 (0.95 to 2.90)		anyIPV:(22%)	Good
Ogbo[45] 2018	Australia	17 564	(<20, 20–34, >35)	<12 months	<6 months	≥13	Birth-related (n=1); Economic factors (n=1); IPV type (n=1); Partner related (n=1); Maternal sociodemographic (n=2); Maternal mental health (n=1); Maternal physical health(n=1)	aORphyIPV: 1.50 (1.30 to 1.70)	aORemoIPV: 4.60 (4.10–5.10)	anyIPV:(8%)	Good
Shwartz[54] 2019	Israel	1128	(16–45)	Lifetime	6 weeks to 6 months	≥10	Economic factors (n=3); Maternal mental health (n=2); Maternal sociodemographic (n=1); Wanted/unwanted pregnancy (n=1)	aORanyIPV: 1.58 (1.07 to 2.33)		anyIPV: 35.7%	Good
Tsai[53] 2016	South Africa	1238	(≥18)	≤12 months	0–2 months	≥13	Time-fixed and time-variable covariates (n=1)	aORanyIPV: 1.26 (1.13 to 1.40)			Good
Velonis[52] 2017	USA	2018	(18–40)	≤12 months	A few weeks (T1), 12 months	≥13	Economic factors (n=1); Maternal sociodemographic (n=1); Maternal mental health (n=1)	aORanyIPV: 2.06 (1.21 to 3.53)		anyIPV: 35.8%(10.4%)	Good

Continued

Table 1 Continued

Author, year	Country	Study size	Mean age (cat./ range)	Time of exposure	Measurement of postpartum depression	EDPS cut-off point	Confounders adjusted for (n=no of factors)*	Risk of PPD (95% CI)	Subgroup analysis, risk of PPD	Prevalence of IPV (prevalence of PPD among IPV exposed)†	NOS score
Wikman[51] 2019	Sweden	2466	(≥18)	–	6 weeks, 6 months	≥12	Unadjusted	cORanyIPV: 3.6 (2.40 to 5.50)‡	6 m PP cORanyIPV: 3.70 (2.10–6.30)	anyIPV: 4.1%	Poor
Woolhouse[50] 2011	Australia	1305	30.9	≤12 months	3 months, 6 months, 12 months	≥13	Economic factors (n=1); Maternal sociodemographic (n=2); Maternal mental health (n=1)	aORphyIPV: 3.94 (2.44 to 6.36) aORemoIPV: 2.72 (1.72 to 4.13)		anyIPV: 16.6%	Good
Zhang[49] 2011	China	215	28	<12 months prepregnancy	30–42 days	≥13	Economic factors (n=2)	aORanyIPV: 6.87 (4.01 to 11.78) aORemoIPV: 4.03 (1.70 to 9.62)		anyIPV: 11.3%(25%)	Fair
Cross-sectional studies											
Afshari[30] 2019	Republic of Iran	505	–	Antenatal	14 days to 6 months	≥13	Birth-related (n=1); Child-related (n=1); Economic factors (n=2); Maternal mental health (n=3); Partner-related (n=1); Pregnancy-related (n=1)	aORanyIPV: 1.49 (0.49 to 4.59)		anyIPV:(74%)	Poor
Ahmad[35] 2018	Malaysia	5727	(Cat.: 18–25,25-30,30–34,>35)	Lifetime	6–16 weeks	≥12	Economic factors (n=3); Family-related (n=1); Maternal sociodemographic (n=1); Partner-related (n=1); Pregnancy-related (n=1)	aORanyIPV: 2.34 (1.12 to 4.87) aORemoIPV: 3.79 (1.93 to 7.45)		phy: 2.6% emo: 3.7% sex: 1.2% anyIPV: 3,3%	Good
Beydoun[14] 2010	Canada	6421	(15–40)	<2 years	5–9 months	≥13	Birth-related (n=1); Economic factors (n=2); Maternal sociodemographic (n=3); Maternal physical health (n=1); Pregnancy-related (n=4); Maternal mental health (n=1); Type of violence ((n=2)	aORanyIPV: 1.61 (1.06 to 2.45)		anyIPV: 5.7((18)	Fair
deCastro[34] 2014	Mexico	604	25	Antenatal	<9 months	≥12	Economic factors (n=1); Maternal mental health (n=1); Pregnancy-related (n=1)		aORany,sev.: 3,9 (1.5–10.5) aORany,mod.: 1.2 (0.6–2.8)	(phy: 24.6%, emo: 13.1%, sex: 6.6%)	Good
Gao[15] 2010	New Zealand	1085	(cat.<20, 20–29, 30–39,<40)	<12 months	6 weeks	≥13	Child-related (n=1); Economic factors (n=4); Maternal sociodemographic (n=1); Partner-related (n=1); Pregnancy-related (n=2)	aORphyIPV: 2.34 (1.52 to 3.60)	aORmin.: 2.00 (1.17–3.42) aORsev.: 2.80 (1.61–4.86)	(IPVsev.: 35.8%, IPVminor: 23.9 %)	Fair
Lobato[33] 2012	Brazil	811	(Cat.<20, 20–35>35)	Antenatal	5 months	≥12	Birth-related (n=1); Economic-factors (n=1); Maternal sociodemographic (n=1); Maternal mental health (n=1), Pregnancy-related (n=1)		aORoneevent: 2.47 (1.31–4.66) aORtwo/ morevents: 1.66 (1.00–2.75)	37.80%	Fair
Tiwari[32] 2007	Hong Kong	3245	(≥18)	≤12 months	1 week	≥10	Family-related (n=1); Maternal sociodemographic (n=1); Economic factors (n=1)	aORphy/sex: 1.75 (0.84 to 3.66) aORemoIPV: 1.84 (1.12 to 3.02)		9.10%	Fair
Urquia[31] 2011	Canada	6421	(≥15)	≤2 years		≥13	Economic factors (n=1); Maternal sociodemographic (n=3)	aORanyIPV: 4.30 (2.10 to 8.70)	aORanyIPV,AN: 3.80 (2.20–6.70)	anyIPV: 10.9% anyIPV,AN: 3.3%	Fair

*Confounder domains adjusted for in the studies. The clustering is shown in table 3.
†The prevalence of PPD among the IPV exposed women.
‡Two months post partum.
AN, antenatal; aOR, adjusted OR; EDPS, Edinburgh Postnatal Depression Scale; emo.cont., emotional IPV, controlling behaviour; emo,hum, emotional IPV, humiliated; emo IPV, emotional IPV; IPV, intimate partner violence; NOS, Newcastle-Ottawa Scale; phyIPV, physical IPV; PP, postpartum; PPD, postpartum depression; PPD, postpartum depression; sexIPV, sexual IPV.

Table 2 Overview of cross-sectional and cohort studies on postpartum depression among IPV victims set in low-income and lower-middle-income countries

Author, year	Country	Study size	Mean age (range, cat.)	Time of exposure	Measurement of post partum	EDPS cut-off point	Confounders adjusted for (n=no of factors)*	Risk of PPD (95% CI)	Subgroup analysis	Prevalence of IPV (prevalence of PPD among IPV exposed)†	NOS score
Cohort studies											
Budhathoki[55] 2012	Nepal	72		Lifetime	6 weeks, 10 weeks	≥13	Unadjusted	cORphyIPV: 1.37 (0.37 to 5.05) cOREmoIPV: 1.53 (0.41 to 5.75) cORsexIPV: 0.35 (0.04 to 2.98)		phyIPV: 20.8% emoIPV: 19.4% sexIPV: 13.9% (phyIPV: 26.7%)	Poor
Patel[56] 2002	India	270	26	Lifetime, antenatal	6weeks	≥11	Unadjusted	RRlife.anyIPV: 2.1 (1.3 to 3.3)	RRAN.anyIPV: 2.6 (1.6–4.3)	anyIPVlife: 13% anyIPVAN: 6%	Poor
Rogathi[7] 2017	Tanzania	1013	(18–24, 25–34, ≥35)	Antenatal	48 hours, 40 weeks	≥13	Maternal health (n=2); Maternal mental health (n=2); Maternal sociodemographic (n=1); Pregnancy-related (n=1); Type of IPV (n=3)	aORanyIPV: 2.51 (1.67 to 3.76) aORphyIPV: 2.15 (1.13 to 4.11) aOREmoIPV: 1.46 (0.92 to 2.30) aORsexIPV: 1.98 (1.22 to 3.23)		anyIPV: 8.2%	Good
Tho Tran[6] 2018	Vietnam	1274	≥17	Entire period with present partner	4–12 weeks	≥10	Birth-related (n=1); Economic factors (n=2); Maternal sociodemographic (n=2); Family-related (n=1); Partner-related (n=1); IPV-type (n=2)	aORphyIPV: 0.64 (0.30 to 1.35) aORsexIPV: 1.11 (0.59 to 2.07)	aOREmoIPV.mild.: 2.28 (1.35–3.86) aOREmoIPV. mod.: 3.15 (1.17–8.51) aOREmoIPV,ser: 3.16 (0.83–12.03)	phyIPV: 8% emoIPV: 25.4% sexIPV: 9.5%	Good
Tho Tran[6] 2019	Vietnam	1274	26	Antenatal	4–12 weeks	≥10	Birth-related (n=1); Economic factors (n=2); Maternal sociodemographic (n=2); Family-related (n=1); Partner-related (n=1); IPV-type (n=2)	aORphyIPV: 1.93 (1.01 to 3.73) aOREmoIPV: 1.01 (0.60 to 1.69) aORsexIPV: 2.75 (1.19 to 6.35)		anyIPV: 35.3% emoIPV: 32.3% phyIPV: 3.5% sexIPV: 9.8%	Good
Cross-sectional studies											
Abadiga[36] 2019	Ethiopia	287	29.6	Within their intimate relationship	<12 months	≥10	Economic factors (n=1); Pregnancy related (n=1); Maternal mental health (n=1)	aORanyIPV: 5.92 (2.44 to 14.40)		anyIPV: 23.7%	Fair
Abebe[40] 2019	Ethiopia	555	24.3	Antepartum	>2 weeks–6 months	≥13	Birth-related (n=2); Family-related (n=1); Partner-related (n=1); Pregnancy-related (n=1); Maternal mental health (n=2)	aORanyIPV: 3.16 (1.76 to 5.67)		anyIPV: 16.4%	Good
Adamu[38] 2018	Ethiopia	618	28	Perinatal	<6 weeks	≥13	Economic (n=1); Family-related (n=1); Partner-related (n=1); Maternal mental health (n=1)	aORanyIPV: 3.1 (1.60, 5.90)		(anyIPV: 59.8%)	Good
Islam[37] 2017	Bangladesh	426	(14–18, 19–24,>25)	Pregestational, antepartum, postpartum	<6 months	≥10	Birth-related (n=2); Child-related (n=1); Economic factors (n=3); Family-related (n=1); Maternal sociodemographic (n=1); Pregnancy related (n=3); Partner-related (n=2); Maternal mental health (n=3); Type of IPV (n=1)	aORphyIPV: 4.01 (2.07 to 7.76) aOREmoIPV: 1.61 (0.62 to 4.17) aORsexIPV: 1.00 (0.49 to 2.03)		anyIPVpre: 14.3%(anyIPVpre: 57.4%) IPVAN:11.3% (anyIPVAN: 79%) IPVPP: 9,2%(anyIPVPP: 71.8%)	Good
Kabir[39] 2014	Bangladesh	660	25	Lifetime, antepartum, postpartum	6–8 months	≥10	Child-related (n=3); Economic factors (n=2); Family-related (n=1); Maternal sociodemographic (n=2); Partner-related (n=1); Type of IPV (n=1)	aORsexIPV: 1.09 (0.73 to 1.64) aOREmoIPV: 1.05 (0.90 to 1.22) aORpp,anyIPV: 2.83 (1.72 to 4.64)		phyIPV: 70% phyIPVAN: 18% phyIPVPP: 52% sexIPVpp: 65% emoIPV: 84%	Good

Continued

Table 2 Continued

Author, year	Country	Study size	Mean age (range, cat.)	Time of exposure	Measurement of post partum	EDPS cut-off point	Confounders adjusted for (n=no of factors)*	Risk of PPD (95% CI)	Subgroup analysis	Prevalence of IPV (prevalence of PPD among IPV exposed)†	NOS score

*Confounder domains adjusted for in the studies. The clustering is shown in table 3.
†The prevalence of PPD among the IPV exposed women.
AN, antenatal; aOR, adjusted OR; EDPS, Edinburgh Postnatal depression Scale; emo IPV, emotional IPV; IPV, intimate partner violence; NOS, Newcastle-Ottawa Scale; phyIPV, physical IPV; PP, postpartum; PPD, postpartum depression; PPD, postpartum depression; sexIPV, sexual IPV.

shows how many studies that fulfil each of the NOS items. Among the 15 HMIC, 11 studies were judged as 'good quality',[17 41 43–47 50 52–54] 2 studies were judged as 'fair quality'[48 49] and 2 studies were judged as 'poor quality'.[42 51] Of the five LMIC cohort studies, three were judged as 'good quality'[6 7 18] and two were judged as 'poor quality'.[55 56] Most of the studies that were judged as 'poor quality' were due to inadequate adjustment of confounders. The cross-sectional studies were judged as follows, six were regarded as good quality,[34 35 37–40] six of fair quality[14 15 31–33 36] and one of poor quality.[30] The quality judgement for all studies is summarised in tables 1 and 2.

Association between IPV and PPD

The majority of studies, 88% (n=29/33) found an association between exposure to IPV (any or type-specific) and development of PPD. A total of 23 studies reported 'any IPV' and among these, 91% (n=21/23) found a significant association between IPV and PPD. Among the studies, which reported physical violence (n=12),[6 7 15 17 18 33 37 42 45 47 50 55] 75% (n=9/12) found a significant association[6 7 15 17 33 37 42 45 50] (aOR range was 1.50–3.94; 95% CI 1.30 to 6.86). Further, 15 studies reported emotional IPV[6 7 17 18 32 35 37 39 42 43 45 47 49 50 55] and 7 studies reported sexual IPV.[6 7 16 37 39 42 55] In addition 67% found an association between emotional IPV and PPD[17 18 32 35 42 43 45 47 49 50] (aOR range: 1.58–4.6; 95% CI 1.04 to 5.1) and 42% (n=3/7) found an association between sexual IPV and PPD[6 7 42] (aOR range: 1.98–2.75; 95% CI 1.22 to 6.36)[6 42] (tables 1–2).

High-income and upper-middle countries

Figures 3 and 4 illustrate the association of IPV and PPD across HMIC and LMIC with outcomes reported as aOR (n=26/33). Among the HMIC studies (n=23), the prevalence of 'IPV overall' varied across studies, and so did the association within the different types of IPV. The prevalence of emotional IPV ranged from 1.7%–28.1%[43 47] among women reporting emotional IPV within the last year, while physical IPV had a prevalence range of 1.8%–37.8%.[17 33]

The majority of HMIC studies found a significant association between IPV and PPD, which is clarified in figure 3 were almost 90% of the cohort studies (n=7/8) showed a significant association between 'any IPV' and PPD with an aOR ranging from 1.18 to 6.87 (95% CI 1.09 to 11.78). For physical IPV, all three studies found a significant association with an aOR ranging from 1.5 to 3.94 (95% CI 1.30 to 6.36). Among the cross-sectional studies, most studies found an association between IPV and PPD; 75% (n=3/4) found a significant association for 'any IPV' (aOR range: 4.61–4.30; 95% CI 1.06 to 8.70) while the only studies reporting 'physical IPV' and 'emotional IPV', both found a significant result.

Low-income and LMICs

Figure 4 illustrates the results from LMICs that report aOR with the majority being cross-sectional studies

Table 3 Confounders adjusted for in the studies (n=33) clustered within the following domains

Confounder domains	Both LMIC/HIC	Upper-middle-income and high-income countries	Low-income and middle-income countries
Birth related	► Gestational age at birth ► Neonate hospitalisation ► Mode of childbirth	► Support after birth ► Interventions during birth	
Child related	► Gender of child	► Satisfaction with infant's sleep patterns ► Congenital abnormalities	► Child temperament breastfeeding initiation ► Fussy and difficult child
Economic factors	► Income (monthly, annual) ► Employment (maternal or partner) ► Education level (maternal or partner) ► Social support	► Food stamps past year ► Stressed due to insufficient money ► Health insurance Homeownership status ► Poverty status	
Family related	► History of family physical/mental illness ► Relation with mother-in-law/own mother		► Family support after delivery
Maternal mental health	► History of mental illness (depression, PPD, other) ► Stressful life events	► Low energy/optimism ► Chronic stress	► Self-esteem
Maternal physical health	► Substance use	► Alcohol use, smoking, body mass index	► HIV-status
Maternal sociodemographic	► Maternal age, marital status/ cohabitation	► Ethnicity/race/immigration	► Age at first pregnancy
Partner related	► Relationship satisfaction	► Partners alcohol consumption	► Partner's preference of child's gender ► Woman's autonomous for decision making
Pregnancy related	► Parity antenatal depression ► Pregnancy type (undesired, unplanned)	► Antenatal health problems ► Reaction to pregnancy	► No of under 5 children
Type of violence	► Type of IPV (phy, psy, sex) ► Past IPV ► Fear of partner ► Controlling behaviour	► History of abuse as a child ► Violence from family member ► Violence from stranger	► Antenatal violence

HIC, high-income country; IPV, intimate partner violence; LMIC, lower-middle-income country; PPD, postpartum depression.

(n=5/8). Overall, 75% (n=6/8) found a significant association across both study designs. The aOR for 'any IPV' ranged from 2.51 to 5.92 (95% CI 1.67 to 14.40), while it for 'physical IPV' ranged from 2.75 to 4.1 (95% CI 1.19 to 7.76).

DISCUSSION

A total of 33 studies were included in this systematic review of which 13 were cross-sectional and 20 were cohort studies. Of the cross-sectional studies, 8 were set in HMIC and 5 in LMIC and of the cohort studies 15 were set in HMIC while 5 were set in LMIC. The studies had considerable heterogeneity in terms of reported IPV exposure and varying cut-off scores ranging from 10 to 13 on the EPDS tool. The main findings, the association between 'any IPV' and PPD ranged from aOR 1.18 to 6.87, with the association between specific types of IPV and PPD ranging from aOR 1.50 to 5.93 for physical violence, aOR 1.58 to 4.60 for emotional violence, and aOR 1.98 to 2.75 for sexual violence. These results are in accordance with previous systematic reviews by Halim *et al*, Bacchus *et al*, Beydoun *et al* and Necho *et al*.[5 22 23 58]

The quality of the studies included in the present review was generally assessed to be good and if studies were assessed as 'poor quality' it was mostly due to missing adjustment of confounders. Overall, a total of 48 different confounders were controlled for with most of the studies controlling for maternal sociodemographic characteristics.[23] Surprisingly, only half of the studies controlled for history of depression, though it is a well-known risk factor for developing PPD.[58] None of the studies adjusted for risk factors such as poor postpartum sleep and vitamin

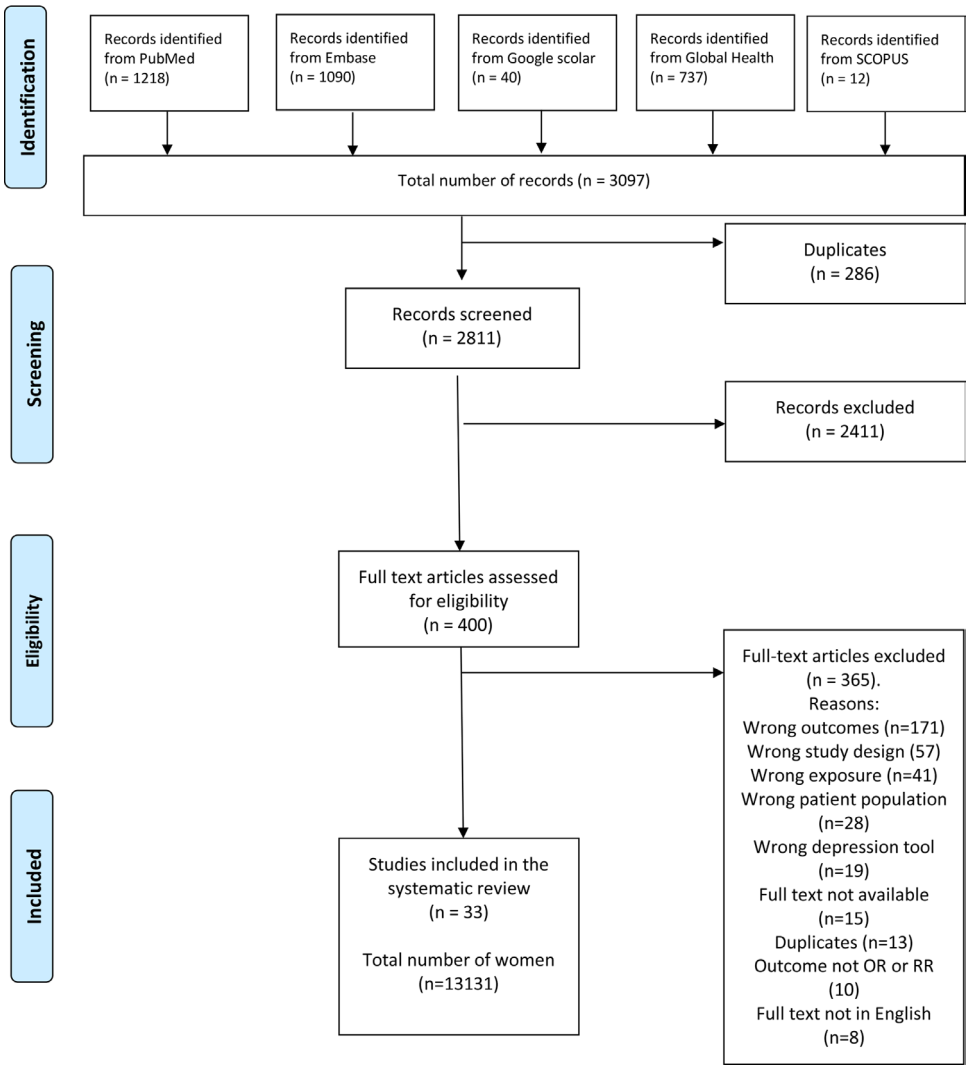

Figure 1 Flow diagram of study selection in the review of intimate partner violence and postpartum depression.

D deficiency, which is reported as risk factors in a systematic review from 2020. In addition, studies from both HICs and LMICs have shown an association between unintended pregnancy and PPD with risk estimates of 2.0 and 2.5, respectively.[59 60] Further, research has shown that emotional violence has an influence on fertility as to decreased control of fertility, abortion and non-planned pregnancy.[61]

Generally, there were no major differences in the association between HMICs and LMICs, though more cohort studies set in HMICs found an association between emotional IPV and PPD compared with LMICs. According to our current knowledge, this review is the first of its kind which divides the results into HMIC and LMIC countries. The authors decided to do so because of the great cultural and economic differences that exist between HMIC and LMIC countries, in an attempt to make the results more homogeneous.

When focusing on the present review, a strong association between any IPV and PPD was found. This finding is in line with a previous systematic review and meta-analysis that found exposure to any IPV increased the risk of PPD by 1.5 –2.0 times.[22] Research examining the pathways between IPV and PPD is sparse. Traditionally, PPD is believed to be largely caused by hormonal and other physiological changes associated with pregnancy and childbirth.[62] Additionally, it is recognised that PPD is also associated with various psychological, socioeconomic and cultural factors.[63–66] It is further acknowledged that stressful events like IPV exposure can cause an imbalance between environmental demands and individual resources which may lead to decreased resistance, increased susceptibility to mental health problems and consequently the onset of depression.[67]

Not only is IPV a major stressor and a traumatic event that can lead to depression, but it is also known that IPV affects the victim's trust in others, fear, coping styles and levels of isolation which additionally may increase the risk of depression.[68] In addition, people who suffer from depression are known to have symptoms like irritability, loss of energy and enjoyment, sensitivity to criticism and generally pessimism, which may seem burdensome or unreasonable for the spouses.[69] Thus, there may be a bidirectional association between IPV and depression.

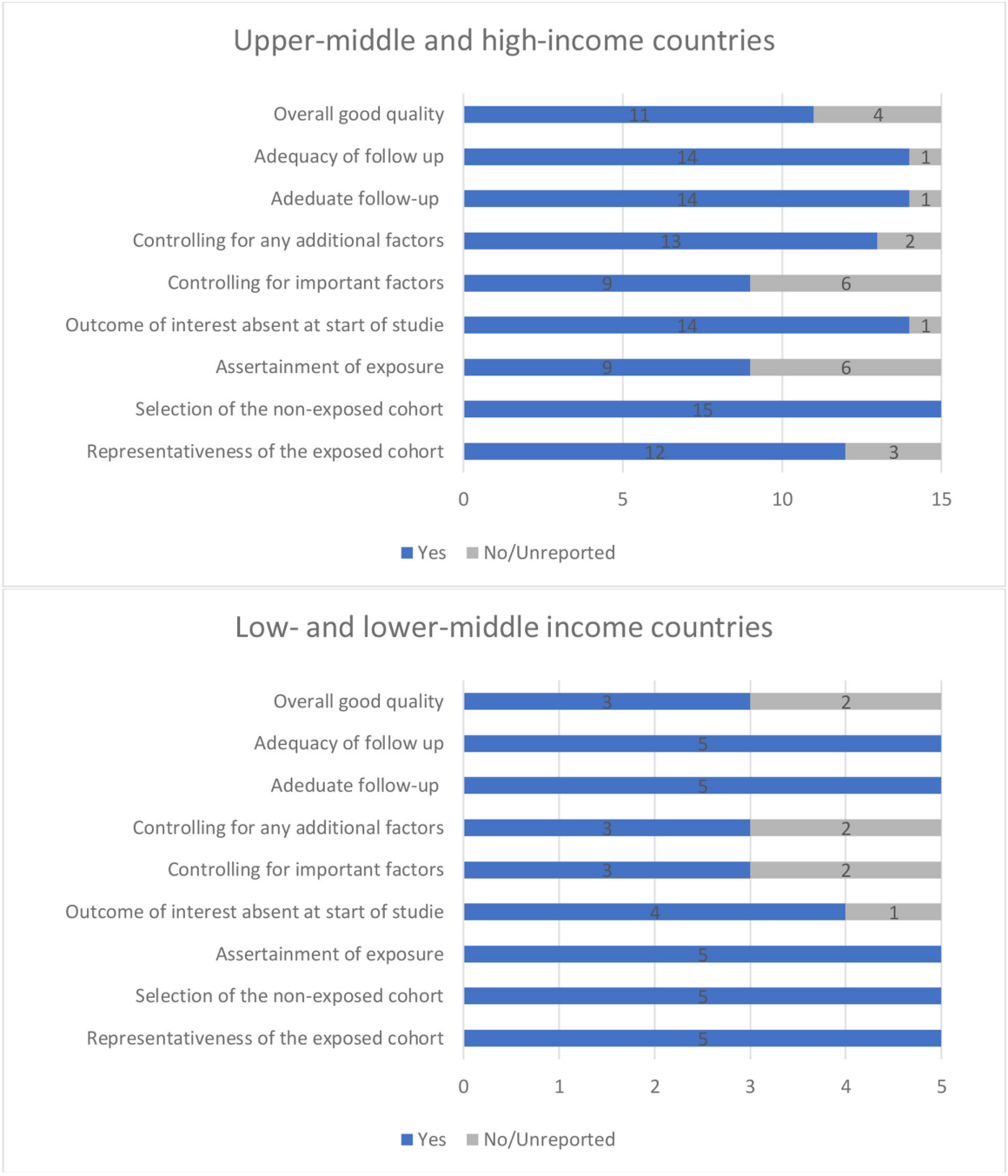

Figure 2 Quality assessment of cohort studies according to country economic status and stars awarded for each item of the Newcastle-Ottawa Scale.

Hence not only is IPV associated with an increased risk of subsequent symptoms of depression but also depression symptoms may be associated with an increased risk of subsequent IPV.[53]

When looking at the specific types of IPV, we found that physical IPV was significantly associated with PPD. We also found an association, between emotional IPV and PPD, although less pronounced. This weaker association may reflect reporting bias since emotional IPV is more difficult to measure than physical IPV. Women who are exposed to emotional IPV may not perceive themselves as victims of abuse. From their perspectives, acts such as shouting or threatening behaviours are often considered a result of a 'hot temper'. However, women who are living in a relationship where they are being shouted at, threatened or humiliated may lose their sense of self-esteem and independence and thus be at increased risk of developing depression.[6] Finally, a strong association between sexual IPV and PPD was found. Some investigators have noted that pregnant women with a history of sexual abuse may re-experience memories of their abuse during procedures of routine pregnancy care[70 71] as the reactivation of memories of sexual abuse may trigger the development of antepartum and PPD.[72]

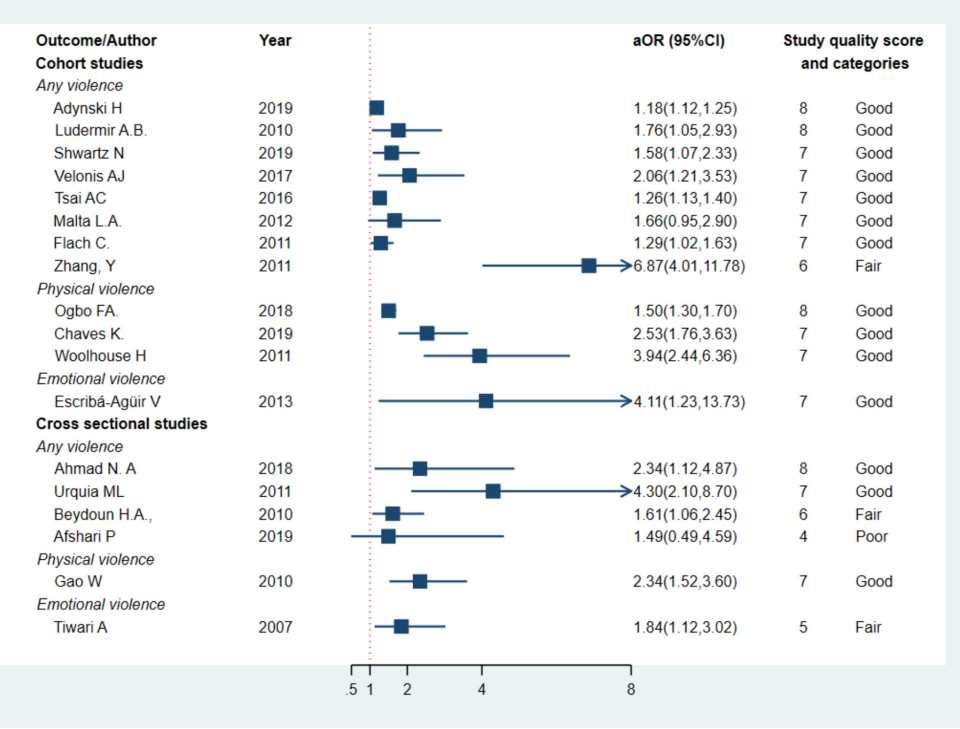

Figure 3 Results of IPV and the association with PPD from the studies set in HMIC, presented in a forest plot ordered according to descending quality. IPV, intimate partner violence; HMIC, high and upper-middle-income countries; PPD, postpartum depression.

Identification of IPV victims is crucial in the fight against IPV. When focusing on pregnant women, antenatal care provides a window of opportunity for identifying women exposed to IPV. The effectiveness of IPV screening has been evaluated in a Cochrane review from 2015 where screening was compared with standard care. The screening was associated with 4.5-fold odds for identification of pregnant women exposed to IPV.[73] IPV screening should ideally go hand in hand with harm reduction interventions like counselling, for example, in sessions on video or telephone to improve empowerment, reduce isolation and start safety planning. These interventions may affect both IPV and PPD. However, if IPV and depression are intertwined in a vicious cycle as described above, these mutually reinforcing effects could undermine the success of video or telephone-based IPV interventions. Thus, combined interventions involving a multi-component approach which both address the spouse and includes cognitive–behavioural therapy may be more effective in interrupting the cycle of IPV and depression.[74]

A strength of this review is that it is based on an extensive systematic search of five online databases. Further, we applied the PRISMA guidelines to direct the review, thus a uniform and transparent approach

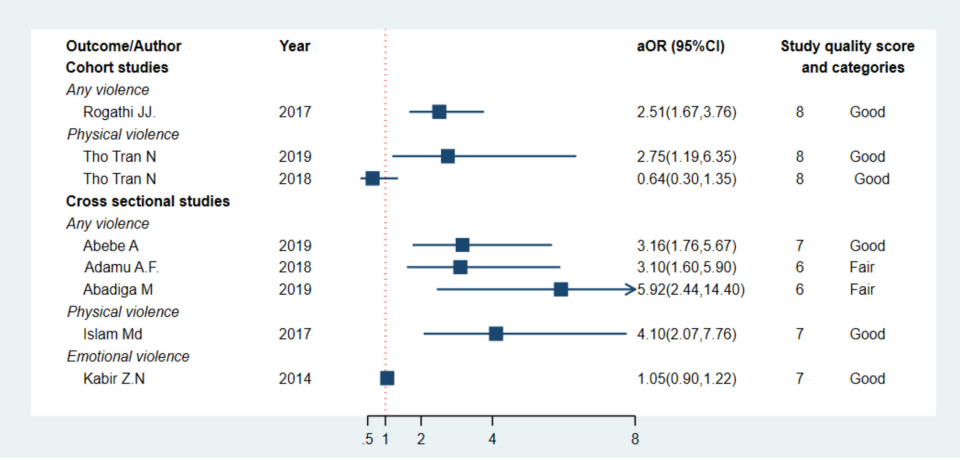

Figure 4 Results of IPV and the association with PPD from the studies set in LMIC, presented in a forest plot ordered according to descending quality. aOR, adjusted OR; IPV, intimate partner violence; LMIC, lower-middle-income country.

were used to synthesise the latest evidence of IPV exposure and PPD. In addition, we conducted an appropriate quality assessment of all included studies using NOS. However, a limitation of NOS is that the scale has to be adapted to specific research designs, which can lead to the possibility of low agreement between quality assessors.[26] To cover the field of interest in a comprehensive manner, we included both cross-sectional and cohort studies from LMICs and HMICs. This approach may have resulted in heterogeneity across studies and thus limited our ability for more in-depth analysis.

To create a stringent and more homogenised overview, we decided to narrow the inclusion criteria to only studies using EPDS with a cut-off ≥10 and outcome reported as RRs or ORs. The predefined cut-off threshold of ≥10 was chosen to support the global orientation in the review that address PPD across many countries in both HMIC and LMIC and taking the wide range of different validated cut-offs into consideration. Other studies have suggested the following thermology 'possible minor depression' and 'possible major depression' at cut-off ≥10 and ≥13, respectively. This terminology must be kept in mind but will not be used throughout the manuscript where the diagnosis in many cases also could be classified as 'signs of PPD'. Like every other measurement tool, EDPS has its strength and limitations. With a cut-off at 10, some women may screen false positive. To account for this, we reviewed the studies to consider whether a cut-off at 13 would change the association. But even after excluding studies with cut-off ≥13 the majority of studies still showed an association between IPV and PPD, except only four LMIC studies would be left in the review.

Another limitation of this review is that due to the heterogeneity of the included studies, we were not able to perform a metanalysis. However, we presented aOR from the studies in a forest plot and ordered them according to quality. This approach helps illustrate the association between IPV exposure and PPD while considering the quality of the studies. Another factor that adds to the heterogeneity across studies, is the variance in reported IPV exposure. Variation in measurement and reporting is an acknowledged problem within women's and newborn health and has led to initiatives that aim to establish core outcome sets (COS). As a result of this initiative, a standardised set of outcome measures has been developed within, for example, pre-eclampsia.[75] To guide future IPV research there is likewise a need for harmonising IPV outcome measures and establish a COS for IPV reporting, which has also been suggested elsewhere.[76]

CONCLUSION

This systematic review contributes to the existing literature on IPV and adverse health outcome by summarising current knowledge on the association between IPV and PPD. We found evidence of an association between IPV exposure and PPD across all study designs and settings, thus we suggest that large multinational longitudinal studies where targeted and effective interventions are prioritised. This may help address the problem of IPV and improve women's health and also allow for future meta-analyses. Further, we recommend well-defined outcome measures and the establishment of COS to better estimate the association between IPV and associated outcomes.

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