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REVIEW

ADDICTION SSA

The association of parental or caregiver alcohol use with child maltreatment: A systematic review and meta-analysis of longitudinal studies

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Abstract

Background and Aims: Caregiver alcohol use is a risk factor for child maltreatment, but a previous meta-analysis was limited to physical abuse only. We aimed to quantify the association of parental or caregiver alcohol use with child maltreatment and assess if this differs by incidence or recurrence of maltreatment and level of caregiver alcohol use.

Methods: We undertook a systematic review and meta-analysis of longitudinal studies according to a registered protocol on PROSPERO (CRD42020211585). We searched the databases MEDLINE, PubMed, Scopus, PsycINFO, CINAHL and the Cochrane Library in November 2024. We included studies that reported the association of interest. We excluded studies that only assessed prenatal alcohol use or caregiver substance use, and studies that did not adjust for socio-economic position. Two reviewers independently screened the retrieved articles for relevance, extracted data from the included studies and assessed the methodological quality of studies using criteria adapted from the Newcastle-Ottawa scale. We performed meta-analyses using inverse variance weighting and random effects models.

Results: We included seven studies on child maltreatment incidence and five on recurrence. All were cohort studies in high-income countries: three in Australia, one in Denmark, one in New Zealand, two in South Korea, one in the United Kingdom and four in the United States. The sample size ranged from 501 to 84 245 (median 4782). Caregiver alcohol-related diagnoses were associated with higher child maltreatment incidence [odds ratio (OR) = 2.32, 95% confidence interval (CI) = 1.10–4.89] and recurrence (OR = 1.92, 95% CI = 1.13–3.28) compared with caregivers without alcohol-related diagnoses. An association of any caregiver drinking with child maltreatment incidence could not be ruled out (OR = 1.22, 95% CI = 0.72–2.08). The review was limited by high heterogeneity and variable reporting of alcohol use and child maltreatment; however, we obtained similar results after sensitivity analysis and adjustment for reporting bias.

Conclusions: Caregiver alcohol use may be an important risk factor for child maltreatment, adding to the growing body of evidence on alcohol's harm to others and calling for stronger actions to reduce alcohol harm.

KEYWORDS
abuse, alcohol, caregiver, child maltreatment, meta-analysis, systematic review

INTRODUCTION

Maltreatment of children by their parents or caregivers is a widespread yet under-recognised public health issue [1]. This includes all forms of ill-treatment and neglect that result in actual or potential harm to a child, perpetrated by someone in a position of responsibility, trust or power [2]. Four types of child maltreatment are widely recognised, including physical abuse (e.g. hitting or kicking), psychological or emotional abuse (e.g. verbal threats or insults), sexual abuse (e.g. sexual harassment, assault or rape) and neglect (e.g. failure to provide appropriate education or health care) [3]. While estimates of prevalence vary widely because of methodological differences, the true burden of child maltreatment is likely to be far higher than reported [1, 4]. Shame or fear makes it difficult for survivors to disclose maltreatment, particularly when trusted caregivers are implicated, and young children may not be able to communicate what they have experienced [3]. Moreover, children are often exposed to multiple types and repeated episodes of maltreatment, with detrimental long-term effects [1]. The most severe forms of child abuse or neglect may be fatal [1]. Exposure to child maltreatment is associated with higher risk of mental health problems, including alcohol and drug-related problems, later in life [5]. Parents who experienced maltreatment in their own childhood are also more likely to abuse or neglect their children [6].

Research quantifying the serious harms of caregiver alcohol use to children remains limited. Child maltreatment is not yet included in comparative risk assessments of alcohol's contribution to the global burden of disease, which tend to underestimate the harms of alcohol to those other than the drinker [7]. Evidence from New Zealand and Canada suggest that 11% to 16% of child maltreatment cases were attributable to parental or caregiver alcohol use [8, 9]. However, these estimations were limited by the lack of risk estimates derived from meta-analyses. A systematic review and meta-analysis published in 2009 showed that parental alcohol abuse was associated with higher risk of child physical abuse, but did not provide a risk estimate to enable calculation of the burden of child maltreatment attributable to parental alcohol use [10]. In addition, this meta-analysis only included three studies with unspecified design or quality, and did not examine different levels of alcohol use (e.g. heavy episodic drinking and low to moderate alcohol use) or child maltreatment other than physical abuse and neglect. Notably it was unclear whether all three studies adjusted for socio-economic position (SEP) [10]. This is important because failure to control for SEP may overestimate associations, as lower SEP is linked to higher risk of alcohol-related problems and child maltreatment [11, 12]. To our knowledge, no similar meta-analyses have been published since. A more recent systematic review found inconsistent associations between parental or caregiver substance use and recurrence of child maltreatment, but alcohol use was not always analysed separately from other drugs [13].

Quantifying the association of parental or caregiver alcohol use with child maltreatment is essential to accurately measure the burden of child maltreatment attributable to others' alcohol use. This would enable a more comprehensive picture of alcohol's harm to others to inform policy decisions. To this end, prospective or longitudinal studies provide better evidence of associations than cross-sectional studies as they are less susceptible to reverse causation. This occurs when the time sequence between the exposure and outcome is unclear, such that child maltreatment may have preceded the parent or caregiver's alcohol use. Cross-sectional or case–control studies are also open to recall bias, where individuals reporting childhood maltreatment are more likely to recall early negative experiences that may be relevant, such as caregiver alcohol use [14]. Retrospective self-reports of childhood maltreatment are particularly prone to error when individuals are asked about experiences that occurred many years ago [14]. A comparison of retrospective and prospective measures of child maltreatment also showed poor agreement, suggesting that they identify different groups of individuals [15].

Objectives

We performed a systematic review and meta-analysis of longitudinal studies to synthesise and characterise the association of parental or caregiver alcohol use with child maltreatment. Our objectives were to:

- Quantify the size of the association of parental or caregiver alcohol use with child maltreatment
- Assess whether associations differ by the frequency, chronicity, severity and type of child maltreatment
- Assess how different levels of parental or caregiver alcohol use are associated with child maltreatment
- Characterise the relationships between mother, father or other caregivers' alcohol use with child maltreatment
- Explore the study characteristics, such as study design and quality, that may explain heterogeneity in the results

METHODS

We carried out this systematic review and meta-analysis according to a published protocol on the PROSPERO register (CRD42020211585) [16] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guideline [17]. The study protocol was amended after a preliminary search to reflect updates to the eligibility criteria, including restrictions on study design and language.

Eligibility criteria

We included studies that examined the association of parental or caregiver alcohol use with maltreatment of children under 18 years of age. Parents or caregivers did not have to reside with the child. We excluded studies that only assessed prenatal alcohol use, as several recent systematic reviews have already examined its association with child maltreatment [18, 19]. We also excluded studies that did not assess caregiver alcohol use separately from other substances.

Study design

To minimise the possibility of reverse causation, we only included studies with longitudinal analyses, such as intervention and cohort studies, where it was likely that caregiver alcohol use had occurred before child maltreatment. As such, cross-sectional and case–control analyses were excluded. Where studies had unclear timing of the exposure and outcome, we wrote to the authors to clarify. Descriptive or qualitative studies, including case series, that did not analyse the association of interest and ecological studies that did not examine associations on the individual level were excluded. Intervention studies whose primary objective was not to reduce caregiver alcohol use were also excluded.

Exposure

Our exposure of interest was parental or caregiver alcohol use, which we characterised as (1) alcohol-related diagnoses and (2) any drinking. The first category included alcohol-related hospitalisation or service use and a history of alcohol dependence or 'abuse' as defined by clinical screening or reports by case workers or health professionals, indicating heavy drinking to levels that are likely to cause harm. 'Any drinking' included other patterns of drinking, such as heavy episodic drinking and low to moderate alcohol use. We classified alcohol use by the child's mother, father or other caregiver. We also documented whether alcohol use was reported by the caregiver themselves, reported by other informants (such as health care or social workers) or ascertained by review of hospitalisation records.

Outcome

Our primary outcome was child maltreatment, including (1) physical abuse (including physical punishment); (2) psychological or emotional abuse (including witnessed intimate partner or domestic violence); (3) sexual abuse (including penetrative and non-penetrative abuse); (4) neglect (including abandonment); and (5) other or undifferentiated types of maltreatment (e.g. harsh parenting and fabricated illness that may fit the definition of maltreatment). The World Health Organization (WHO) has provided more detailed descriptions and examples of these types of maltreatment [3]. We excluded studies assessing intimate partner violence that could not be explicitly witnessed by children, such as in households without children.

We noted whether each study examined incidence or recurrence of child maltreatment, because recurrence may reflect more chronic or frequent child maltreatment. We also categorised maltreatment by severity (suspected, substantiated, hospitalised or died) and recorded whether child maltreatment was reported by the victim themselves, reported by a case worker or health professional, or ascertained by review of hospitalisation records.

Information sources

We searched the electronic databases MEDLINE, PubMed, Scopus, PsycINFO, CINAHL and the Cochrane Library. EMBASE and Web of Science were excluded as we no longer had access. We also searched Google for any relevant unpublished reports, such as dissertations and conference proceedings. The search was performed in September 2023 and updated in November 2024. Search results were downloaded into Covidence [20] and duplicates removed.

Search strategy

For each of these databases, we applied the search strategy in Appendix S1, which was developed in consultation with a librarian/information specialist. The main keywords used included 'alcohol', 'liquor', 'parent', 'caregiver', 'child maltreatment' and 'child abuse'. There were no restrictions by year of report or setting.

Study selection

Two reviewers independently screened the titles and abstracts of the retrieved articles and reviewed the full text articles for relevance against the eligibility criteria. Any disagreements were resolved by consensus. Only studies in English or Chinese were reviewed as two reviewers were proficient in both languages. We excluded studies that provided insufficient information on risk estimates (e.g. standard errors) and studies that did not adjust for SEP.

Data extraction

Two reviewers independently extracted information from the selected studies using a pre-designed template on Covidence. Any discrepancies were resolved by a third reviewer with guidance from a statistician. Extracted information included study characteristics (country, aim of study, setting, study design, age of children, response rate at recruitment and sample size), methods (measurement of caregiver alcohol use and child maltreatment, comparison groups used, duration of and loss to follow-up, statistical methods and covariates adjusted

for), results (adjusted risk estimates and corresponding CI from the final models), and competing interests (funding and conflicts of interest declared).

Risk of bias assessment

Two reviewers independently assessed the methodological quality of individual studies using criteria adapted from the Newcastle-Ottawa scale [21], including the selection of groups, comparability of groups, and the ascertainment of exposure and outcome. Any disagreements were resolved by a third reviewer.

Data synthesis

To obtain a risk estimate of parental or caregiver alcohol use on child maltreatment, we combined results from individual studies using inverse variance weighting. We conducted separate meta-analyses for the incidence and recurrence of child maltreatment. We were unable to conduct further analyses by type or severity of child maltreatment because of the limited studies available. We carried out subgroup analyses for parental or caregiver alcohol-related diagnoses and any drinking. For 'any drinking', we combined the risk estimates across the categories of alcohol use in each study, because the definitions of alcohol use varied considerably between studies. This was done by averaging the log odds for each of the alcohol use categories. We could not analyse alcohol use by type of caregiver, as most studies included a combination of mother, father and other caregiver alcohol use. Finally, a sensitivity analysis was done to explore possible causes of between-study heterogeneity.

To prepare the data for synthesis, relevant estimates were converted into log odds along with the corresponding standard errors. As most estimates were ORs, we converted all hazard ratios (HRs) into ORs for comparability, using the formulae below:

$$RR = \left(1 - e^{HR\ln(1-r)}\right)/r$$
$$\mathrm{OR} = \frac{(1-\mathrm{r}) \times \mathrm{RR}}{1 - \mathrm{RR} \times \mathrm{r}},$$

where RR was the relative risk and r was the rate in the reference group [22].

CI were calculated using the Knapp-Hartung adjustment. The Paule-Mandel estimator was used for binary effect size data. Although other estimators were tested, they did not significantly alter the results. We used random effects models to account for between-study heterogeneity, and I^2 to assess heterogeneity. Next, we used forest plots to visualise effect estimates and CI for both individual studies and meta-analyses. Finally, we assessed publication bias using funnel plots and used 'trim and fill' to adjust for any effects of missing studies.

As a sensitivity analysis, we excluded one study [23] with high risk of bias on most of the quality criteria evaluated. This study examined child neglect only, so we could also evaluate whether combining this study with another on sexual abuse could explain the heterogeneity between studies. Because of the small number of studies, we were unable to further assess the potential sources of heterogeneity.

Statistical analyses were conducted using R, version 4.3.2, with the 'meta' package for meta-analyses and plots [24]. This study did not require ethics approval as it only involved the analysis of published data.

RESULTS

Study selection

Figure 1 details the study selection process. Our initial search yielded 9166 studies. After removing 4179 duplicate studies, we screened the titles and abstracts of the remaining 4987 studies for relevance. We excluded 4622 studies as they did not examine the association of interest, had no full texts available, or were not in English or Chinese. We, then, reviewed the full texts of 365 potentially relevant studies, including 364 studies in English and one in Chinese. We excluded 353 studies that did not involve longitudinal analyses, assess the specific association, exposure or outcome of interest, have sufficient information on risk estimates or adjust for SEP. Finally, we included 12 studies in the systematic review and performed separate meta-analyses for seven studies on child maltreatment incidence and five studies on recurrence.

Study characteristics

The main characteristics of studies on incidence and recurrence of child maltreatment are reported in Tables 1 and 2, respectively. All were cohort studies conducted in high-income countries, including three in Australia [25–27], one in Denmark [28], one in New Zealand [8], two in South Korea [29, 30], one in the United Kingdom [31] and four in the United States [23, 32–34]. All seven studies on child maltreatment incidence involved birth cohorts, while the five studies on recurrence involved children 0 to 16 years at baseline. The sample size ranged from 501 to 84 245 (median = 4782). We could not identify any potential conflicts of interest among the studies that may have influenced the reporting of results.

Nine studies assessed caregiver alcohol-related diagnoses [8, 25, 27–31, 33, 34], with the comparison group being no history of alcohol-related diagnoses. Three studies on incidence of child maltreatment examined any drinking [23, 26, 32], with the comparison group 'no drinking' or 'no drinking in the past 12 months'. Four studies assessed alcohol use by reviewing records of hospitalisation or treatment services [8, 25, 28, 31], four used reports by case workers or health professionals [27, 29, 30, 33] and four relied on self-reports by the caregiver themselves [23, 26, 32, 34]. Eight studies looked at

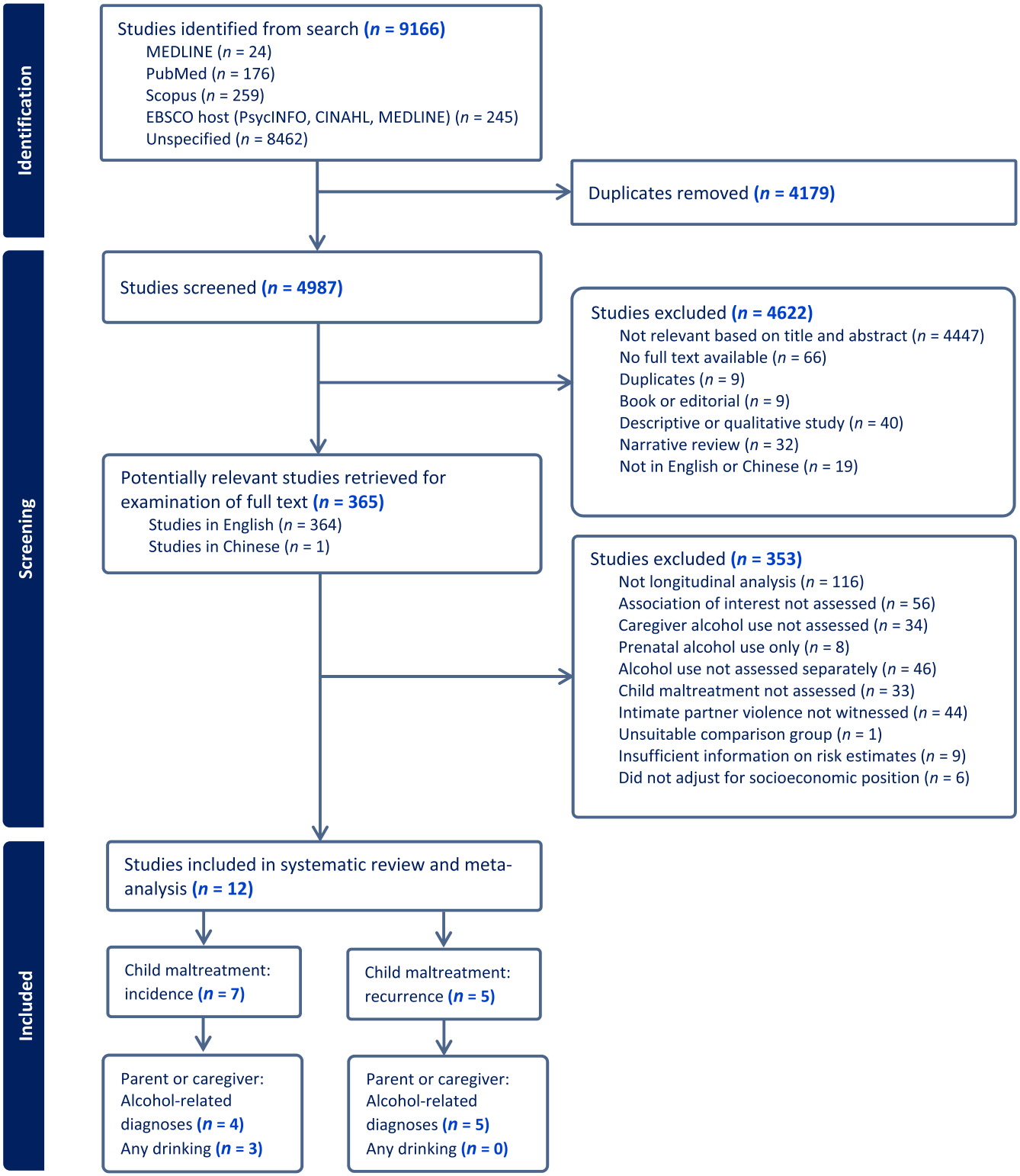

FIGURE 1 Selection process for studies assessing the association of parental or caregiver alcohol use with child maltreatment.

alcohol use by parents and other caregivers [8, 27–31, 33, 34], while three studies assessed maternal alcohol use only [25, 26, 32], and one assessed paternal alcohol use only [23].

Nine studies looked at all types of child maltreatment [8, 25, 27–29, 31–34], two examined child neglect [23, 30] and one examined child sexual abuse specifically [26]. Seven studies involved substantiated or suspected child maltreatment as reported by case workers or health professionals [25, 27, 29, 30, 32–34], two used review of hospitalisation records [28, 31] and two relied on self-reporting of child maltreatment [23, 26]. One study used a combination of these

TABLE 1 Characteristics of seven selected studies on the association of parental or caregiver alcohol use with incidence of child maltreatment.

Study			Children involved		Exposure (parental or caregiver alcohol use)			
First author (publication year)	Country	Study design	Age at baseline	Sample size analysed	Categorisation	Assessment	Caregivers involved	Reference group
Christoffersen (2003) [28]	Denmark	Cohort study	At birth	1350	Alcohol-related diagnoses	Hospitalisation record review	Mother, father	No history of alcohol-related hospitalisation
Hafekost (2017) [25]	Australia	Cohort study	At birth	84 245	Alcohol-related diagnoses	Hospitalisation and treatment services record review	Mother	No alcohol-related diagnoses on the Hospital Morbidity Data System, Mental Health Outpatients, or Drug and Alcohol dataset
Huckle (2023) [8]	New Zealand	Cohort study	At birth	58 359	Alcohol-related diagnoses	Hospitalisation, treatment services and mortality record review	Mother, father	No history of alcohol-related hospitalisations or service use
Paranjothy (2018) [31]	United Kingdom	Cohort study	At birth	253 717	Alcohol-related diagnoses	Hospitalisation record review	Mother, father, other caregiver	No history of alcohol-related emergency hospitalisation
Kotch (1999) [32]	United States	Cohort study	At birth	694	Any drinking	Self-report	Mother	No drinking
Lee (2013) [23]	United States	Cohort study	At birth	1016	Any drinking (largest number of drinks in a single day over past 12 months)	Self-report	Father	No drinking in past 12 months
Martin (2011) [26]	Australia	Cohort study	At birth	2664	Any drinking (light, moderate and heavy drinking)	Self-report	Mother	No drinking (abstention)

Abbreviations: FASD, Fetal Alcohol Spectrum Disorders; GP, general practitioner.

TABLE 1 Characteristics of seven selected studies on the association of parental or caregiver alcohol use with incidence of child maltreatment.

Study			Outcome (child maltreatment incidence)				
First author (publication year)	Country	Study design	Types	Assessment	Perpetrators involved	Timing of measurement	Covariates adjusted for
Christoffersen (2003) [28]	Denmark	Cohort study	Hospitalisation for 'battered child syndrome, abuse or neglect'	Hospitalisation record review	Mother, father, people outside the home	At 13–27 y follow-up	Other life experiences (child in care, parental violence, family separation), self-damage (premature death, drug addiction, mental illness, suicide attempts), damage to others (conviction of violent crime, conviction of rape), life resources (teenage motherhood, youth unemployment)
Hafekost (2017) [25]	Australia	Cohort study	Substantiated child maltreatment	Report by case worker or health professional	Unspecified	At 3–27 y follow-up	Timing of alcohol diagnosis, indigenous status, health service region, socio-economic status, maternal age, marital status, maternal mental health record, maternal illicit drug record, child FASD, child intellectual disability, parity, birth weight

TABLE 1 (Continued)

Study			Outcome (child maltreatment incidence)				
First author (publication year)	Country	Study design	Types	Assessment	Perpetrators involved	Timing of measurement	Covariates adjusted for
Huckle (2023) [8]	New Zealand	Cohort study	Substantiated child maltreatment	Self-report, report by case worker or health professional, hospitalisation record review, mortality data	Mother, father	At 17 y follow-up	Parental drug problems, parental mental health diagnoses, mothers' age at childbirth, highest parental qualification, child gender, child ethnicity, child FASD, child mental health/ developmental conditions
Paranjothy (2018) [31]	United Kingdom	Cohort study	Hospitalisation for 'child victimisation'	Hospitalisation record review	Unspecified	At 1–11 y follow-up	Household member ever had a common mental disorder or psychosis GP code, ever in a single parent household, Townsend deprivation quintile at birth or first 4 months, sex, maternal age at childbirth, gestational age at birth, small for gestational age, breastfeeding at birth or 6–8 weeks, parity, multiple births, congenital anomalies, maternal cigarette smoking
Kotch (1999) [32]	United States	Cohort study	Reported or suspected child maltreatment	Report by case worker or health professional	Unspecified	At 4 y follow-up	Social well-being index, total life event change score, health opinion survey, maternal depression, maternal education, receipt of income support, presence of mother at respondent age 14
Lee (2013) [23]	United States	Cohort study	Reported or suspected child neglect	Self-report (revised Parent–Child Conflict Tactics Scale)	Mother, father	At 5 y follow-up	Father's age, father's education, race/ethnicity, marital birth, religious attendance, current employment, household income, financial assistance, electricity turned off in past year, household stability, paternal parenting stress, paternal involvement with child, paternal depression, parental relationship quality, co-parenting support from mother, male child, child health, child low birth weight
Martin (2011) [26]	Australia	Cohort study	Reported or suspected child sexual abuse (penetrative and non-penetrative)	Self-report	Unspecified	At 21 y follow-up	Child's sex, socio-economic status, pre-pregnancy attitude, contact with baby, positive about baby, tobacco use, breastfeeding and mental health variables (not specified)

Abbreviations: FASD, Fetal Alcohol Spectrum Disorders; GP, general practitioner.

sources and mortality data to ascertain child maltreatment [8]. All studies adjusted for a range of potential confounders, most commonly SEP, child's age and sex, ethnicity, parental mental health and parental drug or tobacco use. Incidence of child maltreatment was assessed at 1 to 27 years of follow-up, while recurrence was assessed over shorter time periods ranging from 2 months to 8 years.

Risk of bias in studies

Tables 3 and 4 summarise the quality assessment of individual studies. Most studies had low risk of bias on most criteria. For incidence of child maltreatment, three studies [23, 26, 32] were rated as having high risk of bias on the criterion 'validation of caregiver alcohol

TABLE 2 Characteristics of five selected studies on the association of parental or caregiver alcohol use with recurrence of child maltreatment.

Study			Children involved		Exposure (parental or caregiver alcohol use)			
First author (publication year)	Country	Study design	Age at baseline	Sample size analysed	Categorisation	Assessment	Caregivers involved	Reference group
Cheng (2015) [33]	United States	Cohort study	0–16 y	5676	Alcohol dependence (Composite International Diagnostic Interview Short Form)	Report by case worker or health professional	Mother, father	No alcohol dependence
Choi (2022) [29]	South Korea	Cohort study	0–16 y	3887	Alcohol abuse	Report by case worker or health professional	Mother, father, other caregivers	No alcohol abuse
Kim (2019) [30]	South Korea	Cohort study	Unspecified	4941 (neglect), 21 664 (other)	Alcohol-related problems	Report by case worker or health professional	Mother, father, other caregivers	No alcohol-related problems
Laslett (2012) [27]	Australia	Cohort study	0–12+ y	29 455	Alcohol abuse	Report by case worker or health professional	Mother, father, other caregivers	No alcohol abuse
Proctor (2012) [34]	United States	Cohort study	0–4 y	501	Alcohol abuse (CAGE questionnaire)	Self-report	Mother, father, other caregivers	No alcohol abuse

Abbreviations: CPS, Child Protective Services; IPV, intimate partner violence.

TABLE 2 Characteristics of five selected studies on the association of parental or caregiver alcohol use with recurrence of child maltreatment.

Study			Outcome (child maltreatment recurrence)				
First author (publication year)	Country	Study design	Types	Assessment	Perpetrators involved	Timing of measurement	Covariates adjusted for
Cheng (2015) [33]	United States	Cohort study	Substantiated child maltreatment	Report by case worker or health professional	Mother, father, other caregivers	At 1–5 y follow-up	Needed services unobtained, no need of any services, collaborative engagement, prior incidents of substantiated maltreatment, depression, illicit drug, non-medical use of prescriptions, IPV episodes, child's age, child's sex, child's chronic problems, ethnicity, marital status, number of children, family income, in-home spells
Choi (2022) [29]	South Korea	Cohort study	Substantiated child maltreatment	Report by case worker or health professional	Mother, father, other caregivers	At 2 y follow-up	Caregiver's sex, age, disability, education level, type of work, employment status, social isolation, family violence, childhood maltreatment history, and parenting skills; child's sex, age, disability, behaviour problems, delinquent behaviours, developmental problems, and risk assessment; family characteristics: receiving cash assistance, survival stress, family structure, prior CPS involvement, frequency of maltreatment
Kim (2019) [30]	South Korea	Cohort study	Substantiated child neglect and other types of maltreatment	Report by case worker or health professional	Mother, father, other caregivers	At 2–60 months follow-up	Agency characteristics, child sex, child age, child disability, child risk factors, frequency of abuse, perpetrator sex, perpetrator age, lack of parenting knowledge and skills, social isolation, exposure to spousal abuse, gambling or gaming addiction, hygiene problems, lethargy or laziness, family receipt of welfare assistance, single-parent family,

TABLE 2 (Continued)

Study			Outcome (child maltreatment recurrence)				
First author (publication year)	Country	Study design	Types	Assessment	Perpetrators involved	Timing of measurement	Covariates adjusted for
							reported by mandated reporter, case status, provision of child/parent services
Laslett (2012) [27]	Australia	Cohort study	Substantiated child maltreatment	Report by case worker or health professional	Unspecified	At 5 y follow-up	Carer other drug abuse, gender, age of child, accommodation status, family income type, family type, parental history of abuse as a child, domestic violence, parental history of mental ill health, protective intervention
Proctor (2012) [34]	United States	Cohort study	Reported or suspected child maltreatment	Report by case worker or health professional	Unspecified	From 4–12 y of age	Living with biological/stepparent at age 4, early maltreatment (birth to age 4), caregiver characteristics (age, education level, depression, social support), home environment characteristics, study site, child gender, child race

Abbreviations: CPS, Child Protective Services; IPV, intimate partner violence.

TABLE 3 Quality assessment of seven selected studies on the association of parental or caregiver alcohol use with incidence of child maltreatment.

	Risk of bias for individual studies						
Criteria	Christoffersen (2003) [28]	Hafekost (2017) [25]	Huckle (2023) [8]	Paranjothy (2018) [31]	Kotch (1999) [32]	Lee (2013) [23]	Martin (2011) [26]
Cohort representative of underlying population (i.e. random/complete sampling with response rate ≥ 50%)	Low	Low	Low	Low	High	High	Cannot be assessed
Non-exposed cohort drawn from same underlying population as exposed cohort	Low	Low	Low	Low	Low	Low	Low
Parental/caregiver alcohol use validated by other reports (e.g. reported by self and other informants)	Some concerns	Some concerns	Low	Some concerns	High	High	High
For studies on incidence, child maltreatment validated as not being present at start of study	Some concerns	Some concerns	Low	Some concerns	Low	High	Low
For studies on incidence, child maltreatment validated as not being present in comparison group	Some concerns	Some concerns	Some concerns	Some concerns	Some concerns	High	High
Study adequately controlled for important potential confounders (i.e. age, sex and socio-economic status of the parent/caregiver)	Low	Low	Low	Low	Some concerns	Low	Low
Child maltreatment validated by social workers or health care professionals	Low	Low	Low	Low	Low	High	High
Proportion of participants lost to follow-up unlikely to introduce bias (i.e. <20%)	Low	Low	Low	Low	Cannot be assessed	High	High

use' as alcohol use was only self-reported and not otherwise validated. For recurrence of child maltreatment, two studies [30, 34] had high risk of bias on the criterion 'representativeness of the cohort'. These samples were derived from records of child protective services, so alcohol use among caregivers may be higher than that in the general population.

Results of individual studies and syntheses

Figure 2 shows the forest plots for studies on incidence of child maltreatment. Except for one study on child sexual abuse, six studies had estimates in the direction of higher risk. The meta-analysis of four studies showed that caregiver alcohol-related diagnoses were

TABLE 4 Quality assessment of five selected studies on the association of parental or caregiver alcohol use with recurrence of child maltreatment.

Criteria	Risk of bias for individual studies				
	Cheng (2015) [33]	Choi (2022) [29]	Kim (2019) [30]	Laslett (2012) [27]	Proctor (2012) [34]
Cohort representative of underlying population (i.e. random/complete sampling with response rate ≥ 50%)	Some concerns	Some concerns	High	Some concerns	High
Non-exposed cohort drawn from same underlying population as exposed cohort	Low	Low	Low	Low	Low
Parental/caregiver alcohol use validated by other reports (e.g. reported by self and other informants)	Low	Some concerns	Some concerns	Some concerns	High
For studies on incidence, child maltreatment validated as not being present at start of study	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
For studies on incidence, child maltreatment validated as not being present in comparison group	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Study adequately controlled for important potential confounders (i.e. age, sex and socio-economic status of the parent/caregiver)	Some concerns	Low	Low	Some concerns	Some concerns
Child maltreatment validated by social workers or health care professionals	Low	Low	Low	Low	Low
Proportion of participants lost to follow-up unlikely to introduce bias (i.e. <20%)	Low	Cannot be assessed	Low	Cannot be assessed	Low

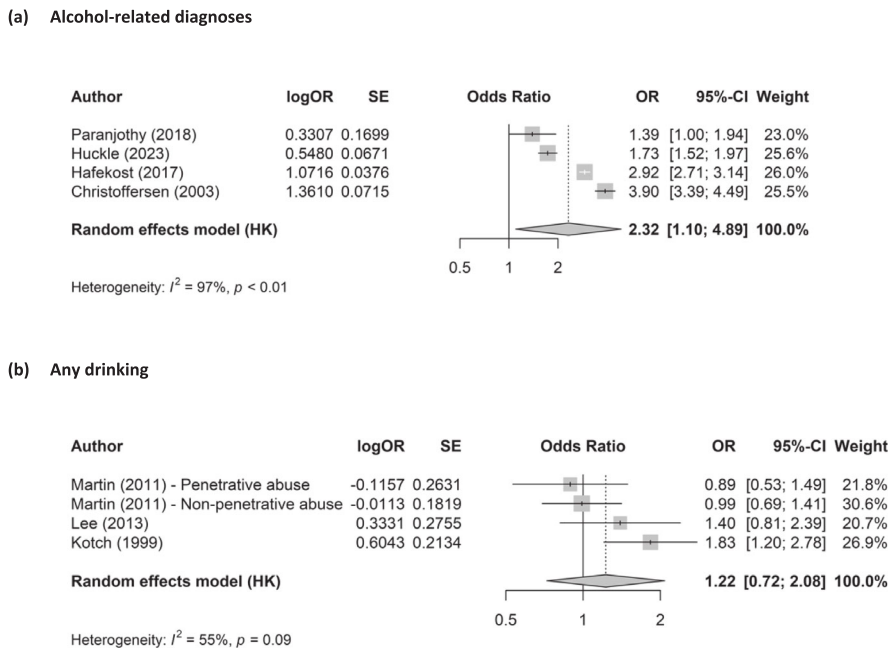

FIGURE 2 Forest plots of seven included studies on the association of parental or caregiver alcohol use with incidence of child maltreatment.

associated with higher incidence of child maltreatment (OR = 2.32, 95% CI = 1.10–4.89). The combined estimate for three studies on any caregiver drinking was smaller but also in the direction of higher risk (OR = 1.22, 95% CI = 0.72–2.08).

Figure 3 shows the forest plot for studies on recurrence of child maltreatment. All six estimates from five studies were in the direction of higher risk. Similar to the results above, caregiver alcohol-related diagnoses were also associated with higher recurrence of child maltreatment (OR = 1.92, 95% CI = 1.13–3.28).

Heterogeneity, sensitivity analysis and reporting bias

The above meta-analyses showed significant degrees of heterogeneity, with I^2 ranging from 55% to 97%. For the association of 'any drinking' with child maltreatment, excluding the study with lowest quality and assessment of child neglect only [23], yielded a very similar OR of 1.18 (95% CI = 0.45–3.09).

For incidence of child maltreatment, the funnel plot in Figure 4(a) shows fewer smaller studies with larger ORs (on the right), suggesting

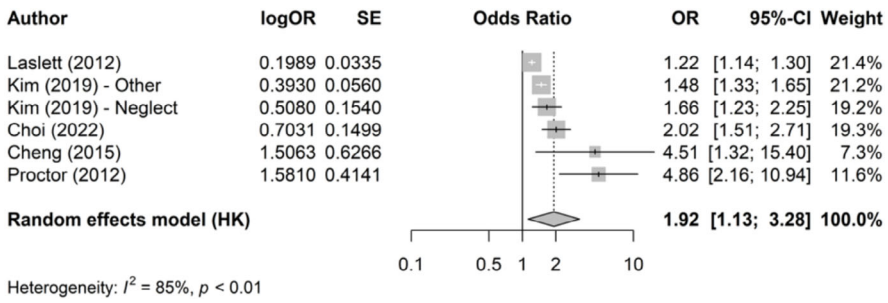

FIGURE 3 Forest plot of five included studies on the association of parental or caregiver alcohol-related diagnoses with recurrence of child maltreatment.

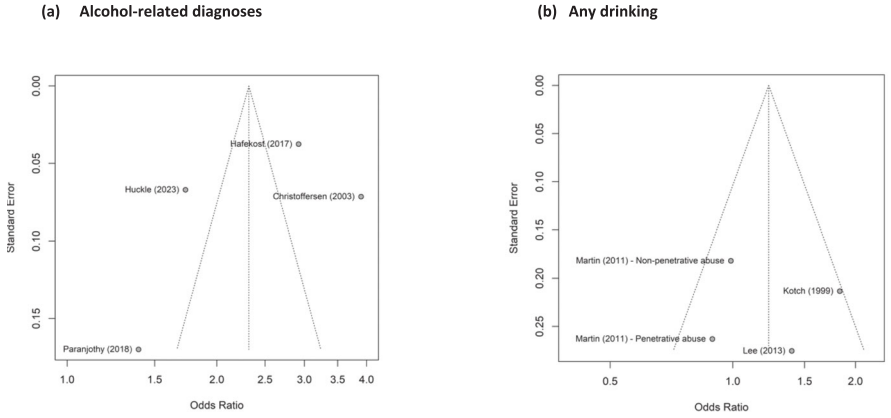

FIGURE 4 Funnel plots of included studies on the association of parental or caregiver alcohol use with incidence of child maltreatment.

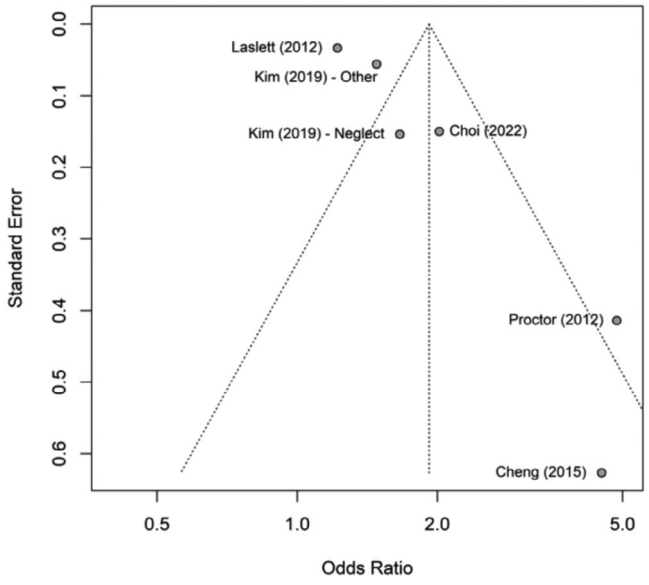

FIGURE 5 Funnel plot of included studies on the association of parental or caregiver alcohol-related diagnoses with recurrence of child maltreatment.

the possibility of reporting bias. After trim and fill, the combined OR increased to 2.73 (95% CI = 1.36–5.46) (Appendix S2, Figure S1a). Similarly, for studies on recurrence, the funnel plot in Figure 5 suggested evidence of reporting bias, with fewer smaller studies with smaller ORs. Trim and fill reduced the combined OR to 1.35 (95% CI = 0.69–2.63) (Appendix S2, Figure S1b).

DISCUSSION

Summary of findings

Our systematic review and meta-analysis of longitudinal studies showed consistent associations of parental or caregiver alcohol-related diagnoses with both higher incidence and recurrence of child maltreatment. We obtained similar estimates after adjustment for reporting bias. We could not rule out an association of any caregiver alcohol use with incidence of child maltreatment. However, this risk estimate was robust to sensitivity analysis.

Our systematic review and meta-analysis found that parents or caregivers with alcohol-related diagnoses had approximately twice the likelihood of child maltreatment compared to those without such diagnoses. This is consistent with findings from a previous systematic review showing higher risk of child physical abuse with parental alcohol abuse [10], and two more recent reviews showing higher risk of maltreatment among children with prenatal substance exposure [18, 19]. Alcohol use is linked to changes in the brain's prefrontal cortex, which may manifest as disinhibition and aggression [35]. Parents with alcohol-related problems may also be less available to supervise their children or protect them from maltreatment by another caregiver, who may not have used alcohol [36]. As our findings were based on observational studies, we could not conclude whether caregiver alcohol use has a causal relationship with child maltreatment. The determinants of child maltreatment likely include multiple factors involving the individual, family and community that are correlated to caregiver alcohol use [1]. Caregivers with adverse childhood experiences, such as parental

conflict or substance use, are more likely to develop alcohol-related problems and become perpetrators of violence [37]. On the neighbourhood level, higher availability of alcohol outlets allowing ready access for consumption at home, as well as lower social support, may increase the risk of child maltreatment [38]. These factors were not controlled for in the studies that we examined.

Of note, our findings were based on studies from high-income and predominantly Western countries, which may have different patterns of alcohol use, parenting attitudes and child maltreatment compared to other settings. These countries have similarly high levels of total alcohol use per capita (in those age ≥15 years), ranging from 8.2 L of pure alcohol in South Korea to 10.8 L of pure alcohol in the United Kingdom [39], and relatively high levels of heavy episodic drinking (in the past 30 days among those age ≥15 years), ranging from 33.2% in the United States to 45.2% in South Korea [39]. Associations may be less apparent in settings where heavy drinking patterns are less common. Evidence also suggests that child maltreatment may be less prevalent in cultures that value collectivism, family unity and children, and more common in cultures with stronger machismo attitudes [40, 41]. Moreover, the substantial heterogeneity between studies could be because of differences in the ascertainment of and responses to child maltreatment. The incidence of child maltreatment in this review ranged from 1% to 2% in studies on hospitalisation for maltreatment [28, 31] to 24% among children at high risk of maltreatment [32]. Similarly, recurrence of child maltreatment varied widely from 3.3% over 5 years [33] to 67.1% over 8 years [34]. The prevalence of child maltreatment is highly affected by methodological differences between studies [42], and stigma in some cultures may discourage disclosure of child maltreatment [40]. Countries with stronger measures to prevent and respond to violence against children may also have lower rates of child maltreatment [43].

Strengths and limitations

To our knowledge, this is the first systematic review of the relationship between caregiver alcohol use and all types of child maltreatment. The meta-analyses allowed this relationship to be quantified, which may be useful to inform comparative risk assessments on alcohol-attributable harm. We used a comprehensive and reproducible search strategy to identify relevant studies according to a pre-published protocol. To reduce error and bias, two independent reviewers were involved in study selection, quality appraisal and data extraction. We also selected studies with longitudinal analyses to minimise reverse causation.

Our review had several limitations. First, observational studies are open to residual confounding, and studies that failed to control for important confounders may overestimate the association of caregiver alcohol use with child maltreatment. We only included studies that adjusted for SEP, which is a well-documented confounder. Individuals with lower SEP are more susceptible to alcohol-related harm, including child maltreatment [11, 12]. Most studies appropriately adjusted for other potential confounders, such as parental mental ill health and drug or tobacco use, as well as the child's age, sex and ethnicity. A minority of studies controlled for family violence and history of childhood maltreatment, which may also confound the association of interest. However, studies rated as having 'some concerns' for adequate control of important confounders did not have consistently larger effect estimates than those rated as 'low risk'. Second, underreporting of both alcohol use and maltreatment was possible, particularly when self-reported without validation by other sources such as case worker reports or records of health service use. This may have led to attenuation of associations. Survey responses to typical quantities of alcohol consumed tend to be underestimates [44]. Screening questionnaires including Alcohol Use Disorders Identification Test and CAGE more accurately identify alcohol use disorders [45], although these were only used in two studies [33, 34]. Moreover, case worker reports may miss a substantial proportion of parents who self-report alcohol use [46], so studies that use multiple data sources may have less misclassification. Similarly, child maltreatment is likely to be substantially underestimated. Only a small proportion of children who are maltreated come into contact with child welfare agencies, which use variable definitions and methods to classify maltreatment [47]. Most studies in this review assessed substantiated child maltreatment, representing reports where investigation yielded sufficient evidence that child maltreatment occurred [48]. Evidence suggests that substantiation is also associated with higher likelihood of maltreatment re-reporting, potentially because a case worker is more likely to substantiate when the future risk of maltreatment is deemed high [49, 50]. Self-reports or caregiver reports may be closer to the true prevalence of child maltreatment, but are likely to be underestimates because of denial or forgetting [1]. Hospitalisations were based on those coded as maltreatment-related injuries [28, 31], which may have missed instances of maltreatment that did not present as physical injuries. However, we did not have sufficient studies for further subgroup analyses. Third, the comparison or reference group for incidence may have included children with maltreatment, which again, would underestimate associations with caregiver alcohol use. Children who were maltreated, but never received official attention or had insufficient evidence of maltreatment may be misclassified as having no history of maltreatment. Fourth, the limited number of studies meant that we could not conduct separate meta-analyses by type of child maltreatment. We have combined all forms of child maltreatment in our analyses, because most included studies did not differentiate between specific types of maltreatment, which frequently occur together [1]. Nonetheless, we obtained similar results after excluding child neglect from the meta-analysis with sexual abuse. Fifth, variable definitions of alcohol consumption were used across studies. Definitions of 'alcohol abuse' and 'alcohol-related problems' were unclear in several studies that relied on caseworker reports [27, 29, 30], which may contribute to heterogeneity. Here, the comparison groups may also have included individuals with alcohol-related problems in the past, leading to underestimation of associations with recurrence of child maltreatment. For comparability, we have consolidated different categories of alcohol use into one ('any drinking'), which may have introduced misclassification. However, estimates for any drinking

were in the direction of higher risk, consistent with those for alcohol-related diagnoses. Sixth, just one study examined paternal alcohol use only [23], which meant we could not assess whether associations differed by maternal, paternal or other caregivers' alcohol use. Seventh, we found considerable heterogeneity between studies. Although we were unable to further examine the potential sources of heterogeneity, our estimate for 'any drinking' remained similar on sensitivity analysis. Finally, there was evidence of reporting bias, with smaller studies potentially missing. However, we used trim and fill to adjust for reporting bias and found similar estimates.

Implications

This review showed that caregivers with alcohol-related diagnoses had higher risk of child maltreatment, adding to the growing body of evidence on alcohol's harm to others. While we could not confirm a causal role of caregiver alcohol use, our findings draw attention to this preventable risk factor for violence against children, calling for stronger actions to limit alcohol harm and child maltreatment. The United Nations Convention on the Rights of the Child reaffirms the need for government policies to protect children from violence [51], yet measures to address alcohol use are not always included in national strategies to prevent domestic violence, such as child maltreatment [52, 53].

Maltreatment may have lifelong negative effects on children, who are particularly vulnerable to harm as they must rely on adults for nurture and care. While not a focus of the current review, individual and family-based interventions show promise in preventing or reducing child maltreatment among parents with substance abuse [54]. From a public health perspective, the WHO recommends seven comprehensive and evidence-based strategies to end violence against children ('INSPIRE'), which promotes the implementation and enforcement of laws, norms and values, safe environments, parent and caregiver support, income and economic strengthening, response and support services, and education and life skills [55]. This package recommends policies to limit access to and misuse of alcohol [55], which our findings here support. Specifically these policies should involve increasing taxes on alcohol, comprehensive restrictions on alcohol marketing and reducing the availability of retailed alcohol, which are the most cost-effective interventions to reduce alcohol-related harm [56], including child maltreatment.

AUTHOR CONTRIBUTIONS

June Y. Y. Leung: Methodology (equal); data curation (equal); investigation (equal); formal analysis (supporting); writing—original draft (lead). **Karl Parker:** Methodology (equal); data curation (supporting); formal analysis (lead); software (lead); visualisation (lead); writing—review and editing (equal). **En-Yi Lin:** Investigation (equal); formal analysis (supporting); writing—review and editing (equal). **Taisia Huckle:** Conceptualisation (lead); funding acquisition (lead); methodology (equal); data curation (equal); investigation (equal); formal analysis (supporting); supervision (lead); validation (lead); writing—review and editing (equal).

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DECLARATIONS OF INTERESTS

None.

DATA AVAILABILITY STATEMENT

The R scripts and data used for the analyses are available from: https://doi.org/10.6084/m9.figshare.26093782.v2.

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SUPPORTING INFORMATION

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