

## Effects of maternal caffeine consumption on the breastfed child: a systematic review

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### Appendices 1–5

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#### Appendix 1: MEDLINE search strategy

- 1 exp Caffeine/ or caffeine\*.mp.
- 2 exp Tea/ or tea.mp.
- 3 exp Coffee/ or coffee.mp.
- 4 exp Chocolate/ or chocolate.mp. or exp Cacao/ or cacao.mp.
- 5 exp Cola/ or cola.mp.
- 6 exp Energy Drinks/ or energy drink\*.mp.
- 7 exp Central Nervous System Stimulants/ or central nervous stimulant\*.mp. or exp Xanthines/ or xanthine\*.mp. or methylxanthine\*.mp.
- 8 exp alcohol drinking/ or alcohol drinking.mp.
- 9 (alcohol adj1 (consum\* or drink\* or intake)).mp.
- 10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
- 11 exp Breast Feeding/ or breastfeeding.mp. or breast fe\*.mp. or exp Milk, Human/ or humanmilk.mp.
- 12 exp Lactation/ or lactati\*.mp. or exp Maternal-Child Nursing/ or maternal-child nursing.mp. or maternal child nursing.mp. or maternal nursing.mp.
- 13 (breastmilk or Breast milk).mp.
- 14 11 or 12 or 13
- 15 10 and 14
- 16 limit 15 to humans

Resources selected:

OVID MEDLINE

OVID MEDLINE Daily Update

OVID MEDLINE In-Process and Other Non-Indexed Citations

## Appendix 2: Cochrane Library summary of search results

The Cochrane Library and British Library searches resulted in 83 and 89 references respectively. Deduplication and removal of non-human studies reduced the number from 172 to 37 references. These 37 references were all excluded at title and abstract screen. Hand-searching of the Journal of Human Lactation and citation searching of included articles provided no further eligible references. A summary of these findings is presented in figure 2 in the main text.

Search performed online at:

<http://onlinelibrary.wiley.com/cochranelibrary/search>

<b>Cochrane Library summary of search results</b>		
<b>Caffeine search term</b>	<b>Total number of references when combined with individual BF terms</b>	<b>Deduplicated and human only references</b>
caffein*	16	8
tea	45	4
coffee	8	2
chocolate	9	2
cacao	4	1
cola	0	0
"energy drink**"	0	0
"central nervous system stimulant**"	0	0
xanthine*	0	0
methylxanthine*	1	1
TOTALS	83	18

<b>Breastfeeding (BF) search terms</b>
breastfe*
"breast fe**"
lactati*
"human milk"
breastmilk
"breast milk"
"maternal-child nursing"
"maternal child nursing"
"maternal nursing"

### Appendix 3: British Library summary of search results

Search performed online at:

[http://explore.bl.uk/primo\\_library/libweb/action/search.do?mode=Advanced&ct=AdvancedSearch&vid=BLVU1&ab=local\\_tab&dscnt=0&dstamp=1512405399227](http://explore.bl.uk/primo_library/libweb/action/search.do?mode=Advanced&ct=AdvancedSearch&vid=BLVU1&ab=local_tab&dscnt=0&dstamp=1512405399227)

<b>British Library summary of search results</b>		
<b>Caffeine search term</b>	<b>Total number of references when combined with individual BF terms</b>	<b>Deduplicated and human only references</b>
caffein*	25	4
tea	24	6
coffee	16	5
chocolate	7	1
cacao	1	0
cola	1	0
energy drink*	2	0
central nervous system stimulant*	0	0
xanthine*	12	2
methylxanthine*	1	1
TOTALS	89	19

<b>Breastfeeding (BF) search terms</b>
breastfe*
"breast fe**"
lactati*
"human milk"
breastmilk
"breast milk"
"maternal-child nursing"
"maternal child nursing"
"maternal nursing"

## Appendix 4: Table of exclusions

The reference numbers in this table refer to the reference list at the end of the appendix, not to the reference list for the main article text.

Study	Title	Exclusion reason
<b>Studies excluded at full text review</b>		
Alm et al. 2000 [1]	Living conditions in early infancy in Denmark, Norway and Sweden 1992- 95: Results from the Nordic Epidemiological SIDS Study	E
Al-Mazroui et al. 1997 [2]	Breastfeeding and supplemental feeding for neonates in Al-Ain, United Arab Emirates	E
Boutwell et al. 2012 [3]	Role of breastfeeding in childhood cognitive development: A propensity score matching analysis	E
Chien et al. 2009 [4]	Maternal lactation characteristics after consumption of an alcoholic soup during the postpartum 'doing-the-month' ritual	E
Connelly and Platt 2014 [5]	Cohort profile: UK Millennium Cohort Study (MCS)	O
Dowd 2007 [6]	Early childhood origins of the income/health gradient: The role of maternal health behaviors	E
Florey et al. 1995 [7]	Infant-feeding and mental and motor development at 18 months of age in firstborn singletons	E
Ghosh et al. 2006 [8]	Longitudinal study of the frequency and duration of breastfeeding in rural Bangladeshi women	E
Giglia and Binns 2007 [9]	Patterns of alcohol intake of pregnant and lactating women in Perth, Australia	O
Grace et al. 2017 [10]	Breastfeeding and motor development: A longitudinal cohort study	E
Grant et al. 2003 [11]	Risk factors for iron deficiency in a hospitalized urban New Zealand population	E
Guerrero et al. 1999 [12]	Rapid ethnographic assessment of breastfeeding practices in periurban Mexico City	E
Jansen 1977 [13]	Malnutrition and child feeding practices in Western Samoa	E
Jeong et al. 2017 [14]	Maternal food restrictions during breastfeeding	E
Karall et al. 2015 [15]	Breast-feeding duration: Early weaning-do we sufficiently consider the risk factors?	E
Ludvigsson and Ludvigsson 2005 [16]	Socio-economic determinants, maternal smoking and coffee consumption, and exclusive breastfeeding in 10205 children	E
Lust et al. 1996 [17]	Maternal intake of cruciferous vegetables and other foods and colic symptoms in exclusively breast-fed infants	E
Marques et al. 2001 [18]	Breastfeeding and early weaning practices in northeast Brazil: a longitudinal study	E
Martin et al. 2008 [19]	Correlates of smoking before, during, and after pregnancy	E
McCann et al. 1999 [20]	Neonatal feeding practices in periurban Bolivia	S
Mclsaac et al. 2015 [21]	Prevalence and characteristics associated with breastfeeding initiation among Canadian Inuit from the 2007-2008 Nunavut Inuit Child Health Survey	E
Medhi and Mahanta 2004 [22]	Breastfeeding, weaning practices and nutritional status of infants of tea garden workers of Assam	E
Mediano et al. 2014 [23]	Case-control study of risk factors for infectious mastitis in Spanish breastfeeding women	E
Mennella 1998 [24]	Short-term effects of maternal alcohol consumption on lactational performance	E
Mennella and Beauchamp 1998 [25]	Infants' exploration of scented toys: Effects of prior experiences	E
Mennella and Pepino 2008 [26]	Biphasic effects of moderate drinking on prolactin during lactation	E
Mennella and Pepino 2010 [27]	Breastfeeding and prolactin levels in lactating women with a family history of alcoholism	E

Mostert et al. 2005 [28]	Dietary intake of pregnant women and their infants in a poor black South African community	E
Ohri-Vachaspati and Swindale 1999 [29]	Iron in the diets of rural Honduran women and children	E
Park et al. 2016 [30]	Mechanistic pathways from early gestation through infancy and neurodevelopment	E
Petridou et al. 1997 [31]	The risk profile of childhood leukaemia in Greece: a nationwide case-control study	E
Prentice et al. 1980 [32]	Dietary supplementation of Gambian nursing mothers and lactational performance	E
Prentice et al. 1983 [33]	Dietary supplementation of lactating Gambian women. II. Effect on maternal health, nutritional status and biochemistry	E
Prentice et al. 1983 [34]	Dietary supplementation of lactating Gambian women. I. Effect on breast-milk volume and quality	E
Rea et al. 1999 [35]	Determinants of the breastfeeding pattern among working women in Sao Paulo	E
Robinson et al. 2013 [36]	Type of milk feeding in infancy and health behaviours in adult life: Findings from the Hertfordshire Cohort Study	E
Roomruangwong et al. 2016 [37]	Antenatal and postnatal risk factors of postpartum depression symptoms in Thai women: A case-control study	E
Schmidt et al. 2016 [38]	Lifestyle INtervention for Diabetes prevention After pregnancy (LINDA-Brasil): study protocol for a multicenter randomized controlled trial	S
Schuz et al. 2001 [39]	Risk factors for pediatric tumors of the central nervous system: results from a German population-based case-control study	E
Valmorbida and Vitolo 2014 [40]	Factors associated with low consumption of fruits and vegetables by preschoolers of low socio-economic level	E
Wade et al. 2014 [41]	Prospective associations of parental smoking, alcohol use, marital status, maternal satisfaction, and parental and childhood body mass index at 6.5 years with later problematic eating attitudes	E
<b><u>Studies excluded due to exposure alcohol versus caffeine</u></b>		
Alvik et al. 2006 [42]	Alcohol consumption, smoking and breastfeeding in the first six months after delivery	EA
Backstrand et al. 2004 [43]	Pulque intake during pregnancy and lactation in rural Mexico: alcohol and child growth from 1 to 57 months	EA
Borges et al. 1993 [44]	Parental alcohol consumption and postneonatal mortality	EA
Clifford and Campbell 2002 [45]	Infant colic - Empirical evidence of the absence of an association with source of early infant nutrition	EA
Flores-Huerta et al. 1992 [46]	Effects of ethanol consumption during pregnancy and lactation on the outcome and postnatal growth of the offspring	EA
Giglia et al. 2008 [47]	The effect of alcohol intake on breastfeeding duration in Australian women	EA
Little et al. 1989 [48]	Maternal alcohol use during breast-feeding and infant mental and motor development at one year	EA
Little et al. 2002 [49]	Alcohol, breastfeeding, and development at 18 months	EA
Logan et al. 2016 [50]	Changing societal and lifestyle factors and breastfeeding patterns over time	EA
Magnus et al. 2014 [51]	Prospective study of maternal alcohol intake during pregnancy or lactation and risk of childhood asthma: the Norwegian Mother and Child Cohort Study	EA
May et al. 2016 [52]	Breastfeeding and maternal alcohol use: Prevalence and effects on child outcomes and fetal alcohol spectrum disorders	EA
Mennella and Beauchamp 1991 [53]	The transfer of alcohol to human milk - Effects on flavor and the infant's behavior	EA
Mennella 1997 [54]	Infants' suckling responses to the flavor of alcohol in mothers' milk	EA
Mennella and Gerrish 1998 [55]	Effects of exposure to alcohol in mother's milk on infant sleep	EA
Mennella 2001 [56]	Regulation of milk intake after exposure to alcohol in mothers' milk	EA
Mennella and Garcia-Gomez 2001 [57]	Sleep disturbances after acute exposure to alcohol in mothers' milk	EA
Mennella et al. 2005 [58]	Acute alcohol consumption disrupts the hormonal milieu of lactating women	EA
Schuetze et al. 2002 [59]	The effects of alcohol in breast milk on infant behavioral state and mother-infant feeding interactions	EA

Yang et al. 2000 [60]	Parental smoking and alcohol consumption and risk of neuroblastoma	EA
E = wrong exposure; O = wrong outcome; S = wrong study design; EA = wrong exposure for this study but study met inclusion criteria for alcohol review		

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## Appendix 5: Data extraction template and risk of bias assessment

### Initial data extraction form

**Q. What are the effects on the breastfed infant of maternal alcohol and caffeine consumption during breastfeeding?**

#### Identification

Reviewer name	
Date of data extraction	

First author	
Year of publication	
Title	
Covidence study identifier #	

#### Methods

Case Control	
Cohort Study	
RCT	



Study Design

Aim of study

No of participants:

### **Population**

- 1) Mother (and child) characteristics of both case/control and cohort: age, gender, pre-existing medical conditions
- 2) Characteristics of breastfeeding – duration, frequency, quantity, exclusivity
- 3) Dietary characteristics of participant mothers

Study inclusion criteria

Study exclusion criteria

**Exposure**

No maternal alcohol consumption during breastfeeding vs maternal alcohol consumption of any frequency or quantity during breastfeeding.

No maternal caffeine consumption during breastfeeding vs maternal caffeine consumption of any frequency or quantity during breastfeeding.

Alcohol exposure reported?	
Quantity	
Frequency	

Caffeine exposure reported?

Quantity

Frequency

**Outcomes**

**Primary outcomes:**

Outcome name	Impact on infant sleeping behaviour		
Reporting type	Continuous	Dichotomous	Not reported

Outcome name	Impact on infant feeding behaviour		
Reporting type	Continuous	Dichotomous	Not reported

Outcome name	Impact on infant health		
Reporting type	Continuous	Dichotomous	Not reported

Outcome name	Impact on infant developmental milestones		
Reporting type	Continuous	Dichotomous	Not reported

**Secondary outcomes:**

Outcome name	Long-term impact on infant health		
Reporting type	Continuous	Dichotomous	Not reported

Outcome name	Impact on maternal health or maternal behaviour which has an influence on breastfeeding e.g. duration or extent		
Reporting type	Continuous	Dichotomous	Not reported

**Adjustments for confounding factors**

*Which factors?*

**Risk of bias assessment – choose appropriate version of Newcastle-Ottawa scale for study type**

See: [http://www.ohri.ca/programs/clinical\\_epidemiology/oxford.asp](http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp)

<b>Risk of bias reviewer name</b>	
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**Any difficulties in making Risk of Bias assessment?**

*e.g. outcomes*

## NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE – COHORT STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability

<b>Selection</b>	<p>1) <u>Representativeness of the exposed cohort</u></p> <p>a) truly representative of the average _____ (describe) in the community <input type="checkbox"/></p> <p>b) somewhat representative of the average _____ in the community <input type="checkbox"/></p> <p>c) selected group of users eg nurses, volunteers</p> <p>d) no description of the derivation of the cohort</p>
	<p>2) <u>Selection of the non exposed cohort</u></p> <p>a) drawn from the same community as the exposed cohort <input type="checkbox"/></p> <p>b) drawn from a different source</p> <p>c) no description of the derivation of the non exposed cohort</p>
	<p>3) <u>Ascertainment of exposure</u></p> <p>a) secure record (eg surgical records) <input type="checkbox"/></p> <p>b) structured interview <input type="checkbox"/></p> <p>c) written self report</p> <p>d) no description</p>
	<p>4) <u>Demonstration that outcome of interest was not present at start of study</u></p> <p>a) yes <input type="checkbox"/></p> <p>b) no</p>
<b>Comparability</b>	<p>1) <u>Comparability of cohorts on the basis of the design or analysis</u></p> <p>a) study controls for _____ (select the most important factor) <input type="checkbox"/></p>

	b) study controls for any additional factor <input type="checkbox"/> (This criteria could be modified to indicate specific control for a second important factor.)
<b>Outcome</b>	<p>1) <u>Assessment of outcome</u></p> <p>a) independent blind assessment <input type="checkbox"/></p> <p>b) record linkage <input type="checkbox"/></p> <p>c) self report</p> <p>d) no description</p>
	<p>2) <u>Was follow-up long enough for outcomes to occur</u></p> <p>a) yes (select an adequate follow up period for outcome of interest) <input type="checkbox"/></p> <p>b) no</p>
	<p>3) <u>Adequacy of follow up of cohorts</u></p> <p>a) complete follow up - all subjects accounted for <input type="checkbox"/></p> <p>b) subjects lost to follow up unlikely to introduce bias - small number lost - &gt; ____ % (select an adequate %) follow up, or description provided of those lost) <input type="checkbox"/></p> <p>c) follow up rate &lt; ____% (select an adequate %) and no description of those lost</p> <p>d) no statement</p>

**CROSSOVER TRIALS / N-OF-1 TRIALS ADDITIONAL ASSESSMENT QUESTIONS (to Newcastle-Ottawa cohort scale)**

(1) Can it be assumed that the trial was not biased from carry-over effects?

(2) Are unbiased data (paired data assessing difference within individual participants) available?