



# Effect on parental's cannabis consumption on the risk of sudden infant death syndrome: a systematic review


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## Abstract

*Objectives: to analyze and synthesize the available evidence on the effect of parental cannabis use on the risk of sudden infant death syndrome (SIDS).*

*Methods: a systematic review was conducted in PubMed/MEDLINE, Embase, Scopus, Web of Science, and the Cochrane Library, from inception to December 2023. The search terms included "marijuana," "cannab\*," "Sudden Infant Death," "Sudden Infant Death Syndrome," "SIDS," "Crib Death," and "Cot Death." Study selection was performed independently by two reviewers, with disagreements resolved by a third author.*

*Results: nine studies were included, all from developed countries. Statistical analyses specifically addressing the association between cannabis use and SIDS were available in seven studies, four of which suggested a positive association. However, limitations included the absence of detailed data on frequency, route, and intensity of cannabis use, with substantial variation in exposure assessment across studies, which hinders comparability.*

*Conclusions: Although there is evidence of an association between cannabis use and SIDS, methodological limitations prevent us from inferring causality. More robust research is needed to explore the mechanisms underlying cannabis use during pregnancy and postpartum by mothers and fathers in order to inform preventive recommendations.*

**key words** Cannabis, Marijuana use, Sudden infant death, Infant health



## Introduction

Sudden infant death syndrome (SIDS) is defined as the sudden death during sleep of any child under one year of age that remains unexplained after a thorough investigation of the case with review of the medical history, including postmortem examination and examination of the place of death, and is characterized as a preventable event.<sup>1</sup> In Brazil, there is still a lack of knowledge about the prevalence of this disease, mainly due to failure in diagnosis and reporting. According to data from the *Departamento de Informática do SUS (DATASUS)* (Public Health System Computing Department), 863 deaths from SIDS were recorded in Brazil between 2015 and 2020.<sup>2</sup>

The risk factors associated with this disease are broad and challenging. However, some are well established and can be categorized as intrinsic—such as the male sex, prematurity, genetic predisposition, and prenatal exposure to cigarettes and/or alcohol—and extrinsic—such as sleeping in prone or lateral decubitus positions, passive smoking, bed sharing with parents, excessive clothing and blankets causing overheating of the infant, soft mattresses, soft objects in the crib, and face covering.<sup>3</sup> Extrinsic factors are considered modifiable.

There is evidence that associate cannabis use during pregnancy with direct harm to the fetus. The proven harmful effects are low birth weight and being small for gestational age, as well as associations with harmful effects for premature birth and admission to the neonatal intensive care unit.<sup>4</sup> In relation to SIDS, there might be a direct relationship between increased risk of SIDS and parental cannabis use; however, the underlying mechanisms have not yet been fully clarified, and the correlation is limited and subject to further investigation.<sup>3,5</sup>

Nevertheless, the American Academy of Pediatrics (AAP) recommendations for reducing the risk of SIDS emphasize that exposure to nicotine, alcohol, marijuana, opioids, and illicit drugs should be avoided.<sup>6</sup> In Brazil, few studies have evaluated cannabis use during pregnancy, and the most recent data showed use by approximately 4.2% of the pregnant women in a low-income population, suggesting that this is an important public health issue.<sup>7</sup>

Therefore, this systematic review aims to analyze and synthesize the available evidence on the effect of parental cannabis use on the risk of SIDS, providing an overview of the current state of knowledge in this area. It is hoped that the results of this review will contribute to a better understanding of the risk factors for SIDS and inform effective preventive interventions.

## Methods

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)<sup>8</sup> guidelines and was registered in the International Prospective Register of Systematic Reviews (PROSPERO) under number CRD42024560749.

To define the guiding question, the following strategy was adopted: Population (children up to two years of age), Exposure (parental use of cannabis during pregnancy and/or postnatal), Comparison (absence of passive exposure to cannabis during pregnancy and/or postnatal), Outcome (occurrence of sudden infant death syndrome). The guiding question of the research was: “Is there an association between passive exposure to cannabis during pregnancy or after birth and the risk of sudden infant death syndrome?”, with passive exposure defined as inhalation of smoke or aerosol from burnt cannabis, or exposure via transplacental.

The research was conducted in December 2023, independently by two researchers, with no restrictions on publication period or language. The consulted databases were: Pubmed/MEDLINE, Embase, Scopus, Web of Science, and Cochrane Library. The search key used was: (marijuana) OR (cannab\*) AND (Sudden Infant Death) OR (Sudden Infant Death Syndrome) OR (SIDS) OR (Crib Death) OR (Cot Death).

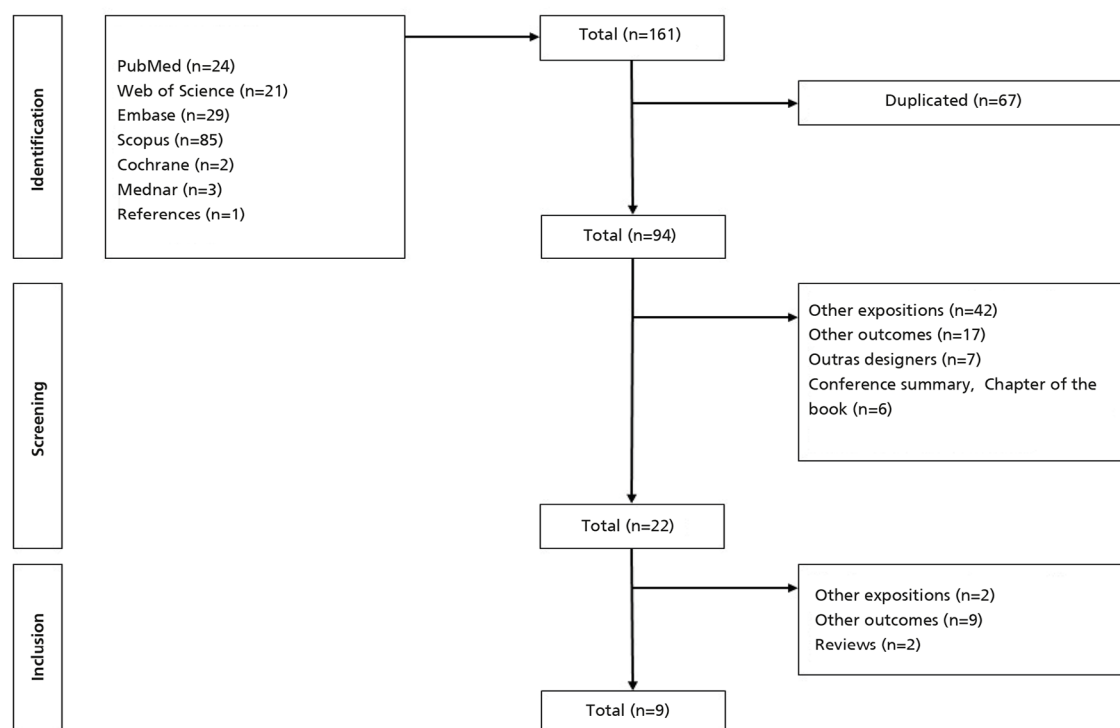
The selection of studies was performed by two researchers with the aid of Microsoft Excel® in an independent and standardized manner, and possible discrepancies were resolved by a third author. First, the titles and abstracts were read, and in a second phase, the full articles were read. The inclusion criteria were: (i) studies that evaluated exposure to cannabis, at any dose or via any route, during the gestational or postnatal period, (ii) studies that had sudden infant death syndrome as an outcome, and (iii) studies with a case-control, cohort, or retrospective cross-sectional design. The exclusion criteria were: (i) studies with exposures or outcomes other than those determined in the inclusion criteria, (ii) review studies, clinical protocols, case reports, and (iii) studies published in the form of book chapters, conference abstracts, letters to the editor, or editorials.

For the qualitative analysis, the following information was extracted from the studies: authors, year of publication, country where the research was conducted, study design, quantification of the exposed population, type of cannabis exposure, main results, and conclusions.

The risk of bias was assessed using the critical appraisal tools recommended by The Joanna Briggs

**Figure 1**

Flowchart shows the steps of identifying, screening, and including studies in the systematic review.



Institute (JBI), using the checklist for cohort studies, cross-sectional studies, and case-control studies.<sup>9</sup> These classifications were not used as criteria for excluding studies.

## Results

A total of nine studies were included in this systematic review. Of these, five (55.6%) were published in the last five years. It should be noted that 66.7% of the studies were conducted in the United States, and none of them evaluated data from developing countries. Table 1 summarizes the characteristics of these studies.

In the studies included in the systematic review, the method of assessing cannabis exposure varied, with the use of interviews, medical records, and toxicological testing. There was also variation in the timing of exposure, with the possibility of use at conception, during pregnancy, or in the postnatal period. Information on frequency, dose, and route of use was not available in the studies analyzed. Only two studies assessed parental cannabis use. The use of medical cannabis was not addressed by any of the researchers.

Regarding to the outcome of SIDS death, the studies mainly used information from autopsy reports or medical records. The number of SIDS deaths evaluated in each study ranged from four to 1,549. Altogether, the studies included in the systematic review evaluated 3,132 SIDS deaths.

A statistical analysis specifically correlating SIDS with cannabis use was available in seven of the nine studies included. In four of these seven studies, the results suggested an association between exposure and outcome. In the other three studies, although a trend toward association was suggested, the confidence intervals did not allow confirmation.

Table 2 shows the results of the risk of bias analysis of the studies included in the systematic review. It can be observed that the studies included in the review met most of the requirements for a lower risk of bias, according to the assessment scales used.

## Discussion

Based on the analysis of the studies selected in this systematic review, it was demonstrated that most of the available literature presented results suggesting a correlation between parental cannabis use and SIDS.

Given the increasing legalization of cannabis in the Western world, its use is becoming more prevalent each year, involving women of childbearing age and, consequently, pregnant women.<sup>18</sup> Data from the 2016 and 2017 US National Surveys of Drug Use and Health showed that 12% of the pregnant women in their first trimester and about 4% in their second and third trimesters reported using cannabis in the past 30 days.<sup>18</sup> In the same survey, 20% of the pregnant women who reported cannabis use met the criteria for drug dependency.<sup>19</sup>

Table 1

Characteristics of studies included in the systematic review, ordered by year of publication. Brazil, 2025.

Author, year	Country	Design	Study period	Exposure assessed	Outcomes assessed	n (outcome)	n (controls or missing outcome)	Statistical analysis
Rosen and Johnson, <sup>10</sup> 1988	United States	Prospective cohort	1982 to 1983	Gestational exposure to cannabis was identified by maternal report during prenatal care	SIDS was defined after autopsy	4	61	Of the four children who died from SIDS, 3 were daughters of mothers who used cannabis
Ostrea Jr et al., <sup>11</sup> 1997	United States	Prospective cohort	1988 to 1989	Gestational exposure to cannabis was identified by meconium analysis	The cause of death was defined by medical records	11	2,953	For children exposed to drugs of abuse in general: OR = 1.5 (95%CI = 0.46 to 5.01)
Klonoff-Cohen and Lam-Kruglick, <sup>12</sup> 2001	United States	Case-control	1989 to 1992	The children's parents were interviewed about cannabis use from conception to the child's death	SIDS was defined after autopsy report	239	239	Use at conception: aOR=2.2 (1.2 - 2.4), p=0.01; Use during pregnancy: aOR=2.0 (1.0 - 4.1), p=0.05; Postnatal use: aOR=2.8 (1.1 - 7.3), p=0.04
Scragg et al., <sup>5</sup> 2007	New Zealand	Case-control	1987 to 1990	Exposure to cannabis during pregnancy and postnatal was identified in interviews with mothers	SIDS was defined after autopsy reports and police investigation of alternative causes	393	1,800	Use during pregnancy: aOR=1.18 (95%CI=0.76 to 1.85); Postnatal use: aOR=1.38 (95%CI=0.90 to 2.12)
Claudet et al., <sup>13</sup> 2021	France	Retrospective cross-sectional study	2015 to 2018	Cannabis exposure was identified by toxicological analysis after death	SIDS was diagnosed at reference centers in the country, including cases in which toxicological analysis was requested	398	-	Cannabis exposure was identified in 25% of cases
Bandoli et al., <sup>14</sup> 2022	United States	Retrospective cohort	2005 to 2017	Any maternal diagnosis related to cannabis use <sup>1</sup>	SIDS was defined by cause of death records <sup>2</sup>	211	484,905	aOR = 2.7 (95%CI = 1.5 to 5.0)
Hauck and Blackstone, <sup>15</sup> 2022	United States	Case-control	1993 to 1996	Cannabis use during pregnancy	SIDS was defined after autopsy report	195	195	OR = 2.76 (95%CI = 1.28 to 5.93)
MacFarlane et al., <sup>16</sup> 2022	New Zealand	Case-control	2012 to 2015	Parents of children were interviewed about cannabis use in the last 24 hours	SIDS was defined after autopsy report and police investigation of alternative causes	132	258	OR = 6.41 (95%CI = 0.44 to 94.26)
Bandoli et al., <sup>17</sup> 2023	United States	Retrospective cohort	2011 to 2018	Any maternal diagnosis related to cannabis use <sup>1</sup>	SIDS was defined by cause of death records <sup>2</sup>	1549	3,459,555	aOR = 1.5 (95%CI = 1.2 to 1.9)

<sup>1</sup>cannabis abuse without dependence; cannabis dependence; cannabis related disorder; <sup>2</sup>death recorded as "SIDS," "accidental suffocation or strangulation in bed," or "unknown cause." CI = confidence interval; OR = odds ratio; aOR = adjusted odds ratio; SIDS = sudden infant death syndrome.

Table 2

Critical evaluation checklist for cohort, cross-sectional, and case-control studies. Brazil, 2025.											
Cohort studies	Evaluation criteria <sup>a</sup>										
	1	2	3	4	5	6	7	8	9	10	11
Bandoli <i>et al.</i> , <sup>14</sup> 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	Y
Bandoli <i>et al.</i> , <sup>17</sup> 2023	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	Y
Ostrea Jr <i>et al.</i> , <sup>11</sup> 1997	Y	Y	U	N	U	Y	Y	Y	Y	NA	Y
Rosen and Johnson, <sup>10</sup> 1988	N	Y	Y	Y	N	Y	Y	Y	Y	NA	N
Case-control studies	1	2	3	4	5	6	7	8	9	10	
Hauck and Blackstone, <sup>15</sup> 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Klonoff-Cohen and Lam-Kruglick, <sup>12</sup> 2001	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
MacFarlane <i>et al.</i> , <sup>16</sup> 2022	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	
Scragg <i>et al.</i> , <sup>5</sup> 2007	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	
Cross-sectional studies	1	2	3	4	5	6	7	8			
Claudet <i>et al.</i> , <sup>13</sup> 2021	Y	Y	Y	Y	Y	N	Y	N			

Y = Yes; N = No; U = Unclear; NA = Not applicable.

Aromataris *et al.*<sup>9</sup>

Tetrahydrocannabinol (THC), the main psychoactive component of cannabis, is lipophilic and easily crosses the placenta, where it can accumulate in the fetus.<sup>20</sup> Studies suggest that prenatal exposure to THC can disrupt the endocannabinoid system, which is crucial for placental implantation and fetal development.<sup>20</sup> A 2022 meta-analysis associated cannabis use during pregnancy with a 61% increase in the risk of small babies for gestational age, a 106% increase in the risk of low birth weight, a 28% increase in the risk of premature birth, and a 38% increase in the risk of admission to a neonatal intensive care unit.<sup>21</sup>

Considering the specific relationship between perinatal cannabis use and the risk of SIDS, the study by Bandoli *et al.*<sup>14</sup> showed that a diagnosis related to cannabis use during pregnancy conferred a 2.7-fold increased risk of SIDS, including adjustment for maternal nicotine use.<sup>14</sup> The results of a new research by the same group in 2023 showed that the incidence of infant death in the first year of life was higher among those diagnosed with maternal cannabis use disorder compared to those without this diagnosis.<sup>17</sup>

A French study evaluated the postmortem toxicological analysis of 398 cases of infants who died of SIDS between 2015 and 2018. The main substances isolated were illicit drugs (43%), with cannabis and opiates being the main drugs identified.<sup>13</sup> However, specific statistics for cannabis alone were not reported, preventing conclusions about this possible association. Similarly, the study by Rosen and Johnson<sup>10</sup> did not evaluate cannabis individually, but in only one of the SIDS cases analyzed, the infant was the child of a mother with a history of marijuana use and mild alcohol abuse.<sup>10</sup>

Klonoff-Cohen and Lam-Kruglick study<sup>12</sup> was the only one selected to analyze the influence of paternal cannabis use on SIDS, highlighting that the role of paternal use of psychoactive drugs is an understudied area.

Paternal cannabis use during conception, pregnancy, and the postnatal period, considering smoking in the presence of or near the baby, was significantly associated with SIDS in univariate and multivariate analyses. According to the authors, this result can be attributed to the higher prevalence of men who smoke cannabis compared to women, as well as the greater amount, frequency, and duration of use among men.<sup>12</sup>

Another research, conducted in the United States in 2021, concluded that the use of alcohol, cocaine, and cannabis during pregnancy increases the risk of SIDS, with maternal cannabis use during pregnancy increasing the risk of SIDS fivefold.<sup>15</sup> However, cannabis use became insignificant in the multivariate model, considering sociodemographic variables.<sup>15</sup>

In contrast, other studies analyzed<sup>11,13</sup> showed that the relationship between parental cannabis use and SIDS may not be so direct, presenting other correlated factors that must be taken into account. A research conducted in New Zealand showed that recent cannabis use by caregivers, when considered in isolation, was not statistically significantly associated with SIDS.<sup>16</sup> However, exposure to potentially correlated risk factors, such as sleeping on the couch or recent use of alcohol and/or other drugs by caregivers, was associated with a significantly increased risk of SIDS.<sup>16</sup>

Ostrea *et al.*<sup>11</sup> evaluated 2,964 infants in the United States at birth for exposure to various drugs through meconium analysis. However, mortality rates in the drug-positive group, specifically including cannabinoids, were not significantly different from those in the drug-negative groups.<sup>11</sup> In contrast, another study in New Zealand found a strong relationship between cannabis use since birth and SIDS. However, after adjusting for ethnicity and smoking, the main associations with cannabis use, the risk fell to 1.73, and to 1.47 with all confounding factors, remaining

significant.<sup>5</sup> However, the results suggest that cannabis is a weak risk factor for SIDS, and that the risk associated with frequent cannabis use (weekly or more) by mothers is similar to that of tobacco (daily) and equally influenced by sociodemographic factors.<sup>5</sup>

The AAP notes in its recommendations that parents who use illicit substances become less vigilant, which prevents them from promptly noticing situations that pose a risk to their child and reduces their ability to wake up in an emergency. The risk is even greater in situations of bed sharing, where impaired alertness can lead to serious incidents, such as accidental suffocation when rolling over on the child.<sup>6</sup> In addition, these parents may fall asleep with the infant in their arms, increasing the risk of falls and suffocation. Impaired lucidity caused by substance use also predisposes parents to situations of negligence, such as leaving objects near the baby's face, positioning the baby improperly for sleep, or overheating the child, all of which are factors that can lead to suffocation or other fatal risks.<sup>6</sup>

The review identified important limitations in the available studies: geographic bias due to the predominance of research in developed countries; use of inaccurate indicators of cannabis exposure, often based only on maternal diagnostic codes; wide variation in how consumption is measured (frequency, intensity, route of use), without considering oral intake or postnatal exposure through breast milk; and inconsistencies in the classification of consumption frequency, which reduces comparability between studies.

## Final considerations

Overall, the studies analyzed in this systematic review suggest a possible association between cannabis use and the risk of SIDS. However, the limitations of this review highlight the need for more comprehensive studies on the isolated use of cannabis by mothers and fathers and its relationship with SIDS, with more accurate data on frequency, intensity, and route of use. Most studies focus on developed countries and lack adequate analysis of socioeconomic variables that influence the results. Therefore, future studies are needed to explore the mechanisms underlying cannabis use during pregnancy and postpartum, by both mothers and fathers, to establish a more accurate correlation with SIDS. These studies should replicate the findings in new contexts and identify mediating variables in the causal pathway between cannabis use and infant mortality. In addition, it is imperative to develop effective interventions to treat cannabis use disorder during pregnancy, as well as to implement national recommendations for investigative examinations in light of the national infant mortality registry. This will contribute to a better understanding and

mitigation of the risks associated with parental cannabis use and SIDS.

## Authors' contributions

Bignoto LLC, Fernandes PC, Bastida ACF: data extraction, writing of the original draft.

Alvim VF: coordination of the research, final writing of the manuscript.

Grunewald STF: research design and coordination, data analysis, final manuscript writing.

All authors approved the final version of the article and declare no conflict of interest.

## Data Availability

The entire dataset supporting the results of this study has been published in the article itself.

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