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## **The impact of cosmetic breast implants on breastfeeding: a systematic review and meta-analysis**

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1 **Abstract**

2 **Background:** Cosmetic breast augmentation (breast implants) is one of the most common  
3 plastic surgery procedures worldwide and uptake in high income countries has increased in  
4 the last two decades. Women need information about all associated outcomes in order to  
5 make an informed decision regarding whether to undergo cosmetic breast surgery. We  
6 conducted a systematic review to assess breastfeeding outcomes among women with breast  
7 implants compared to women without.

8 **Methods:** A systematic literature search of Medline, Pubmed, CINAHL and Embase  
9 databases was conducted using the earliest inclusive dates through December 2013. Eligible  
10 studies included comparative studies that reported breastfeeding outcomes (any  
11 breastfeeding, and among women who breastfed, exclusive breastfeeding) for women with  
12 and without breast implants. Pairs of reviewers extracted descriptive data, study quality, and  
13 outcomes. Rate ratios (RR) and 95% confidence intervals (CI) were pooled across studies  
14 using the random-effects model. The Newcastle-Ottawa scale (NOS) was used to critically  
15 appraise study quality, and the National Health and Medical Research Council Level of  
16 Evidence Scale to rank the level of the evidence.

17 **Results:** Three small, observational studies met the inclusion criteria. The quality of the  
18 studies was fair (NOS 4-6) and the level of evidence was low (III-2 - III-3). There was no  
19 significant difference in attempted breastfeeding (one study, RR 0.94, 95%CI 0.76, 1.17).  
20 However, among women who breastfed, all three studies reported a reduced likelihood of  
21 exclusive breastfeeding amongst women with breast implants with a pooled rate ratio of 0.60  
22 (95%CI 0.40, 0.90).

23 **Conclusions:** This systematic review and meta-analysis suggests that women with breast  
24 implants who breastfeed were less likely to exclusively feed their infants with breast milk  
25 compared to women without breast implants.

26 This systematic review has been registered with the international prospective register of  
27 systematic reviews (PROSPERO): CRD42014009074

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29 **Keywords:** breastfeeding; breast implants; mammoplasty; systematic reviews; meta-analysis

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## 43 **Background**

44 Since the introduction of silicone gel and saline breast implants for cosmetic enhancement of  
45 breast size in the early 1960's, breast augmentation has become one of the most common  
46 plastic surgery procedures worldwide [1]. In 2012, 286,000 women in the U.S. had breast  
47 augmentation surgery– an increase of 877% from 1992, when the American Society of Plastic  
48 Surgeons began formulating yearly national cosmetic surgical statistics [2]. The majority of  
49 women who undergo such surgery do so during their reproductive years [3], despite  
50 ambiguity regarding the risks to breastfeeding success associated with breast implants.

51

52 Breastfeeding has immediate and longer term nutritional, gastrointestinal, immunological,  
53 and neurodevelopmental benefits to the baby, and psychosocial benefits for the mother [4].  
54 WHO recognises that while providing some breast milk to the infant is better than none,  
55 exclusive breastfeeding is needed to achieve optimal growth, development, and health for  
56 infants [5]. If supplementary formula feeding is initiated, the infant does not receive the full  
57 advantages of exclusive breastfeeding and the breastfeeding mother must also engage in a  
58 complicated balancing act between maintaining or increasing the existing supply while  
59 ensuring the infant receives adequate nourishment. The potential to compromise lactation as a  
60 result of breast augmentation is particularly relevant with regards to cosmetic breast surgery,  
61 which is an elective procedure motivated by aesthetic appeal, rather than in reconstructive  
62 surgery (such as following mastectomy). Since there is an element of choice, women need  
63 information about all associated risks, both short and long term, in order to make an informed  
64 decision regarding whether to undergo cosmetic breast surgery.

65

66 The internet currently serves as a prominent source of medical information for people  
67 considering plastic surgery [6, 7]. However, a considerable amount of the information

68 accessed through search engines regarding breast augmentation in general and its effects on  
69 lactation in particular is either misleading or inaccurate [8, 9]. Other media have also been  
70 shown to be unbalanced, with two thirds of the feature articles on cosmetic surgery in the UK  
71 portraying it as risk-free with no mention of potential problems or complications [10]. With  
72 the abundance of very accessible, unfiltered sources of information, there is a need for  
73 evidence based evaluation of the risk to future breastfeeding ability that can be offered to  
74 women considering breast augmentation. The aim of this systematic review is to assess  
75 breastfeeding outcomes among women with bilateral cosmetic breast augmentation (also  
76 referred to as breast implants, mammoplasty and mammoplasty) compared to women without  
77 breast surgery [11]. Specifically to assess 1) the rate of any breastfeeding and 2) among  
78 women who breastfeed, the rate of exclusive breastfeeding.

79

## 80 **Methods**

### 81 *Search Methods*

82 A systematic search of published studies in Medline, Pubmed, CINAHL and Embase  
83 databases using earliest inclusive dates through December 2013 was employed. The search  
84 strategy combined terms related to breast surgery along with terms related to breastfeeding,  
85 using both subject headings and key words when applicable. There were no language or any  
86 other restrictions. The specific search strings used for each of the databases is given in Table  
87 1. The database search was supplemented by hand-searching reference lists of relevant  
88 publications.

89

### 90 *Eligibility criteria and outcomes*

91 Studies comparing women who have undergone breast augmentation to women without prior  
92 breast augmentation were eligible for inclusion [11]. The outcomes of interest were 1)  
93 breastfeeding rates and, 2) among the women who breastfeed, exclusive breastfeeding at the  
94 time of assessment. Exclusive breastfeeding was defined as providing only breast milk  
95 (directly from the breast or as expressed breast milk) or as defined by the study. Non-  
96 exclusive breast milk feeding included any use of breast milk substitute/formula feeding or  
97 insufficient lactation as defined by the study.

98

#### 99 *Study selection*

100 The review allowed the inclusion of clinical trials and observational studies (cohort, case-  
101 control, or cross-sectional studies), but excluded case series or reports, guidelines, comments  
102 or reviews without original data [11]. We also excluded studies of women with breast  
103 augmentation subsequent to treatment for breast cancer, studies with a comparison group that  
104 comprised women with other types of breast surgery, and those lacking a control group  
105 altogether.

#### 106 *Data extraction*

107 The titles and abstracts of all articles identified from the systematic search were screened.  
108 The full-text of potentially eligible articles was reviewed for inclusion by at least two  
109 independent assessors. Any disagreements regarding inclusion of particular studies were  
110 resolved through discussion. After the final list of studies to be included was established, data  
111 on the primary and secondary outcomes were extracted independently by two reviewers using  
112 a standard form. Results were compared and any discrepancies were resolved through  
113 discussion and/or following consultation with a third reviewer.

114

#### 115 *Quality assessment*

116 To assess the risk of bias within the included studies, the Newcastle-Ottawa Scale (NOS) for  
117 assessing the quality of non-randomized studies in meta-analyses was utilised [12]. Using this  
118 scale, a non-randomized study can be awarded a maximum of nine stars on items related to  
119 the selection of the study groups (four stars), the comparability of the exposed and unexposed  
120 groups (two stars), and the ascertainment of outcomes of interest (three stars). Prior to the  
121 rating process, we tailored the scale to capture potential sources of bias relevant to the  
122 included studies by pre-specifying the desired minimum duration of follow up to one month  
123 postpartum, as well as identifying the main confounding factors (maternal age, parity,  
124 intention to breastfeed, gestation at birth and mode of delivery). As the NOS compares non-  
125 randomized studies within study design groups, the strength of the evidence was also ranked  
126 on the National Health and Medical Research Council Level of Evidence Scale [13]. Using  
127 this scale studies are ranked as Level I Evidence for systematic reviews of randomized  
128 controlled trials, II for randomized controlled trials, III-1 for pseudorandomized trials, III-2  
129 for comparative studies with concurrent controls, III-3 for comparative studies without  
130 concurrent controls and IV for case series. The included studies were rated independently by  
131 three reviewers, the scores and ranks were compared, and any differences in scoring were  
132 resolved through discussion.

133

#### 134 *Statistical analysis*

135 The rate of any breastfeeding following a birth subsequent to breast augmentation, and the  
136 rate of exclusive breastfeeding was calculated from the raw data presented in the included  
137 papers. The outcomes were assessed for all women in the studies and in a post-hoc subgroup  
138 analysis by incision type. For outcomes from two or more contributing studies, rate ratios  
139 (RR) from each study were pooled using a random effects meta-analysis, with trials weighted  
140 by their inverse variance [14]. STATA's "metan" command was used to perform the meta-

141 analyses. The degree of variability across studies was summarized using the  $I^2$  statistic that  
142 estimates the percentage of total variation across the studies that is due to heterogeneity rather  
143 than chance [15].

## 144 **Results**

145 Systematic database searches yielded 1435 records, of which 936 were unique citations. A  
146 further 10 papers were identified through hand searching. Of 946 unique records, 941 were  
147 excluded based on the title and/or abstract as they were irrelevant to the review, did not  
148 include the exposure or outcomes of interest, or failed to meet the other stated criteria (Figure  
149 1). Only five full-text articles were reviewed, of which two were excluded due to inability to  
150 distinguish pregnancies before and after breast augmentation [16], or between breast  
151 augmentation and other breast surgeries [17].

152

153 The characteristics of the three included studies are summarised in Table 2. All included  
154 studies were hospital-based cohort studies (Evidence Levels III-2 – III-3), enrolling women  
155 from either a surgery clinic, a maternity ward, or a lactation support service. Andrade et al.  
156 [18] excluded women with more than one type of plastic surgery of the breast, thus not  
157 including women with augmentation subsequent to mastectomy, whereas Cruz and Korchin  
158 [19] and Hurst [20]’s studies lack any reference to whether women with breast implants for  
159 reconstructive purposes were included. While Cruz and Korchin [19] included only women  
160 with saline implants in their study cohort, information on implant type is not indicated in the  
161 two other studies. Both Cruz and Korchin [19] and Hurst [20], report their findings by the  
162 type of incision made for the breast implantation (sub/inframammary or periaerolar). Only  
163 one study [18] attempted to reduce confounding by restricting the cohort to ‘healthy’ infants,  
164 ‘healthy’ breasts, and mothers without a history of low breast milk production. In contrast,  
165 Hurst [20] primarily recruited mothers whose infants were both hospitalized in a children’s



166 hospital and referred to the hospital's lactation support team. Many of these were high risk  
167 babies with high rates of preterm birth and low birthweight. Cruz and Korchin [19] recruited  
168 women with small breasts who were evaluated for possible breast augmentation. For women  
169 who had previously had children, prior breastfeeding experience was obtained, although the  
170 number of children, duration since birth and intention to breastfeed were not reported.  
171 Breastfeeding outcomes were then compared to those of women who had a birth subsequent  
172 to breast augmentation [19].

173  
174 The quality of the studies was fair (NOS scores 4-6) and the strength of evidence was low  
175 (Evidence Levels III-2 – III-3) (Table 2). NOS scores were reduced for deriving the study  
176 population from a single hospital or clinic [18-20], incomplete description of how the  
177 exposed cohort was identified [18], selection of cases and controls from different time  
178 periods that may lead to biases [19], limited attempt to control for potential confounders [19],  
179 using a matched design but an unmatched analysis [20], relying on self-report rather than  
180 observation for the assessment of breastfeeding [18-20], follow-up duration shorter than one  
181 month [19], and lacking information on loss to follow-up [20].

182  
183 Assessed outcomes differed considerably across studies. While Cruz and Korchin [19] and  
184 Andrade et al. [18] chose to define a time point at which the success of breastfeeding was  
185 assessed (two weeks and one month, respectively), Hurst [20] evaluated the overall success  
186 of lactogenesis and breastfeeding up to 2-3 months postpartum or until breastfeeding ceased.  
187 Notably, while Hurst [20] and Andrade et al. [18] explicitly defined breastfeeding as infants  
188 receiving breast milk, whether directly from the breast or as expressed milk, it is unclear  
189 whether Cruz and Korchin [19] included expressed breast milk when referring to "successful  
190 breastfeeding".

191 Of the three included studies, only Cruz and Korchin [19] included both women attempting to  
192 breastfeed or not, and found similar rates of attempted breastfeeding for women with (59%)  
193 and without (63%) breast augmentation (RR 0.94, 95%CI 0.76, 1.17) including 37% and  
194 55%, respectively, reporting any breastfeeding at 2 weeks (RR 0.67, 95%CI 0.50, 0.91).  
195 These rates did not differ by incision type. However, among women who breastfed, all three  
196 studies [18-20] reported a reduced likelihood of exclusive breastfeeding for women with  
197 breast augmentation with a pooled rate ratio of 0.60 (95%CI 0.40, 0.90) (Figure 2).  
198 Alternatively, if the outcome is formulated as non-exclusive breastfeeding then the pooled  
199 analysis gives a 3-fold increase (RR 3.00, 95%CI 1.16, 7.80) in the use of supplementary  
200 formula feeding among women with breast implants who attempt to breastfeed. Of the two  
201 studies that examined outcomes by incision type [19, 20], sub/inframammary incisions were  
202 associated with a reduction in exclusive breastfeeding (pooled RR 0.61, 95%CI 0.46, 0.82)  
203 compared to women with breast implants whereas periareolar incisions had a wide  
204 confidence interval (pooled RR 0.32, 95%CI 0.04, 2.51) which did not provide evidence of  
205 an effect.

206

## 207 **Discussion**

208 Despite the frequency and increasing popularity of breast augmentation [21], this systematic  
209 review highlights a lack in the quality and strength of evidence to inform women considering  
210 cosmetic breast implants about the potential impact on successful breastfeeding. Although  
211 women with breast augmentation were found to be as likely to attempt breastfeeding as  
212 women without breast augmentation, women with breast augmentation were less likely to  
213 exclusively feed their infants with breast milk. However, the first finding is based on a single  
214 study and the second on only three, with none of the included studies having high quality or  
215 level of evidence scores [12, 13]. Reduced likelihood of exclusive breastfeeding may be

216 attributed directly or indirectly to: the augmentation surgery or the inserted breast implants,  
217 an underlying condition (breast hypoplasia), or different attitudes and expectations among  
218 women who have breast augmentation surgery.

219

220 Breast implantation surgery can cause damage to ducts, glandular tissue, or innervation of the  
221 breast [22, 23]. Alternatively, breast implants may place pressure on the breast tissue, which  
222 can damage the breast tissue or block lactiferous ducts [20]. Reduced capacity to lactate can  
223 also result from surgery-related complications [24, 25], the most common of which are  
224 capsular contracture, hematoma formation, infection, or pain that can turn breastfeeding into  
225 a painful experience. The effect of such complications on breastfeeding has been documented  
226 in several case studies [26-29]. Risk to lactation capacity increases with time from the initial  
227 surgery as some women face the need to undergo reoperation to maintain or improve an  
228 initial result, or to treat complications [22]. The studies included in this review did not add to  
229 our knowledge of the specific mechanisms by which breast augmentation may disrupt normal  
230 breastfeeding function, as there was no detailed information on the surgical history and  
231 prevalence of complications was not reported.

232

233 Another possible explanation of our findings is the pre-surgical condition of breast  
234 hypoplasia, which may be especially prevalent among women choosing breast augmentation.  
235 Given current evidence, we are unable to rule out this condition as the cause of reduced milk  
236 production and the need to supplement breastfeeding with breast milk substitute. This  
237 condition of insufficient glandular tissue - often characterised by small, asymmetrical, or  
238 unusually (mostly tubular) shaped breasts, a wide intramammary space and enlarged areolas  
239 – can significantly reduce milk production [30]. The incidence of hypoplastic breasts in the  
240 general population or its proportion among women choosing to go through breast

241 implantation is unknown. In this regard, Cruz and Korchin [19]’s control cohort of women  
242 with previous births who subsequently presented as candidates for breast augmentation may  
243 have allowed them to control for pre-surgical conditions. Thus, this study potentially points  
244 to the implantation surgery itself, rather than pre-surgical hypoplasia, as the cause of reduced  
245 exclusive breastfeeding rates. However, as Cruz and Korchin do not demonstrate the  
246 comparability of their cohorts at the time of giving birth (e.g. maternal age, parity, and socio-  
247 economic status), differences in the women could also explain the findings.

248

249 The observed association of breast augmentation with supplementary feeding could also  
250 result from a difference in attitudes and beliefs towards breastfeeding. Women who chose  
251 breast augmentation may be more likely to give up breastfeeding once challenged with  
252 lactation difficulties, due to prior expectations and lower self-confidence in being able to  
253 meet infant’s needs. Alternatively, they may show less perseverance when faced with  
254 obstacles due to having a reduced sense of commitment to breastfeed in the first place.

255 Studies of the psychological status of women seeking cosmetic intervention have focused on  
256 body image dissatisfaction, low self-esteem and mental health conditions [31-34]. However,  
257 attitudes to breastfeeding and their role in preoperative decision making processes and  
258 postoperative patient satisfaction, have received little attention. The lack of studies may  
259 suggest that maintaining lactation ability is not even part of what most women are concerned  
260 with when considering breast augmentation [35]. This may result from the perception of  
261 breasts in western culture as sexual, rather than functional organs designed for the feeding of  
262 young [36], and is likely exacerbated by advertising that suggests formula and breast milk are  
263 equivalent sources for a baby’s nutrition [37-39]. Clarifying the exact reasons for the  
264 observed effect requires further research, not only to explore physical causes of reduced

265 breastfeeding capability associated with breast augmentation, but also to elucidate the  
266 contribution of psychosocial factors to this intricate picture.

267

268 It is problematic to infer no difference in the likelihood of women with breast augmentation  
269 attempting to breastfeed based on one small study with a relatively low rate of attempted  
270 breastfeeding (59-63%) [19]. Furthermore as this study included only women with saline  
271 implants [19], it is possible that the findings do not apply to women with silicone implants.  
272 Between 1992 and 2006 the U.S. Food and Drug Administration (FDA) placed silicone gel-  
273 filled breast implants in moratorium as a result of serious safety concerns [40, 41]. These  
274 included concern about the wellbeing of breastfed infants of mothers with silicone gel  
275 implants, which was addressed by extensive research aimed at examining the silicone  
276 contents of breast milk [42, 43] and its implications on infant oesophageal disorders [44-46].  
277 Although no conclusive evidence was found, psychological studies during this period showed  
278 that the moratorium and its media coverage had a marked effect on preoperative concerns and  
279 postoperative levels of satisfaction of breast augmentation patients [47, 48]. It is reasonable  
280 to speculate that women with silicone implants who gave birth during the years following the  
281 moratorium were less likely to attempt breastfeeding due to hesitance towards the safety of  
282 their breast milk [49].

283

284 Overall, our systematic search of the literature demonstrated how little has been studied  
285 regarding the impact of breast augmentation on breastfeeding outcomes. Surprisingly,  
286 although breast implants have a history of more than half a century, and in spite of constant  
287 development of new and improved augmentation techniques, only three studies were found to  
288 examine this important issue using adequate, no-surgery control groups. These three studies  
289 included small cohorts of women, drawn from only a single source, and were based on

290 heterogeneous study populations (Level III evidence) [13]. Based on two studies, we found a  
291 reduction in exclusive breastfeeding in the subgroup of women with submammary incisions  
292 at augmentation surgery, but could not make a conclusion about those with periareolar  
293 incisions. It should be noted that the subgroup analyses were post-hoc and need to be  
294 interpreted with caution. Questions related to the implications of implant type (saline vs.  
295 silicone) and volume on maintaining breastfeeding capacity have hardly been explored.  
296 Further, the three included studies varied in the selected endpoints for assessment of  
297 breastfeeding, possibly influencing their ability to capture the difference in breastfeeding  
298 course between women with and without breast implants. The heterogeneity across the  
299 included studies, along with their moderate scores on the NOS risk of bias assessment,  
300 indicates that the effect of breast augmentation may vary depending on maternal  
301 characteristics and the need to interpret the pooled estimates with care.

302

### 303 *Conclusions*

304 Our systematic review suggests that breast augmentation is associated with 40% decrease in  
305 the likelihood of exclusive breastfeeding among women who breastfeed. However, our  
306 finding is based on only three relatively small and heterogeneous studies, and therefore is  
307 limited in its external validity. To explore the uncertainty about the observed association and  
308 clarify the many unknowns surrounding this issue, more research is required, using larger  
309 cohorts and more representative study populations. This information is vital to enable  
310 informed decision-making for more than an estimated million women worldwide going  
311 through breast implantation surgery each year.

312

313 **Competing interests**

314 The authors declare that they have no competing interests.

315

316 **Authors' contributions**

317 CLR and MSS conceived the study and CLR coordinated the project. All authors participated

318 in the study design, planning of analysis and interpretation of the results. CSA undertook the

319 statistical analyses and provided statistical expertise. MS and CLR drafted the manuscript,

320 AA and MSS provided clinical expertise. All authors critically reviewed drafts of the

321 manuscript, and read and approved the final manuscript.

322

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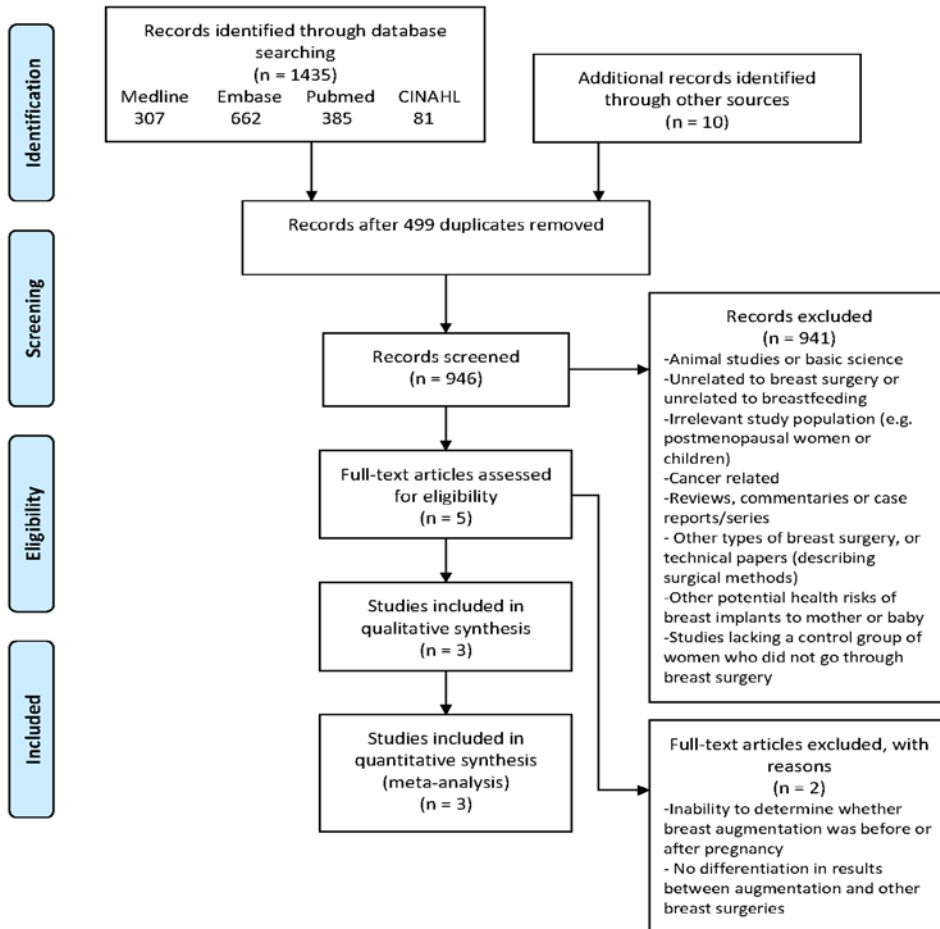
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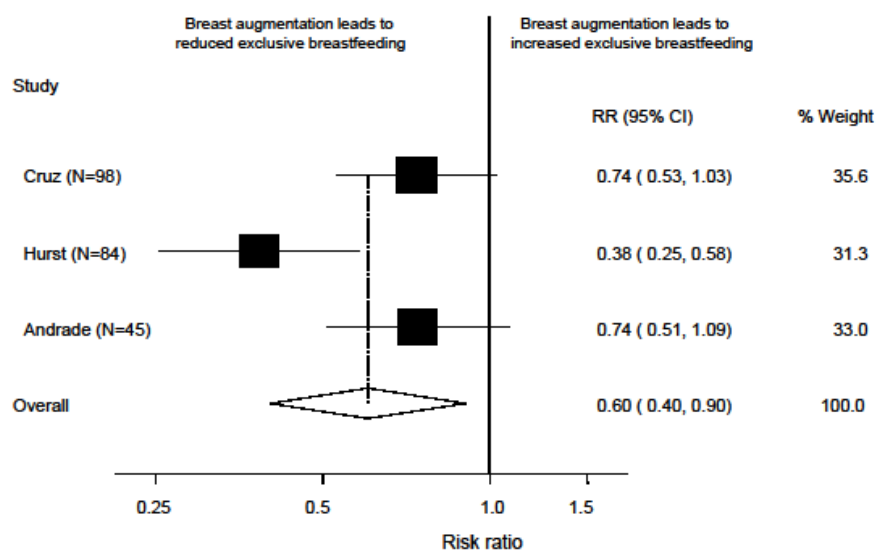
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## **Figure legends**

Figure 1: Systematic review flow chart

Figure 2: Forest plot of studies that investigated the association between breast augmentation and exclusive breast milk feeding among women who breastfed.





I-squared for heterogeneity=71.7%  
heterogeneity chi-square=7.03 , P=0.03 for df=2  
test of null hypothesis that RR=1: P=0.01

**Table 1: Specific search strings used for each of the databases**

String				
Number	Medline	Embase	Pubmed	CINAHL
1	exp breast implant/	Breast Implants/	Breast-surgery	Breast implants
2	breast augmentation/	Breast Implantation/	Breast-implants	Breast augmentation
3	exp breast reconstruction/	exp Mammoplasty/	Breast- implantation	Augmentation mammoplasty
4	exp breast prosthesis/	exp "Prostheses and Implants"/	Breast-prosthesis	Augmentation mammoplasty
5	exp breast surgery/	Breast/su [Surgery]	Mammoplasty	Breast enlargement
6	exp plastic surgery/	Surgery, Plastic/	Mammoplasty	Silicones
7	mammoplasty.mp.	mammoplasty.mp .	Breast- augmentation	Breast reconstruction
8	mammoplasty.mp.	mammoplasty.mp .	Breast- enlargement	Breast surgery
9	breast augmentation.mp.	breast augmentation.mp.	Breast and plastic-surgery	Plastic surgery
10	breast enlargement.mp.	breast enlargement.mp.	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
11	breast surgery.mp.	breast surgery.mp.	Breastfeeding	Breastfeeding
12	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11	Breast feeding	Breast feeding
13	exp breast feeding/	exp Breast Feeding/	Lactation	Lactation
14	exp lactation/	exp Lactation/		11 or 12 or 13
15	breast milk/	breastfeeding.mp.	11 or 12 or 13	10 and 14

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16	breastfeeding.mp.	breast feeding.mp.	10 and 15
17	breast feeding.mp.	lactation.mp.	
18	lactation.mp.	13 or 14 or 15 or 16 or 17	
19	13 or 14 or 15 or 16 or 17 or 18	12 and 18	
20	12 and 19		

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**Table 2: Characteristics of the three included studies**

<i>Reference</i>	<i>Location</i>	<i>Study period</i>	<i>Study Design</i>	<i>Study population</i>	<i>Cases</i>	<i>Controls</i>	<i>Data source</i>	<i>Outcomes, NOS Score and LOE rank</i>
Hurst 1996	Texas, U.S.A. Lactation support program in a single children's hospital	1990-1995	Retrospective cohort study	5066 mothers of babies who were admitted or referred (~15% from primary care) to a tertiary children's hospital lactation program	42 women with implants who attempted breastfeeding	42 women without implants who attempted breastfeeding (matched on year, lactation course, age, parity and breastfeeding experience)	Lactation follow-up records, documenting breastfeeding progress weekly during infant's hospitalization and every other week after discharge (by phone), until 2-3 months postpartum or until breastfeeding	Exclusive breast milk feeding or insufficient breastfeeding (defined as little or no lactogenesis or low infant growth with exclusive breastfeeding) NOS=5 LOE=III-2

							ceased	
Andrade 2010	Brazil, single maternity hospital	2004-2005	Cohort study	Women giving birth at the hospital and who attempted breastfeeding	24 women with implants	25 women without implants, selected from same floor as cases	Assessment at home	Exclusive and nonexclusive breastfeeding at 1 month NOS=6 LOE=III-2
Cruz and Korchin 2010	Puerto Rico. Presumably a single plastic surgery clinic	12 month period, year not reported	Retrospective cohort study	18-40 year old women with small breasts who were evaluated for possible breast augmentation	105 women with saline implants who subsequently had children	107 women who had children prior to evaluation for implants	Self- administered questionnaire at initial consultation (controls) or at regular follow- up visit (cases)	Attempted breastfeeding; successful breastfeeding for $\geq 2$ weeks, including exclusive and non-exclusive breastfeeding NOS=4 LOE=III-3

NOS Newcastle-Ottawa Scale assessing the quality of nonrandomized studies in meta-analyses [12]

LOE National Health and Medical Research Council Level of Evidence Scale [13]