

1 **Determinants of low breastfeeding self-efficacy amongst mothers of children**  
2 **aged less than six months old: Results from the BADUTA Study in East Java,**  
3 **Indonesia**

4

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## 65 **Abstract**

### 66 **Background**

67 Despite the increasing rate of exclusive breastfeeding practice in Indonesia, supportive  
68 interventions are still required. Breastfeeding self-efficacy of mothers is a key factor positively  
69 associated with optimum breastfeeding practices. Our analysis aims to assess the determinants of  
70 low breastfeeding self-efficacy amongst a sample of women with children aged under six months  
71 in Malang and Sidoarjo Districts, East Java, Indonesia.

### 72 **Methods**

73 We used information from 1210 mothers of children aged <6 months recruited in the BADUTA  
74 study conducted in 2015-2016 in Malang and Sidoarjo Districts. The outcome variable in this  
75 analysis was mothers' self-efficacy for breastfeeding using the 14 statements in the Breastfeeding  
76 Self Efficacy-Short Form. In total, 17 potential predictors of breastfeeding self-efficacy were  
77 evaluated, categorised into six sub-groups: (1) context/demographic variables; (2) household  
78 characteristics; (3) maternal characteristics; (4) child characteristics; (5) breastfeeding  
79 characteristics; and (6) antenatal and delivery care characteristics. Logistic regression analyses  
80 were employed to examine factors associated with mothers' self-efficacy with breastfeeding.  
81

### 82 **Results**

83 More than half of the women had a low level of self-efficacy. Factors associated with low  
84 breastfeeding self-efficacy were low levels of education, i.e. completed primary school or lower  
85 (aOR=1.95, 95%CI: 1.20-3.15), completed junior high school aOR=2.30; 95%CI: 1.44-3.69),  
86 and completed senior high school (aOR=2.01, 95%CI: 1.34-3.00); working outside the house  
87 (aOR=1.72, 95% CI: 1.26-2.35); never received any advice on breastfeeding (aOR=1.37, 95%CI:  
88 1.04-1.81) and low knowledge of breastfeeding (aOR=1.38, 95%CI: 1.04-1.85). Problems  
89 encountered with breastfeeding was also emerged as a significant predictor for low breastfeeding  
90 self-efficacy, either for mothers receiving solutions (aOR=2.16, 95%CI: 1.58-2.95) or those not  
91 receiving any solutions (aOR=2.65, 95% CI: 1.91-3.67). Furthermore, mothers who had cesarean  
92 section deliveries were more likely to have low breastfeeding self-efficacy (aOR=1.33, 95%CI:  
93 1.06-1.68); while mothers exposed to three or more breastfeeding interventions were more likely  
94 to have a high level of breastfeeding self-efficacy (aOR=1.84, 95%CI: 1.03-3.27).  
95

### 96 **Conclusions**

97 Multipronged breastfeeding education programs and support are required to improve women's  
98 self-efficacy with breastfeeding. Improved access to breastfeeding counsellors, active support for  
99 mothers following cesarean delivery, and increased supporting facilities at workplaces are  
100 essential to improve self-efficacy with breastfeeding.  
101

102  
103 **Keywords:** breastfeeding; self-efficacy; children aged <6 months; BADUTA study; Malang  
104 District; Sidoarjo District; Indonesia

105

## 106 **Introduction**

107 The importance of breastfeeding for both babies and mothers has been widely acknowledged [1].  
108 For infants, exclusive breastfeeding is strongly recommended in their first six months of life to  
109 provide the ideal nutrition for optimal growth and development [2]. After this period, infants  
110 should continue to receive breast milk along with appropriate complementary feeding until  
111 reaching at least two years of age [3]. The short-term and long-term effects of breastfeeding for  
112 babies include the short-term effects of reductions in the risk of diarrhea and respiratory  
113 infections [4], the long-term effects of protection against overweight and obesity, as well as a  
114 positive effect on intelligence [5]. For mothers, breastfeeding helps to increase child spacing, and  
115 reduce the risk of mastitis, postpartum haemorrhage, depression, as well as ovarian and breast  
116 cancer [3, 6, 7].

117

118 In Indonesia, the rate of exclusive breastfeeding is increasing, although supportive interventions  
119 are still required. Based on the last two Indonesia Demographic and Health Survey data, the  
120 national rate of exclusive breastfeeding has increased from 32.4% in 2007 [8] to 41.5 % in 2012  
121 [9] and to 52.0% in 2017 [9]. However, the 2018 Basic Health Survey from the Ministry of  
122 Health reported the national rate of exclusive breastfeeding amongst infants aged 0-5 months  
123 was 74.5%, ranging from 72.7% in urban areas to 76.6% in rural areas [10].

124

125 There is a range of different factors associated with breastfeeding practices, including the  
126 intention to breastfeed, maternal age, maternal education, smoking status, economic status,  
127 knowledge of breastfeeding, advice from health professionals, problems encountered during

128 breastfeeding, or child's birth weight [11]. One of the factors also reported positively associated  
129 with breastfeeding is the mothers' breastfeeding self-efficacy. Self-efficacy, an element of the  
130 social cognitive theory of Bandura [12], is a predictor of health-related behaviours [13]. Self-  
131 efficacy consists of two components: (1) the outcome expectancy or the belief that a given  
132 behaviour will produce a particular outcome, and (2) self-efficacy expectancy or an individual's  
133 conviction that they can successfully perform certain tasks or behaviours to produce the desired  
134 outcome [12, 13]. We defined breastfeeding self-efficacy as the mothers' beliefs and confidence  
135 in their ability to successfully breastfeed their infants [14]. Breastfeeding self-efficacy is an  
136 important predictor of the duration [15] as well as the exclusivity of breastfeeding [16, 17]. Thus,  
137 the assessment of mothers' breastfeeding self-efficacy will help in identifying those women who  
138 need more support for breastfeeding during the postnatal period [15].

139

140 The Global Alliance for Improved Nutrition (GAIN) and the University of Sydney, in  
141 collaboration with the Centre for Health Research, Universitas Indonesia (CHR-UI), SEAMEO-  
142 RECFON, and the London School Hygiene and Tropical Medicine, conducted the BADUTA  
143 Study, an impact evaluation of the BADUTA Program, in 2015 to 2017 in East Java, Indonesia  
144 [18]. Our analysis used the cross sectional surveys conducted as part of the BADUTA Program  
145 evaluation with the aim of examining factors associated with low breastfeeding self-efficacy  
146 amongst the sample of women with children aged under six months in Malang and Sidoarjo  
147 Districts, East Java, Indonesia.

148

## 149 **Methods**

### 150 **Data source and study sites**

151 This analysis used data derived from the BADUTA study conducted in 2015-2016 in Sidoarjo  
152 and Malang District of East Java, Indonesia. In both districts, we selected six sub-districts to  
153 conduct the trial. The sub-districts in Sidoarjo District were Tulangan, Wonoayu, Sidoarjo,  
154 Prambon, Taman, and Krian; and in Malang District were Dampit, Turen, Tumpang,  
155 Poncokusumo, Gondanglegi, and Jabang. We have presented detailed information about the  
156 BADUTA study protocol elsewhere [18]. We used data for this analysis from two independent  
157 cross-sectional surveys conducted in 2015 at the beginning, and in 2017 at the end of the project.  
158 To assess breastfeeding self-efficacy amongst mothers, we only used information collected from  
159 mothers of children less than six months of age.

160

### 161 **Background information on study sites**

162 East Java Province is one of the provinces in Indonesia located in Java Island, and the capital is  
163 Surabaya City, the second-largest city in Indonesia. The total population of East Java is  
164 approximately 37 million people, the second-most populous province in the country [19].  
165 Malang District, located in the centre-south region of East Java Province, has an estimated total  
166 population in 2017 of 2,576,596 people [20]. Most of the people were working as labourers or  
167 private employees (37.63%) [20]. Sidoarjo District, located north of Surabaya City, has an  
168 estimated total population in 2017 of 2,207,600 people [21].

169

170

171 **Study design and samples of the study**

172 We conducted an observational epidemiological study to examine factors associated with low  
173 breastfeeding self-efficacy. For our analysis, we combined the data from the baseline and endline  
174 cross-sectional surveys, for both the intervention and comparison groups. In the baseline survey,  
175 the sample size was 409 pregnant women and 2435 children under two years old [18]. In the  
176 endline survey, the sample for pregnant women and children under two years old was 642 and  
177 2740, respectively. For this analysis, we only used information from 1210 women of children  
178 under six months (575 from the baseline and 635 from the endline survey).

179

180 **Survey instruments and field personnel**

181 House-to-house interviews were carried out using pre-tested and structured questionnaires. The  
182 information collected in this study included socioeconomic and demographic characteristics;  
183 infant feeding practices as well as the intention of the mother to breastfeed and self-efficacy for  
184 breastfeeding of the mothers; child morbidity, reported by mother/caregiver; as well as contact  
185 with the health system and exposure to the interventions. Information about the mothers' self-  
186 efficacy for breastfeeding was collected using the Breastfeeding Self-Efficacy Scale-Short Form  
187 questionnaire developed by Dennis [13], a 14-item instrument aimed at measuring breastfeeding  
188 confidence.

189

190 At the baseline, we established eight fieldwork teams in each district. However, in the endline  
191 study, we established ten fieldwork teams to shorten the duration of data collection. For

192 interviews, each team consisted of one field coordinator, one assistant field coordinator, and ten  
193 enumerators. All field coordinators, assistant field coordinators, and enumerators attended a  
194 training program for a week, including two days of supervised field practice. The training aimed  
195 to familiarise the enumerators, and their coordinators, with the questionnaire, sampling  
196 methodology, as well as interview techniques.

197

198 Data were collected electronically on hand-held devices using CommCare system developed by  
199 Dimagi [22]. Information was recorded on structured, error detecting forms on tablets and then  
200 dispatched directly to a server for cleaning and merging. Field supervisors and a data manager  
201 monitored the data quality on a regular basis.

202

### 203 **Outcome variable**

204 The outcome variable in this analysis was mothers' self-efficacy for breastfeeding as a binary  
205 variable (low or high self-efficacy on breastfeeding). For each of the 14 statements in the  
206 Breastfeeding Self Efficacy-Short Form, mothers were asked to give a score from 1 to 5 that  
207 offered a range of answer options from "strongly disagree" to "strongly agree," respectively. All  
208 scores were then added to calculate the total score. As in other studies, we based the  
209 classification of breastfeeding self-efficacy on the median of the total score [23, 24]. The use of  
210 median was supported by previous studies using either mean and or median as the cut-off point  
211 to categorise low and high breastfeeding self-efficacy [24-26]. We classified mothers who scored  
212 less than the median as having a low self-efficacy on breastfeeding, mothers who scored equal to  
213 or above the median as having a high self-efficacy.



214

## 215 **Potential predictors**

216 The potential predictors were selected using the analytical framework shown in Figure 1. In  
217 total, there were 17 potential predictors of breastfeeding self-efficacy included in the analyses,  
218 categorised into six sub-groups: (1) context/demographic variables; (2) household  
219 characteristics; (3) maternal characteristics; (4) child characteristics; (5) breastfeeding  
220 characteristics; and (6) antenatal and delivery care characteristics.

221 ---Figure 1 to be inserted here---

222

223 In the group of contextual and intervention variables, we constructed a composite variable  
224 indicating the total number of interventions from 13 variables representing breastfeeding-related  
225 interventions in the BADUTA study. Those 13 interventions were: (1) discussing breastfeeding  
226 with cadres on a home visit during pregnancy; (2) discussing exclusive breastfeeding in pregnant  
227 women's class during pregnancy; (3) did not receive any free formula milk after delivery (part of  
228 the Baby Friendly Hospital Initiative); (4) discussing breastfeeding with a village facilitator  
229 during pregnancy; (5) watching a breastfeeding-related video shown by the village facilitator  
230 during pregnancy; (6) discussing the topic of breastfeeding in emo-demo sessions; (7) receiving  
231 mobile phone messages on early initiation of breastfeeding; (8) receiving mobile phone  
232 messages on the benefits of colostrum; (9) receiving mobile phone messages on exclusive  
233 breastfeeding; (10) receiving mobile phone messages on exclusive breastfeeding problems and  
234 how to handle them; (11) receive breastfeeding counseling by midwives during pregnancy; (12)  
235 receive breastfeeding counseling by cadres during pregnancy; and (13) watching TV

236 commercials about breastfeeding. For each question, answers were scored "1 (one)" if the  
237 mothers answered "yes," and scored "0 (zero)" if answered otherwise. All scores were then  
238 summed to obtain a total intervention score. The total intervention score for each individual was  
239 further categorized into "no intervention" (total score = 0); "one intervention" (total score = 1);  
240 "two interventions" (total score = 2), and "three or more intervention" (total score is  $\geq 3$ ). The  
241 total intervention score was calculated for all women from both the intervention and comparison  
242 groups included in this analysis. Our purpose was to assess the impact of any breastfeeding  
243 intervention, whether from the study interventions or routine programs on breastfeeding self-  
244 efficacy. We have documented a detailed explanation of the interventions in the BADUTA study  
245 elsewhere [18].

246

247 In household characteristics, the household wealth index variable was constructed using  
248 Principal Component Analysis (PCA) [27] using an inventory of the household's facilities and  
249 assets, i.e., ownership of electricity, drinking water, toilet facility, type of toilet facility, fecal  
250 final disposal and ownership of bicycle, television, water heater, 12kg of LPG, fridge, and car.  
251 This index was used to rank households and classify them into five quintiles, i.e., poorest, poor,  
252 middle, rich, and richest categories of households.

253

254 In the breastfeeding group, one composite variable was developed to represent mothers' level of  
255 knowledge about breastfeeding. We constructed this variable from five questions: (1) the best  
256 food or liquid to be provided to children aged < 6 months; (2) the duration for exclusively  
257 breastfeeding a child; (3) the duration a child should receive breast milk; (4) the benefits of

258 giving breast milk to children; and (5) the time a child should receive complementary feeding.  
259 For each question, score "1 (one)" was assigned to all correct answers, and "0 (zero) for all  
260 incorrect answers. All scores were summed to get the total knowledge score, and we calculated  
261 the median value. Two categories of knowledge were developed: (1) high level of knowledge,  
262 for those whose total knowledge score was greater or equal to the median, and (2) a low level of  
263 knowledge for those whose total knowledge score was less than the median. To test if previous  
264 experience with feeding infants influenced breastfeeding self-efficacy, we also used an indicator  
265 for previous live births as we did not specifically ask the mothers about their earlier  
266 breastfeeding experiences.

267

## 268 **Data analysis**

269 Contingency tables were used to examine the characteristics of all variables (outcome variables  
270 and potential predictors) used in the analysis. This was followed by logistic regression analyses  
271 to determine factors associated with all outcome variables using ORs (odds ratios) as the  
272 estimated measures of association. We used Stata survey commands (svyset) to adjust for the  
273 clustering from the cluster randomisation. All estimates presented in this analysis considered the  
274 complex sample design.

275

276 In the first step of logistic regression, bivariate analyses were used to assess the relationship  
277 between outcome variables and their potential predictors independently. In the second step, we  
278 performed multivariate analyses using a backward elimination method to remove all variables  
279 not significantly related to the study outcome, with a significance level of 0.05. Two variables

280 selected a priori and retained in the final model regardless of the significance level, were: (1)  
281 Period of the survey (baseline or endline) and (2) the fulfilment of the minimum requirement of  
282 four antenatal care visits by trimester (met or did not met). In the final model, we obtained the  
283 adjusted ORs (aOR) and 95% confidence intervals (95% CIs) for all variables in the model.

284

285 In multivariate analysis, we used the number of breastfeeding interventions as a composite  
286 variable. After obtaining the final model (Model #1), we developed the second model by  
287 replacing this variable with all the individual exposure to intervention indicators (Model #2). We  
288 then retained the other variables in the final model of Model #1 in Model #2. We used Stata/MP  
289 software (version 13.1; Stata Corp) for all analyses.

290

### 291 **Collaborating institutions**

292 This study was conducted by an International Research Consortium that comprises of highly  
293 experienced researchers from the University of Sydney (Australia), the London School of  
294 Hygiene and Tropical Medicine (LSHTM) (United Kingdom), the Center for Health Research  
295 Universitas Indonesia (CHR-UI), the Indonesia Nutrition Foundation for Food Fortification  
296 (KFI), and the Southeast Asian Ministers of Education Organization (SEAMEO), Regional  
297 Center for Food and Nutrition (RECFON).

298

299

300 **Results**

301 Table 1 shows the frequency distribution of mothers with children under six months by  
302 households, mothers, child characteristics, breastfeeding experience and knowledge, antenatal  
303 and delivery care services, as well as for women with low breastfeeding self-efficacy.  
304 Approximately three-quarters of the mothers were aged 20-34 years, and the majority were  
305 housewives. Slightly more than half reported ever receiving some advice on breastfeeding.  
306 Almost 32% of mothers reported having a problem during breastfeeding, yet 12% had problems  
307 but did not receive any solution. Around 25% of mothers had a low level of knowledge regarding  
308 breastfeeding. The characteristics of women with low breastfeeding self-efficacy were similar to  
309 all the women in the study except more worked outside their house, more had low levels of  
310 knowledge about breastfeeding, and more had experienced problems with breastfeeding. From  
311 the six knowledge components used in this analysis, the lowest percentage of correct answers  
312 was regarding the time to start complementary feeding (71.7%), followed by the minimum  
313 duration children should receive breast milk (74.3%) (Figure 2).

314 ---Table 1 to be inserted here---

315 ---Figure 2 to be inserted here---

316

317 Table 2 presents the distribution of 1210 (575 from the baseline and 635 from the endline  
318 surveys) mothers of children aged less than six months who were interviewed in the BADUTA  
319 study by contextual, intervention, and breastfeeding characteristics against low self-efficacy  
320 status. Based on the interventions received, 40% received at least one intervention on  
321 breastfeeding, but less than 8% received three or more interventions. The low percentage of

322 mothers receiving BADUTA interventions is due to the pooled dataset from baseline and endline  
323 surveys. At the endline survey, around 33% of women in the comparison group did not receive  
324 any breastfeeding interventions, while 67% received at least one type of intervention (47%  
325 received one; 17% received two, and 4% received three or more). In the intervention group, 13%  
326 of women did not receive any breastfeeding interventions, and 87% received at least one  
327 intervention (36% received one; 24% received two, and 27% received three or more  
328 interventions).

329 ---Table 2 to be inserted here---

330

331 Over half the women (56%) in the study had low breastfeeding self-efficacy. The median score  
332 of breastfeeding self-efficacy in mothers with low efficacy was 35 (SD: 6.33) and in mothers  
333 with high self-efficacy was 43 (SD=4.31). As shown in Figure 3, there was a significant  
334 difference in the percentage of women with low breastfeeding self-efficacy related to how they  
335 were feeding their infants under six months of age ( $p < 0.001$ ). There was no significant  
336 difference between the percentage of mothers with low breastfeeding self-efficacy who  
337 exclusively or predominantly breastfed their infants. However, the percentage of mothers with  
338 low breastfeeding self-efficacy was significantly higher among women who were exclusively or  
339 predominantly breastfeeding compared with women feeding with breast milk and formula, or  
340 with breast milk and solids/semi-solids, or not breastfeeding at all (Figure 3).

341 ---Figure 3 to be inserted here---

342

343 Figure 4 presents the distribution of the respondents' answers to each component of the  
344 Breastfeeding Self-Efficacy Scale. Overall more than 50% of the mothers answered either agree

345 or strongly agree to all components of the Breastfeeding Self-Efficacy Scale score. The highest  
346 percentage of agreement was found in mothers who felt able to tell when their baby finished  
347 breastfeeding (80%), and the lowest was in mothers who felt they could deal with breastfeeding  
348 being time-consuming. As shown in Table 1, low breastfeeding self-efficacy was highest  
349 amongst women with lower levels of education, of younger age, and working outside the house.  
350 Low breastfeeding efficacy declined as the number of breastfeeding interventions the women  
351 received increased.

352 ---Figure 4 to be inserted here---

353  
354 Table 3 presents the results of the analysis of factors associated with low breastfeeding self-  
355 efficacy. The adjusted odds of low breastfeeding self-efficacy in mothers with a low education  
356 level was approximately two times the odds of mothers who have graduated from university or  
357 an academy. The odds of having low breastfeeding self-efficacy was higher amongst mothers  
358 working outside the house than mothers doing housework (aOR=1.72, 95%CI: 1.26-2.35,  
359 p=0.001). All breastfeeding knowledge and experience variables were significant predictors of  
360 breastfeeding self-efficacy. We observed significantly higher odds of low breastfeeding self-  
361 efficacy amongst mothers who did not receive any advice on breastfeeding (aOR=1.37, 95%CI:  
362 1.04-1.81, p=0.025) and amongst those with low knowledge of breastfeeding (aOR=1.38,  
363 95%CI: 1.04-1.85, p=0.028). Mothers who reported they had problems with breastfeeding were  
364 more likely to have higher odds of low breastfeeding self-efficacy.

365 ---Table 3 to be inserted here---

366

367 Furthermore, this study found that mothers who had a cesarean section delivery had higher odds  
368 of having low breastfeeding self-efficacy (aOR=1.33, 95%CI: 1.06-1.68, p=0.015). As expected,  
369 the likelihood of having low breastfeeding self-efficacy reduced as the number of interventions  
370 the women received increased. In the analysis shown in the supplementary table (Table S1), we  
371 replaced the total number of interventions by an indicator of exposure to each specific  
372 intervention. It is interesting to see that in general, there was no significant association between  
373 each intervention and self-efficacy, except for mothers who were visited by a cadre at home to  
374 talk about breastfeeding (aOR=0.32, 95%CI: 0.10-0.99, p=0.048).  
375



## 376 **Discussion**

### 377 **Main findings**

378 Our study found that more than half of the women with children under six months had a low  
379 level of breastfeeding self-efficacy. This was also confirmed in exclusive breastfeeding status of  
380 mothers, as a significantly higher percentage of mothers with high breastfeeding self-efficacy  
381 exclusive breastfed their babies than those with low breastfeeding self-efficacy. The significant  
382 predictors of low breastfeeding self-efficacy included low education level, working outside the  
383 house, never receiving any advice on breastfeeding, low knowledge about breastfeeding, and  
384 problems encountered with breastfeeding. Mothers who had a cesarean section delivery also had  
385 a low self-efficacy for breastfeeding. As expected, the odds of having low self-efficacy were  
386 lower as the number of breastfeeding interventions received increased. The findings of this study  
387 should assist decision-makers and program managers in designing and implementing supportive  
388 interventions to increase mothers' self-efficacy with breastfeeding. Increased self-efficacy will  
389 promote optimal breastfeeding practices to the benefit of both mothers and their children.

390

### 391 **The role of knowledge and education in breastfeeding self-efficacy**

392 We confirmed the relationship between knowledge and breastfeeding self-efficacy in our study.  
393 Firstly, mothers with a low level of knowledge regarding breastfeeding were more likely to have  
394 lower self-efficacy than those with a high level of knowledge. Secondly, we found that low self-  
395 efficacy was associated with lower educational attainments. The level of education mirrors  
396 mothers' level of knowledge and awareness, not only about breastfeeding but also health in  
397 general, the possibility of having more exposure to health-related information, and

398 comprehension about health information received. A study has reported that mothers with  
399 secondary and high school education are more likely to have a higher self-efficacy score than  
400 those graduating from university [28]. The difference was assumed due to the mother's  
401 occupation, as highly educated mothers were more likely to have a job and work outside the  
402 house. However, in our analysis, we have adjusted the association between education or  
403 knowledge and breastfeeding self-efficacy for the maternal occupation to remove the  
404 confounding of the effects by occupation.

405

#### 406 **Education-based interventions and support to improve breastfeeding self-efficacy**

407 The important role of knowledge and education found in our study indicates the importance of  
408 promoting strategies to enhance mothers' and other family members' awareness of breastfeeding.  
409 Previous literature has reported the benefits of both prenatal [29-32] and postnatal education and  
410 the support mothers received for breastfeeding [33, 34]. It is also important to consider the type,  
411 timing, setting, and frequency of education interventions [31]. A systematic review highlighted  
412 the importance of support-based initiatives during postnatal care through interaction with  
413 lactation experts [35]. The use of combined settings (health facility and community) for health  
414 education, not solely in hospitals or community, was reported to be more beneficial than  
415 education merely in a health facility [31, 36].

416

417 Furthermore, we found that mothers who had never received any advice on breastfeeding were  
418 more likely to have lower breastfeeding self-efficacy than those who had ever received any  
419 advice. Interactive and face-to-face education, in addition to the consistent delivery of

420 breastfeeding messages, will increase self-efficacy. Previous literature revealed that combined  
421 individual and group counselling is more effective than individual or group counselling only  
422 [36]. Multiple intervention contacts, rather than only a single contact intervention, have more  
423 favourable outcomes [31, 37]. Thereby, health workers should effectively use every contact  
424 opportunity with mothers and other family members, from antenatal to postnatal period, to  
425 improve mothers' awareness and self-efficacy with breastfeeding.

426

427 One review found that peer support interventions were also effective in promoting optimum  
428 breastfeeding [37], suggesting an opportunity to encourage health-volunteers and mothers, who  
429 have successfully breastfed, to support other mothers breastfeeding their children. This analysis  
430 found that mothers with breastfeeding problems, particularly those who did not receive any  
431 solutions, had a lower self-efficacy than those who never experienced any problems. Peer  
432 support will assist first-time mothers to build their confidence in breastfeeding through  
433 experience sharing sessions. It will also help support mothers to overcome their breastfeeding  
434 challenges and problems.

435

436 Other intervention channels for providing education and support are the use of telephone  
437 contacts for discussion or counselling or production of promotional materials such as leaflets,  
438 flip charts, DVDs, or workbooks. An experimental study in Brazil found that mothers who  
439 received educational interventions, enhanced by a flip chart with illustrations of breastfeeding  
440 themes, showed increased breastfeeding self-efficacy [33]. The use of checklists, pamphlets, and

441 audiovisual materials on breastfeeding among recently delivered mothers in hospitals also  
442 improved the mothers' self-efficacy for breastfeeding [34].  
443 Mothers who delivered by cesarean section in this study were more likely to have low  
444 breastfeeding self-efficacy. A finding similar to other studies where women who had delivered  
445 by cesarean section were less likely to breastfeed or to delay breastfeeding initiation [38, 39].  
446 The problems related to lactogenesis due to abdominal surgery or stress response as a result of  
447 delivery complications are hypothesised to contribute to increased difficulty with or early  
448 cessation of breastfeeding [38, 40]. Consequently, interventions targeting mothers, both with  
449 planned or emergency cesarean section, are required. Support and counselling programs by  
450 health workers and lactation counsellors, including postpartum home visits, might be beneficial  
451 for these women.

452

453 Previous research reported the critical role of family support to help mothers to breastfeed their  
454 children [41]. Women who received praise from other family members had higher scores of  
455 breastfeeding self-efficacy than those receiving praise from friends [42]. Thus, the involvement  
456 of family members, particularly husbands in educational programs, for example, during prenatal  
457 classes, is vital for promoting optimal breastfeeding practices.

458

459 The odds of high self-efficacy with breastfeeding amongst women in this study increased as the  
460 number of breastfeeding interventions received by the mothers increased. Many of BADUTA  
461 interventions were related to strengthening the existing health system, which is also available in  
462 the comparison group. Consequently, in the endline survey, we found a high percentage of

463 women from the comparison group also received breastfeeding interventions. These  
464 breastfeeding interventions heavily relied on awareness-raising and education strategies to  
465 improve the community's knowledge and skills in breastfeeding. The combined effect of  
466 different interventions might reflect a dose-response effect of increasing odds of higher  
467 breastfeeding self-efficacy with an increasing number of breastfeeding intervention services  
468 received by mothers [43, 44].

469

470 To ensure the quality of support and educational interventions received by mothers, interventions  
471 to increase knowledge and skills of health workers, lactation counsellors, community health  
472 workers (cadres), particularly concerning their counselling skills, are essential. Trained birth  
473 attendants, whose services are still widely used by the community in some settings for mother  
474 and childcare, could be trained by health workers to promote breastfeeding amongst pregnant  
475 and recently delivered mothers.

476

#### 477 **The role of maternal occupation on breastfeeding self-efficacy**

478 We found a low level of breastfeeding self-efficacy in women working outside their homes.  
479 Secondary analysis using nationally representative survey data for Indonesia found that a mother  
480 working outside her home was a barrier for optimal breastfeeding practices [45]. A strong reason  
481 for this could be the short duration of maternity leave in Indonesia. In the formal sector, only 1.5  
482 months of maternity leave is given before and after delivery [46], while in the informal sector,  
483 this regulation is often not fully applied. Although the Act of the Republic of Indonesia stated  
484 that female workers still breastfeeding their children should be given appropriate opportunities to

485 breastfeed even during working hours [46], supportive breastfeeding facilities are limited or even  
486 unavailable. Advocacy, in addition to the development of supportive policy and regulations, to  
487 ensure the availability of lactation space and breastfeeding breaks in the workplace is therefore  
488 crucial for women working outside their homes [44].

### 489 **Strengths and limitations**

490 This study has several strengths. It has a large sample size, giving adequate power to analyse the  
491 role of different predictors on breastfeeding self-efficacy. It is the first study in Indonesia to  
492 examine self-efficacy with breastfeeding in mothers of children aged less than six months. Some  
493 limitations are worth noting when interpreting the results. Our results were based on mothers'  
494 recall ability, and information provided by respondents was not validated. Another limitation  
495 was how mothers responded to breastfeeding self-efficacy questions will be influenced by their  
496 current feeding practices, particularly amongst those who decided not to breastfeed their infants.  
497 There are other possible determinants of mothers' self-efficacy with breastfeeding that were not  
498 analysed as they were not available in the dataset, such as the mothers' previous breastfeeding  
499 experience or the level of family support. To partially address previous breastfeeding experience,  
500 we examined the association of having had a previous live birth on the odds of low  
501 breastfeeding self-efficacy in mothers, and we found no association between them.

502

503

## 504 **Conclusions**

505 Overall, our study found maternal education, knowledge of breastfeeding, occupation, and mode  
506 of delivery as predictors of mothers' breastfeeding self-efficacy. Consequently, multipronged  
507 breastfeeding education and support are required to improve women's self-efficacy with  
508 breastfeeding. The use of combined settings, individual and group counselling with multiple  
509 contact opportunities should be considered by program managers. Effective education strategies  
510 and support programs targeting not only mothers but also other family members are required.

511

512 Additionally, efforts to ensure the availability and access to breastfeeding counsellors or peer  
513 counsellors will help mothers to increase their confidence in breastfeeding. Training of cadres  
514 and traditional birth attendants to provide necessary counselling on breastfeeding will be  
515 beneficial to provide continuous support to women. Furthermore, home visits, including those  
516 women who delivered with cesarean section, will ensure mothers have ongoing support and  
517 overcome challenges or barriers in breastfeeding. Interventions to increase the availability of  
518 supporting facilities in the workplace are also required to enhance optimum breastfeeding  
519 practices amongst women working outside their homes.

520

521

522 **Declarations**

523 **Ethics approval and consent to participate**

524 We obtained ethics approval from the Faculty of Public Health, Universitas Indonesia  
525 (323/H2.F10/PPM.00.02/2016) and Human Research Ethics Committee of the University of  
526 Sydney, Australia (Protocol number: 2015/115). We also secured a research clearance from the  
527 Ministry of Internal Affairs at the central level, the Office of National Unity, and from the  
528 Community Protection branch at the provincial and district levels. We took written informed  
529 consent from all respondents before the interview. All individuals included in this research are  
530 18 years or older.

531

532 **Consent for publication**

533 Not applicable

534

535 **Availability of data and materials**

536 The datasets used and/or analysed during the current study are available from the corresponding  
537 author on reasonable request.

538

539 **Competing interests**

540 The authors declare no conflict of interest. The funders had no role in the design of the study; in  
541 the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the  
542 decision to publish the results.

543

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552

### 553 **Author Contributions**

554 CRT and MJD designed the study; CRT, MJD, IA and AM performed data analyses; CRT and  
555 MJD wrote the original draft of the manuscript; AA, RD, TDT, EF, HK, LM, AA, UF provided  
556 data analysis advice; MJD, IA, AA, RD, TDT, EF, HK, LM, AA, UF reviewed the manuscript.  
557 All authors read and approved the manuscript.

558

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571

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709 **Figure 2.** Distribution of mothers of children under six months by their answers to each  
710 breastfeeding knowledge component, The BADUTA Study in East Java, Indonesia,  
711 2015-2016

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713 **Figure 3.** Distribution of mothers with low breastfeeding self-efficacy by the feeding patterns  
714 of their infants under six months of age, The BADUTA Study in East Java,  
715 Indonesia, 2015-2016

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717 Note: A chi-square statistic was performed to examine the distribution of infants who were  
718 exclusively breastfed based on mothers' self-efficacy level. The bars represent 95% CI. Svy  
719 commands were used to adjust for the cluster sampling design.

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721 **Figure 4.** Distribution of mothers of children under six months by their answers to each  
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723 Study in East Java, Indonesia, 2015-2016

724

725 Note: For each question, a score of 1 to 5 was assigned to the responses from "strongly disagree" to  
726 "strongly agree." BF=breastfeeding.

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731

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733 households, mothers, child characteristics, breastfeeding experience, and  
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735 efficacy status, The BADUTA Study in East Java, Indonesia, 2015-2016

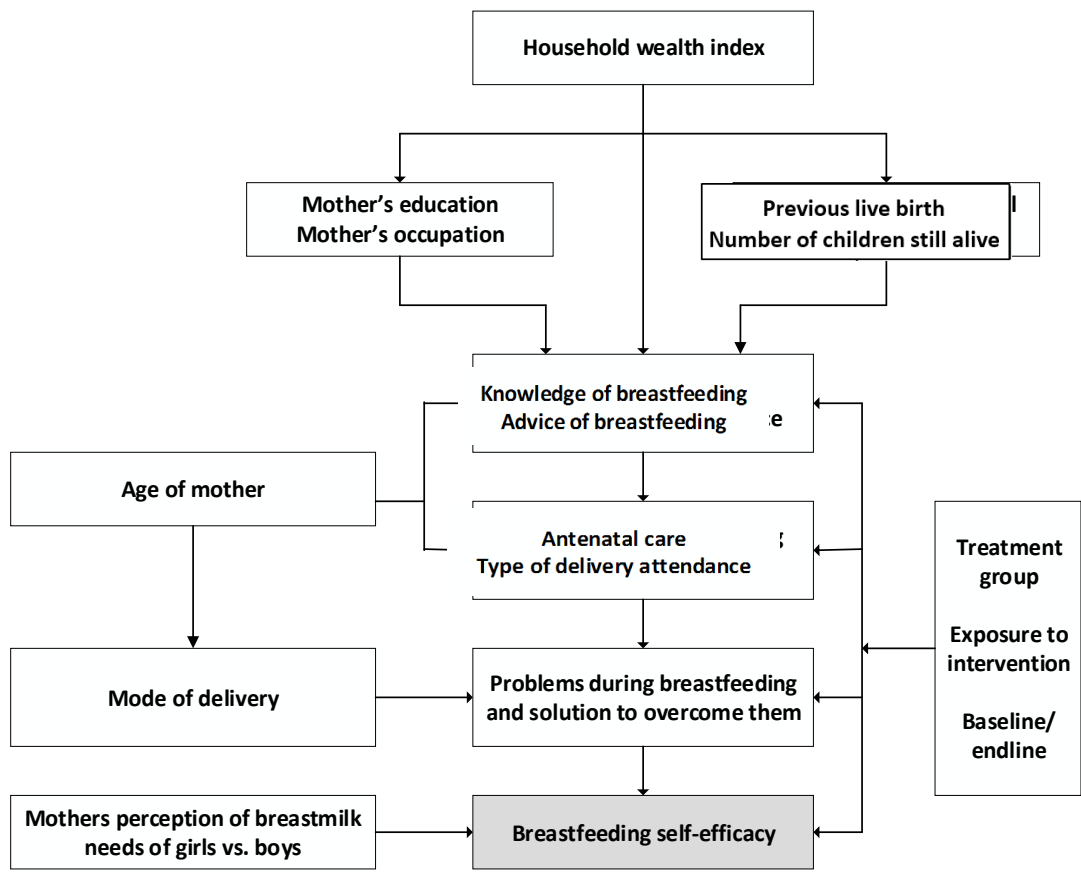
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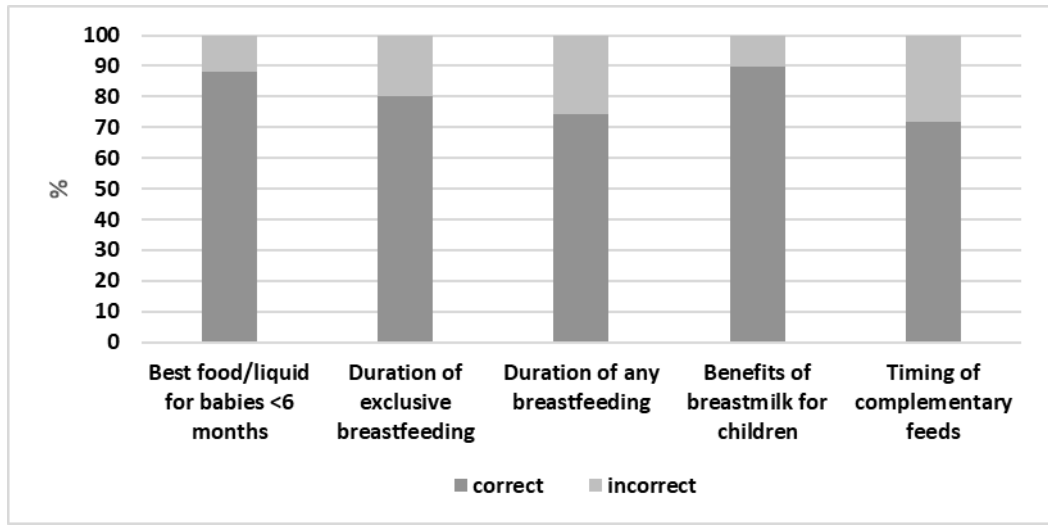
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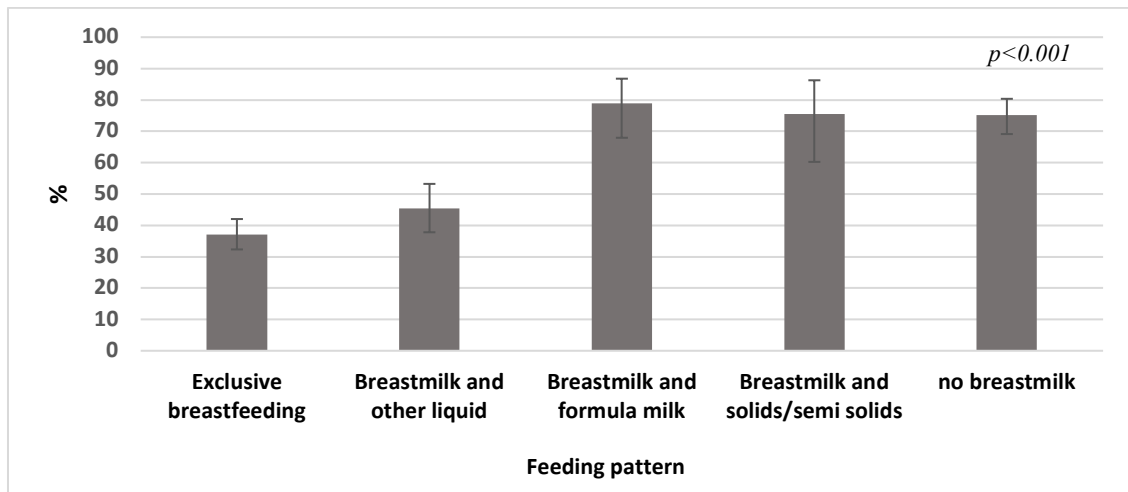
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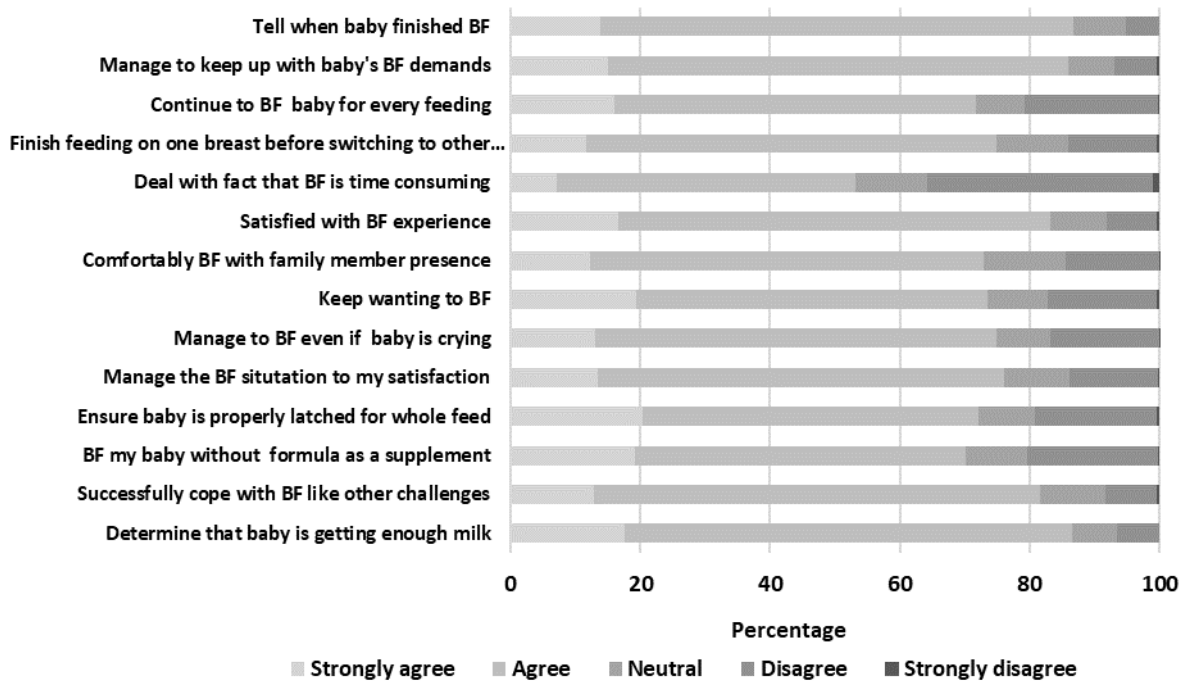
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Note: A chi-square statistic was performed to examine the distribution of infants who were exclusively breastfed based on mothers' self-efficacy level. The bars represent 95% CI. Svy commands were used to adjust for the cluster sampling design.

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**Figure 4.** Distribution of mothers of children under six months by their answers to each component of breastfeeding self-efficacy short form (BSES-SF)The BADUTA Study in East Java, Indonesia, 2015-2016

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Note: For each question, a score of 1 to 5 was assigned to the responses from "strongly disagree" to "strongly agree." BF=breastfeeding

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**Table 1.** Frequency distribution of mothers with children under six months old by households, mothers, child characteristics, breastfeeding experience, and knowledge, antenatal and delivery care services as well as breastfeeding self-efficacy status, The BADUTA Study in East Java, Indonesia, 2015-2016

Variables	Total Sample		Breastfeeding Self-Efficacy <sup>1</sup>		
	n	%	Low (%)	High (%)	p
<b>Household characteristics</b>					
<b>Household wealth index</b>					
Poorest	243	20.1	54.7	45.3	0.086
Poor	281	23.2	54.5	45.5	
Middle	236	19.5	59.8	40.2	
Rich	268	22.2	61.9	38.1	
Richest	182	15.0	50.0	50.0	
<b>Maternal characteristics</b>					
<b>Maternal age</b>					
≤19 years	85	7.0	64.7	35.3	0.280
20-34 years	913	75.5	56.1	43.3	
35+ years	212	17.5	55.2	44.8	
<b>Maternal education</b>					
University/Academy	154	12.7	44.2	55.8	0.008
Completed senior high school	495	40.9	57.2	42.8	
Completed junior high school	334	27.6	60.5	39.5	
No school/incomplete primary/completed primary school	227	18.8	57.7	42.3	
<b>Maternal occupation</b>					
Housewife	963	79.6	54.9	45.1	0.027
Working outside the house	247	20.4	62.8	37.2	
<b>Number of children still alive</b>					
1	534	44.1	56.6	43.4	0.993
2	477	39.4	56.2	43.8	
3	156	12.9	57.1	42.9	
4+	43	3.6	58.1	41.9	
<b>Previous live birth</b>					
None	520	43.0	56.4	43.6	0.911
Any	690	57.0	56.7	43.3	
<b>Antenatal, delivery care</b>					
<b>Minimum antenatal care visits<sup>2</sup></b>					
Completed (4+ visits)	858	71.6	54.6	45.4	0.057
Incomplete (<4 visits)	340	28.4	60.6	39.4	
<b>Mode of delivery</b>					
Normal	821	67.9	55.2	44.8	0.168
Caesarea	389	32.2	59.4	40.6	
<b>Birth attendant</b>					
General Practitioner/OBGYN	483	39.9	57.1	42.3	0.772
Midwife/nurse	708	58.5	55.9	44.1	
Traditional birth attendant/family/friend	19	1.6	63.2	36.8	
<b>Child's characteristics</b>					
<b>Sex of the child</b>					
Male	582	48.7	56.0	44.0	0.792
Female	613	51.3	56.8	43.2	
<b>Birth weight according to monitoring card</b>					

Variables	Total Sample		Breastfeeding Self-Efficacy <sup>1</sup>		
	n	%	Low (%)	High (%)	p
Larger than average	275	22.8	62.6	37.4	0.062
Average	831	69.0	54.5	45.5	
Smaller than average	99	8.2	54.6	45.4	
<b>Breastfeeding experience and knowledge</b>					
<b>Ever received any advice on breastfeeding</b>					
Yes	638	52.7	52.7	47.3	0.004
No	572	47.3	60.8	39.2	
<b>Knowledge about breastfeeding</b>					
High <sup>3</sup>	909	75.1	53.8	46.2	0.001
Low <sup>4</sup>	301	24.9	64.8	35.2	
<b>Problems during breastfeeding</b>					
No problem	824	68.1	50.5	49.5	<0.001
Yes, received	240	19.8	67.1	32.9	
Yes, but did not have any solutions	146	12.1	73.3	26.7	

*Note:*<sup>1</sup>Low breastfeeding self-efficacy was mothers whose total self-efficacy score was less than the median value. <sup>2</sup>Minimum Antenatal Care refers to the recommendation of at least four antenatal visits, i.e., once in trimester one to three, and twice in trimester three. <sup>3</sup>High level of knowledge was mothers whose total knowledge score was greater or equal to the median value. <sup>4</sup>Low level of knowledge was mothers whose total knowledge score was less than the median distribution.

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**Table 2.** Frequency distribution of mothers with children under six months by contextual and intervention characteristics and breastfeeding and self-efficacy status, The BADUTA Study in East Java, Indonesia, 2015-2016

Variables	Total Sample		Breastfeeding Self-Efficacy <sup>1</sup>		
	n	%	Low (%)	High (%)	p
<b>Exposure to interventions</b>					
Exposed to intervention <sup>2</sup>	286	23.6	49.7	50.3	0.007
Not exposed to intervention <sup>3</sup>	924	76.4	58.7	41.3	
<b>Number of breastfeeding interventions mothers were exposed to</b>					
No intervention	726	60.0	60.2	39.8	<0.001
One intervention	266	22.0	56.4	43.6	
Two interventions	127	10.5	48.8	51.2	
Three or more interventions	91	7.5	38.5	61.5	
<b>Period</b>					
Baseline	575	47.5	60.5	39.5	0.008
Endline	635	52.5	52.9	47.1	
<b>Ever visited by village facilitator at home</b>					
Yes	22	1.8	36.4	63.6	0.054
<b>Ever attended "emo-demo."</b>					
Yes	50	4.1	44.0	56.0	0.068
<b>Ever received SMS Bunda messages</b>					
Yes	20	1.7	35.0	65.0	0.050
<b>Ever visited by cadre at home</b>					
Yes	17	1.4	29.4	70.6	0.023
<b>Ever attended pregnancy class</b>					
Yes	40	3.3	40.0	60.0	0.032
<b>Roomed in with baby after delivery</b>					
Yes	363	30.0	48.2	51.8	<0.001
<b>Ever received counselling by a midwife</b>					
Yes	188	15.5	52.1	47.9	0.185
<b>Ever received counselling by a cadre</b>					
Yes	24	2.0	37.5	62.5	0.058
<b>Ever seen "Rumpi Sehat" TV commercials</b>					
Yes	123	10.2	43.9	56.1	0.003

*Note: <sup>1</sup>Low self-efficacy was mothers whose total self-efficacy score was less than the median value. <sup>2</sup>Exposed to intervention refers to respondents living in the intervention sub-districts at the endline survey. <sup>3</sup>Not exposed to intervention referred to all respondents from the baseline survey and those living in the control sub-districts at the endline survey.*

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**Table 3.** Factors associated with low breastfeeding self-efficacy amongst mothers of children under six months old, The BADUTA Study in East Java, Indonesia, 2015-2016

Variables	Univariate			Multivariate <sup>1</sup>		
	aOR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>
<b>Contextual and intervention characteristics</b>						
<b>Exposure to intervention</b>						
Exposed to intervention <sup>2</sup>	1.00					
Not exposed to intervention <sup>3</sup>	1.44	1.13 1.83	0.003			
<b>Number of breastfeeding interventions mothers exposed to</b>						
No intervention	1.00			1.00		
One intervention	0.86	0.64 1.14	0.290	1.47	0.73 2.96	0.283
Two interventions	0.63	0.47 0.85	0.002	1.84	0.98 3.46	0.059
Three or more interventions	0.41	0.24 0.71	0.001	1.84	1.03 3.27	0.039
<b>Period</b>						
Baseline	1.00			1.00		
Endline	0.73	0.55 0.97	0.032	0.87	0.59 1.29	0.495
<b>Household characteristics</b>						
<b>Household wealth index</b>						
Poorest	1.00					
Poor	0.99	0.70 1.39	0.948			
Middle	1.23	0.86 1.75	0.257			
Rich	1.35	0.93 1.95	0.118			
Richest	0.83	0.52 1.32	0.426			
<b>Mother's characteristics</b>						
<b>Maternal age</b>						
≤19 years	1.00					
20-34 years	0.70	0.41 1.17	0.172			
35+ years	0.67	0.40 1.14	0.138			
<b>Maternal education</b>						
University/Academy	1.00			1.00		
Completed senior high school	1.69	1.19 2.39	0.003	2.01	1.34 3.00	0.001
Completed junior high school	1.94	1.31 2.86	0.001	2.30	1.44 3.69	0.001
No school/incomplete primary/completed primary school	1.73	1.12 2.67	0.014	1.95	1.20 3.15	0.007
<b>Maternal occupation</b>						
Housework	1.00			1.00		
Working outside the house	1.38	1.06 1.81	0.018	1.72	1.26 2.35	0.001
<b>Number of children still alive</b>						
1	1.00					
2	0.99	0.77 1.26	0.904			
3	1.02	0.69 1.52	0.920			

Variables	Univariate			Multivariate <sup>1</sup>			
	aOR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>	
4+	1.07	0.55	2.07	0.847			
<b>Previous live birth</b>							
None	1.00						
Any	1.01	0.82	1.26	0.906			
<b>Antenatal and delivery care</b>							
<b>Minimum antenatal care visits<sup>4</sup></b>							
Completed (4+ visits)	1.00				1.00		
Incomplete (<4 visits)	1.28	0.98	1.68	0.073	1.27	0.94	1.71 0.116
<b>Mode of delivery</b>							
Normal	1.00				1.00		
Caesarean	1.19	0.96	1.47	0.108	1.33	1.06	1.68 0.015
<b>Birth attendant</b>							
General practitioner/OBGYN	1.00						
Midwife/nurse	0.95	0.78	1.165	0.631			
Traditional birth attendant/family/friend	1.29	0.54	3.082	0.572			
<b>Child's characteristics</b>							
<b>Sex of the child</b>							
Male	1.00						
Female	1.03	0.82	1.30	0.791			
<b>Birth weight from monitoring card</b>							
Larger than average	1.00						
Average	0.72	0.51	1.00	0.053			
Smaller than average	0.72	0.44	1.17	0.183			
<b>Breastfeeding knowledge &amp; experience</b>							
<b>Ever received any breastfeeding advice</b>							
Yes	1.00				1.00		
No	1.40	1.09	1.78	0.007	1.37	1.04	1.81 0.025
<b>Knowledge about breastfeeding</b>							
High level <sup>5</sup>	1.00				1.00		
Low level <sup>6</sup>	1.58	1.19	2.10	0.002	1.38	1.04	1.85 0.028
<b>Problems during breastfeeding</b>							
No problem	1.00				1.00		
Yes, and received solutions	2.00	1.51	2.64	0.000	2.16	1.58	2.95 <0.001
Yes, but don't receive any solutions	2.69	1.88	3.86	0.000	2.65	1.91	3.67 <0.001

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Note: <sup>1</sup>Multivariate logistic regression using the backward elimination method to select significant predictors of low breastfeeding self-efficacy. The variable for the minimum requirement of four antenatal care visits by trimester was selected a priori to be retained in the final model regardless of its significance level. <sup>2</sup>"Exposed to intervention," refers to respondents living in the intervention sub-districts at the endline survey <sup>3</sup>Not exposed to intervention referred to all respondents from the baseline survey and those living in the control sub-districts at the endline survey. <sup>4</sup>Minimum Antenatal Care refers to the recommendation of at least four antenatal visits, i.e., once in trimester one to three, and twice in trimester three. <sup>5</sup>High level of knowledge -total knowledge score was

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*equal to or greater than the median distribution. <sup>6</sup>Low level of knowledge was mothers whose total knowledge score was less than the median distribution.*

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**Table S1:** Factors associated with low breastfeeding self-efficacy amongst mothers of children under six months old, The BADUTA Study in East Java, Indonesia, 2015-2016

Variables	Univariate			Multivariate <sup>1</sup>		
	aOR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>
<b>Contextual and intervention characteristics</b>						
<b>Exposure to intervention</b>						
Exposed to intervention <sup>2</sup>	1.00					
Not exposed to intervention <sup>3</sup>	1.44	1.13 1.83	0.003			
<b>Number of breastfeeding interventions mothers exposed to</b>						
No intervention	1.00					
One intervention	0.86	0.64 1.14	0.290			
Two interventions	0.63	0.47 0.85	0.002			
Three or more interventions	0.41	0.24 0.71	0.001			
<b>Period</b>						
Baseline	1.00			1.00		
Endline	0.73	0.55 0.97	0.032	0.98	0.64 1.48	0.907
<b>Ever visited by village facilitator at home</b>						
No	1.00			1.00		
Yes	0.43	0.17 1.12	0.084	0.84	0.29 2.44	0.746
<b>Ever attended "emo-demo."</b>						
No	1.00			1.00		
Yes	0.59	0.35 1.00	0.049	1.11	0.58 2.13	0.759
<b>Ever received SMS Bunda messages</b>						
No	1.00			1.00		
Yes	0.41	0.15 1.14	0.087	0.57	0.17 1.95	0.371
<b>Ever visited by cadre at home</b>						
No	1.00			1.00		
Yes	0.32	0.12 0.84	0.22	0.32	0.10 0.99	0.048
<b>Ever attended pregnancy class</b>						
No	1.00			1.00		
Yes	0.50	0.21 1.21	0.125	0.93	0.35 2.47	0.877
<b>Roomed in with baby after delivery</b>						
No	1.00			1.00		
Yes	0.62	0.49 0.78	0.000	0.75	0.54 1.03	0.072
<b>Ever received counselling by a midwife</b>						
No	1.00			1.00		
Yes	0.81	0.59 1.11	0.185	1.16	0.81 1.65	0.411
<b>Ever received counselling by a cadre</b>						
No	1.00			1.00		
Yes	0.45	0.22 0.95	0.035	0.78	0.36 1.67	0.531
<b>Ever seen "Rumpi Sehat" TV commercials</b>						



Variables	Univariate			Multivariate <sup>1</sup>			
	aOR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>	
No	1.00			1.00			
Yes	0.57	0.38 0.84	0.005	0.73	0.43 1.25	0.251	
<b>Household characteristics</b>							
<b>Household wealth index</b>							
Poorest	1.00						
Poor	0.99	0.70 1.39	0.948				
Middle	1.23	0.86 1.75	0.257				
Rich	1.35	0.93 1.95	0.118				
Richest	0.83	0.52 1.32	0.426				
<b>Mother's characteristics</b>							
<b>Maternal age</b>							
≤19 years	1.00						
20-34 years	0.70	0.41 1.17	0.172				
35+ years	0.67	0.40 1.14	0.138				
<b>Maternal education</b>							
University/Academy	1.00			1.00			
Completed senior high school	1.69	1.19 2.39	0.003	1.98	1.32 2.96	0.001	
Completed junior high school	1.94	1.31 2.86	0.001	2.18	1.40 3.42	0.001	
No school/incomplete primary/completed primary school	1.73	1.12 2.67	0.014	1.91	1.20 3.04	0.007	
<b>Maternal occupation</b>							
Housework	1.00			1.00			
Working outside the house	1.38	1.06 1.81	0.018	1.74	1.28 2.38	<0.001	
<b>Number of children still alive</b>							
1	1.00						
2	0.99	0.77 1.26	0.904				
3	1.02	0.69 1.52	0.920				
4+	1.07	0.55 2.07	0.847				
<b>Previous live birth</b>							
None	1.00						
Any	1.01	0.82 1.26	0.906				
<b>Antenatal and delivery care</b>							
<b>Minimum antenatal care visits<sup>4</sup></b>							
Completed (4+ visits)	1.00			1.00			
Incomplete (<4 visits)	1.28	0.98 1.68	0.073	1.25	0.92 1.70	0.146	
<b>Mode of delivery</b>							
Normal	1.00			1.00			
Caesarean	1.19	0.96 1.47	0.108	1.36	1.08 1.72	0.009	
<b>Birth attendant</b>							

Variables	Univariate			Multivariate <sup>1</sup>			
	aOR	95% CI	<i>p</i>	aOR	95% CI	<i>p</i>	
General practitioner/OBGYN	1.00						
Midwife/nurse	0.95	0.78	1.165	0.631			
Traditional birth attendant/family/friend	1.29	0.54	3.082	0.572			
<b>Child's characteristics</b>							
<b>Sex of the child</b>							
Male	1.00						
Female	1.03	0.82	1.30	0.791			
<b>Birth weight from monitoring card</b>							
Larger than average	1.00						
Average	0.72	0.51	1.00	0.053			
Smaller than average	0.72	0.44	1.17	0.183			
<b>Breastfeeding knowledge &amp; experience</b>							
<b>Ever received any breastfeeding advice</b>							
Yes	1.00				1.00		
No	1.40	1.09	1.78	0.007	1.44	1.08	1.91 0.013
<b>Knowledge about breastfeeding</b>							
High level <sup>5</sup>	1.00				1.00		
Low level <sup>6</sup>	1.58	1.19	2.10	0.002	1.39	1.04	1.87 0.027
<b>Problems during breastfeeding</b>							
No problem	1.00				1.00		
Yes, received	2.00	1.51	2.64	0.000	2.19	1.57	3.04 <0.001
Yes, but don't receive any solutions	2.69	1.88	3.86	0.000	2.71	1.94	3.77 <0.001

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Note: <sup>1</sup>Multivariate logistic regression using the backward elimination method to select significant predictors of low breastfeeding self-efficacy. The variable for the minimum requirement of four antenatal care visits by trimester was selected a priori to be retained in the final model regardless of its significance level. <sup>2</sup>"Exposed to intervention," refers to respondents living in the intervention sub-districts at the endline survey <sup>3</sup>Not exposed to intervention referred to all respondents from the baseline survey and those living in the control sub-districts at the endline survey. <sup>4</sup>Minimum Antenatal Care refers to the recommendation of at least four antenatal visits, i.e., once in trimester one to three, and twice in trimester three. <sup>5</sup>High level of knowledge -total knowledge score was equal to or greater than the median distribution. <sup>6</sup>Low level of knowledge was mothers whose total knowledge score was less than the median distribution.