The effectiveness of breastfeeding education on maternal breastfeeding self-efficacy and breastfeeding duration: a systematic review

Centre conducting the review
Hong Kong Centre for Evidence Based Nursing: a Collaborating Centre of the Joanna Briggs Institute
The Nethersole School of Nursing
The Chinese University of Hong Kong, Hong Kong

Primary Reviewer
Chan Man Yi, RN, RM, BN(Hons), MSc, Doctoral Nursing Student
Registered Nurse, Department of Obstetrics and Gynecology, Prince of Wales Hospital
Phone: (852) 60159116 Email: s1010148080@cuhk.edu.hk

Secondary Reviewer
Heung Sin Man, RN, BSN, MSN, Doctoral Nursing Student
Phone: (852) 3400 3213 Email: s1010148110@mailserv.cuhk.edu.hk

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Correspondence
Hong Kong Centre for Evidence Based Nursing: a Collaborating Centre of the Joanna Briggs Institute, 8/F, Esther Lee Building, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong. Email: janitachau@cuhk.edu.hk
Review question/objective

1. The objectives of this review are to synthesise the best available evidence on:

2. The effectiveness of different types of breastfeeding education on increasing maternal self-efficacy.

3. The impact of different types of breastfeeding education on duration of exclusive breastfeeding, duration of any breastfeeding, and breastfeeding complications.

4. The effectiveness of different types of breastfeeding education on increasing maternal self-efficacy and breastfeeding duration, as compared with conventional care.

Specific review questions are:

1. What is the effectiveness of various forms of breastfeeding education (for example, educational program, didactic teaching session, one-to-one, group, peer support, and workshop) on maternal breastfeeding outcomes, including maternal breastfeeding self-efficacy and breastfeeding duration?

2. What is the effectiveness of breastfeeding education of varying duration (for example, one hour, one and a half hours) on maternal breastfeeding outcomes, including maternal breastfeeding self-efficacy and breastfeeding duration?

3. What is the effectiveness of various timing of breastfeeding education (for example, prenatal, postnatal, both prenatal and postnatal period) on maternal breastfeeding outcomes, including maternal breastfeeding self-efficacy and breastfeeding duration?

4. What is the effectiveness of different providers of breastfeeding education (for example, lactation consultant, midwife, nurse, nurse practitioner, or physician) on maternal breastfeeding outcomes, including maternal breastfeeding self-efficacy and breastfeeding duration?

5. What is the effectiveness of breastfeeding education based on self-efficacy theory compared with other types of breastfeeding education on maternal breastfeeding outcomes, including maternal breastfeeding self-efficacy and breastfeeding duration?
Background

The benefits of breastfeeding for infant and maternal health, as well as for the society are well documented. Breast milk contains nutrients at percentages exactly suited to the needs of the infant for growth and development.\textsuperscript{1,2,3} Breastfeeding has been associated with lower rates of gastrointestinal, respiratory, and urinary tract infection and less atopic illness in the first year.\textsuperscript{4,5,6} The benefits to the breastfeeding mothers include the increased likelihood of the burning of body fat deposited during pregnancy and self-image enhancement. Some studies have demonstrated a lower incidence of developing premenopausal breast and/or ovarian cancer among breastfeeding mothers.\textsuperscript{7}

For the society, the practical benefits include substantive savings on expenses associated with formula feeding; the purchase of milk artificial formulas has been reduced in some countries. Position statements from professional organisations, such as the American Academy of Pediatrics, recognise the significant impact that breastfeeding can have in terms of reducing healthcare costs. Breastfeeding highly reduces risks involved in feeding infants prepared milk formulas as well, including milk powder contamination, allergy reaction due to the cow milk and the storage of milk formulas. Because of the well-known advantages of breastfeeding, international awareness about this issue has been raised. As a result, global support for the encouragement, commencement, and continuation of breastfeeding has been initiated. The World Health Organization (WHO) recommends breastfeeding exclusively for the first six months of life and continuation of breastfeeding for up to two years of age.\textsuperscript{9}

However, although the importance of breastfeeding is well known around the world, many mothers from different countries prematurely discontinue breastfeeding. Prevalence of breastfeeding in developed and developing countries highlights the continuity challenges associated with accomplishing the WHO breastfeeding recommendations, indicating that few mothers from developed countries continue to breastfeed beyond 12 weeks postpartum. In the United Kingdom (UK), statistics show that the breastfeeding initiation rate was 69\% in 2005.\textsuperscript{10} A sharp reduction in breastfeeding within the first few weeks after initiation was also reported, indicating that UK mothers who breastfed exclusively for six months accounted for only 25\% of the total. Similar results were found in Canada and USA.\textsuperscript{11}

In the Asian countries, it is reported that 96\% of Japanese mothers intend to exclusively breastfeed, however, only 42\% are exclusively breastfeeding at four weeks postpartum.\textsuperscript{12} Hong Kong mothers are no exception to this, where similar data is found.\textsuperscript{13} Compared with developing countries, the statistics show that only 50\% of Chinese mothers exclusively breastfeed for the first six months postpartum.\textsuperscript{14} To sum up, despite these widely known benefits and recommendations of breastfeeding, the majority of mothers from both developing and developed countries discontinue breastfeeding before the duration recommended by WHO.
Many studies have been conducted to identify factors that promote breastfeeding prevalence and their relationship with mother's breastfeeding behaviour.\textsuperscript{15,16} The identified factors influencing a woman's decision on sustained breastfeeding can be classified as either modifiable or non-modifiable factors.

Multiple factors that contribute to breastfeeding, such as maternal age and education level, marital status, family income and socioeconomic status, are non-modifiable.\textsuperscript{17, 18} Some studies have shown that breastfeeding rates are higher among women who are older and have attained a higher educational level, and breastfeeding is more common in married women.\textsuperscript{19, 20} However, many of these high-risk factors are non-modifiable demographic variables, and are difficult to address.

In contrast, modifiable factors include maternal attitudes, timing of the decision to breastfeed, timing of first feeding, breastfeeding knowledge, and self-efficacy. Evidence states that these variables might have a positive relationship with continued breastfeeding.\textsuperscript{21,22} One of the possible modifiable variables is self-efficacy, the importance of which on breastfeeding outcomes has drawn the attention of several researchers. Self-efficacy often is confused with confidence, however there are some clear distinctions between these terms. Self-efficacy is similar to but different from confidence. Confidence refers to the strength of a belief, whereas self-efficacy includes both the strength of the belief and the affirmation of the capability to perform a specific behaviour.\textsuperscript{23} Some interventions based on the self-efficacy concept have been introduced to increase the breastfeeding rate.

In the past two decades, maternal self-efficacy has been increasingly shown to play an important role in both breastfeeding initiation and duration. Maternal self-efficacy in breastfeeding is derived from the self-efficacy concept of Bandura.\textsuperscript{23} Maternal self-efficacy is defined as a mother's perceived ability to breastfeed her child and influences her decisions regarding breastfeeding, such as whether to breastfeed, how much effort to place on breastfeeding, and how to respond to any challenges during the experience.\textsuperscript{24} Even as early as 1992, O’Campo et al.\textsuperscript{22} in a prospective study examined eleven psychosocial and demographic variables in breastfeeding and recognised that maternal self-efficacy was positively correlated to breastfeeding duration. Mothers with lower self-efficacy in their perceived ability to breastfeed were at three times the risk of discontinuing breastfeeding. Ertem et al.\textsuperscript{25} in a longitudinal study finds that pregnant women who lacked confidence in their ability to breastfeed were twice as likely to discontinue before two months postpartum. Mothers with a higher perceived self-efficacy for breastfeeding tend to initiate breastfeeding and persist even through challenges, however, a mother with a lower perceived self-efficacy may wean prematurely. In addition, Papinczak and Turner\textsuperscript{26} collected quantitative and qualitative data from 159 mothers using three questionnaires over a six-month postpartum period. The finding also indicates breastfeeding self-efficacy is positively related to breastfeeding duration. Another
study also reports similar results, 27% of women with low maternal self-efficacy in the prenatal period discontinue breastfeeding within the first postpartum week compared with only 5% of mothers with higher perceived self-efficacy. Moreover, it reports as a result of mothers having higher self-efficacy, they use less formula supplementation, have less complaint of nipple trauma or wound pain, and tend to have a longer length of breastfeeding. To sum up, if maternal breastfeeding self-efficacy is high, breastfeeding duration will be longer as mothers have more confidence in continuity of breastfeeding. A positive correlation between maternal self-efficacy and the duration of breastfeeding has been showed in many studies. In 1999, Dennis conceptualised the breastfeeding self-efficacy theory based on Bandura's self-efficacy concept from social cognitive theory (1977) and developed the Breastfeeding Self Efficacy Scale (BSES) as a measuring tool to assess breastfeeding self-efficacy and guide the implementation of interventions. The BSES has consistently been shown to predict breastfeeding duration at four, six, eight and 16 weeks postpartum among mothers in different countries, including Canada, Australia, China, Poland, and Puerto Rico. A significant relationship has been demonstrated between breastfeeding self-efficacy and exclusive breastfeeding as well. In order to improve low breastfeeding duration rates and exclusivity rates, healthcare professionals need to reliably assess high risk women who may discontinue prematurely and identify their levels of maternal self-efficacy in relation to breastfeeding. The BSES can be used as a baseline assessment tool in the clinical setting so that the high risk mothers can be offered appropriate interventions to prevent early breastfeeding cessation.

The breastfeeding period can be extended when mothers receive appropriate nursing interventions, continuing support and evaluation. Many breastfeeding education programs are introduced in order to promote breastfeeding and to facilitate a longer duration of breastfeeding. Some of them are successful and some fail. According to a study by Pugin et al, the provision of breastfeeding skill-based education antenatally increases the breastfeeding rate. It emphasises that early introduction of appropriate and effective interventions will help mothers to achieve recommendations of six months exclusive breastfeeding as well. Another study examined 14 women enrolled in the prenatal education. The finding indicates mothers who received prenatal education also increased duration of breastfeeding. A national survey in Taiwan found that mothers who attended prenatal breastfeeding classes have a higher rate of breastfeeding at one month after delivery than the mothers in control group. Similar results were also found in studies by Di and Chezem et al. They all conclude that prenatal education providing appropriate knowledge and skills increases mothers' self-efficacy in breastfeeding and increases the breastfeeding duration. On the other hand, some studies show the positive effect on postpartum breastfeeding education. A study by Froozani et al. states that postpartum breastfeeding education improves breastfeeding rates at four months postpartum. Mothers in the experimental group have exclusive breastfeeding rates of 54%, whereas
mothers in the control group have a rate of 6.5% respectively. In 2000, the Fairbank et al. study suggested education should be provided before and after birth. It states antenatal breastfeeding information in personalised formats, in addition to postnatal support, have been effective for increasing breastfeeding prevalence. Based on the theoretical underpinnings of maternal breastfeeding self-efficacy, some researchers developed and examined several interventions. The results show breastfeeding duration is longer as the maternal self-efficacy increases after the intervention.

However, some studies have different findings, they reveal no impact of antenatal classes on breastfeeding prevalence. In a randomised controlled trial conducted by Hill, 64 mothers in a university hospital attended the prenatal breastfeeding education and were surveyed at six weeks postpartum. Participants and controls described their level of breastfeeding knowledge, the method of feeding and their perception of their personal breastfeeding success. It found no difference in breastfeeding duration rate between the intervention and control groups. Another study also indicates there was no significant difference between the mothers who attended the structured in-hospital educational class and the mothers who received usual care in terms of the rate of breastfeeding and the rate of exclusive breastfeeding during the four-month postpartum period.

To sum up, the effectiveness of breastfeeding education is still inconclusive. It is important to examine the current interventions being used to increase maternal breastfeeding self-efficacy and breastfeeding duration. Some breastfeeding education classes are provided during the antenatal period only and some are structured in-hospital educational classes. Do breastfeeding educations enhance maternal self-efficacy and breastfeeding duration, and if they do so, what is the best approach to the education? Due to some variations among the educational interventions, it is important to assess the heterogeneous nature of these interventions. A systematic review of the effectiveness of these is thus needed.

Some systematic reviews on evaluating the effectiveness of breastfeeding interventions have been published. However, they only focus on the effect on breastfeeding initiation and child and maternal outcomes. The significance of this review is to identify what types of breastfeeding education are more likely to effectively enhance maternal self-efficacy and promote breastfeeding duration. It will provide more useful information for health care professionals to develop appropriate interventions and increase breastfeeding rate.
Inclusion criteria

Types of participants

The study population will include pregnant women and mothers of infants in the immediate postpartum period. Studies recruiting mothers, who are over 18 years old, who have a caesarean, instrumental, or spontaneous vaginal delivery and who have given birth for the first time to an infant or infants will be eligible to be included in this review.

Women and infants with a specific health problem, for example, mothers with an eating disorder or human immunodeficiency virus (HIV) / acquired immunodeficiency syndrome (AIDS), or infants with cleft palate, low birth weight (≤2500g) or premature babies (≤37 weeks of gestation), will be excluded from this review owing to the special considerations required to account for the complexity of factors which may affect the outcomes in those women.

Types of interventions

Any structured (organised) educational interventions, offered either in hospital or community by a provider (nurse, nurse practitioner, lactation consultant, midwife or physician), implemented with the intention of enhancing maternal self-efficacy and duration of breastfeeding are eligible for inclusion.

Educational interventions which include mothers, fathers or both parents will be included. The interventions may be directed towards individuals or groups, and may be provided face-to-face, through print media, internet or by video. They are offered at different times during the prenatal and/or postnatal period, and lengths and frequencies of sessions may vary. Timing is important in breastfeeding education as mentioned in several studies above, so it will be included in subgroup analysis. Interventions that take place during the delivery period only will be excluded.

Any educational interventions, based on theoretical underpinnings, whose specified aim is to increase maternal self-efficacy will also be included in this review. For the purposes of this review, self-efficacy is defined as people's judgments of their capabilities to organise and execute courses of actions required to attain designated types of performance.

Studies of educational interventions for parents of infants in a neonatal intensive care unit will be excluded since the needs of these families differ substantially from those of other families. Studies reporting only the effect of the intervention on mothers' knowledge of breastfeeding, infant-feeding decision, or breastfeeding initiation, rather than breastfeeding duration will be excluded.
**Comparators**

The main expected comparison groups will include:

- no education
- standard or usual care

This review will focus on the effectiveness of breastfeeding education instead of breastfeeding support. Interventions to be excluded from this review, due to the existence of Cochrane reviews on these topics include: support for breastfeeding mothers and professional and lay support interventions on breastfeeding duration.\(^1\)

**Types of outcome measures**

**Primary outcomes**

The effect of interventions on duration of any breastfeeding is the primary outcome in this review. Breastfeeding duration is defined as the number of days from starting breastfeeding until a mother completely ceased breastfeeding. Evaluations of interventions aimed to increase duration of breastfeeding may include measures in weeks or months, or they may be categorised into periods of times (e.g. short, intermediate, long or prolonged). For the purposes of this review, breastfeeding durations of less than three months will be defined as short term, four to five months as intermediate term, six to eight months as long term, and nine or more months as prolonged.\(^2\) Then, the outcome measures regarded as ‘successful’ or ‘unsuccessful’ breastfeeding will be evaluated. Breastfeeding success is defined in this review as duration of breastfeeding for at least four weeks with different kinds of breastfeeding.\(^3\) Pumping breast milk will be included.

Breastfeeding self-efficacy is one of the main outcomes in this review. Outcomes will be recorded as those relating to self-efficacy and those which are specific for breastfeeding education including health status, quality of life and patient satisfaction. This list is not intended to be exhaustive but suggests the major patient reported outcomes measures.

- Self-efficacy as measured by general self-efficacy scale or breastfeeding self-efficacy scale
- Self-reported measures of health status and health-related quality of life (e.g. SF-36, EQ5D)
- Self-reported measures of patient satisfaction and experience with the process of care
Secondary outcomes

In studies that measured the primary outcome of duration of breastfeeding, any additional information relating to exclusivity of breastfeeding will also be recorded. In this review, breastfeeding regimens will be classified as exclusive or nonexclusive breastfeeding. Studies use different definitions of exclusive breastfeeding (“no supplement of any kind,” “including water while breastfeeding,” or “occasional formula is permissible while breastfeeding”); all of those definitions will be adopted. Then, all other breastfeeding regimens (partial, mixed or nonspecific) will be classified as nonexclusive breastfeeding.

Evaluations of interventions solely focusing on exclusivity of breastfeeding, without reporting duration of breastfeeding, will be excluded. Any breastfeeding complications such as mastitis and breast abscess arising from the interventions will also be reported.

Types of studies

This systematic review will consider all studies that used randomised controlled trials (RCTs) design. Other research designs such as quasi-experimental studies (for example, non-randomised controlled clinical trials with control group) will be included in the review.

Search strategy

The search strategy is designed to identify both published and unpublished material in English or Chinese from inception to December 2011. The search will proceed in three stages as follows.

The first stage will involve a search of electronic databases stated below to look for key words contained in the title and abstract.

Secondly, a more extensive search of the databases will be performed based on the developed search strategies. The keywords, index terms and matched subject headings that are specific to each database will be searched in order to identify potential articles for inclusion into the review.

Finally, a hand-searching of other sources of studies such as Journal of Human Lactation, British Journal of Midwifery, Health Promotion International and Health Education Quarterly will be performed. Postgraduate and doctoral dissertations will be searched for additional studies. An online search of websites using a search engine such as Yahoo will also be performed to identify potential research studies for inclusion into the review. Moreover, the reference lists
and bibliographies of all retrieved articles from all types of searches will be screened to reveal additional relevant studies. Authors of previous studies will be contacted to request any work in progress or for details of any relevant unpublished studies.

The databases to be searched will include:

MEDLINE, CINAHL, EMBASE, Cochrane Library, All EBM Reviews, Database of Abstracts of Reviews of Effects (DARE), ProQuest (Dissertation), ISI Web of Science, PsycINFO, HealthSTAR, BioMed Central, Centre for Reviews and Dissemination (CRD), WanFang Data, China Journal Net, Chinese Biomedical Literature Database, Chinese Medical Current Contents, Hong Kong Index to Chinese Periodical Literature, Chinese Electronic Periodical Services, Chinese Electronic Theses and Dissertations Service, and Taiwan Electronic Periodical Services, and Maternity and Infant Care.

The search for unpublished studies or grey literature will include:


Initial keywords or terms to be used include:

antenatal
perinatal
postnatal
breastfeeding
breastfeeding education
client education
women education
patient education
health education
breastfeeding program
education program
self-efficacy
self concept
confidence
breastfeeding duration
Then, a search for some relevant self-efficacy scales as follows:

Self-efficacy scale
maternal self-efficacy
breastfeeding self-efficacy scale

A proposed detailed search strategy is shown in Appendix I.

Assessment of eligibility

Two reviewers will independently review articles and decide on those to be included in the review based on the inclusion criteria. If a research study is considered eligible for inclusion into the review, its full text will be retrieved. If the title or abstract of the study is inconclusive, the full text will be retrieved for further assessment. Any disagreements that arise between reviewers will be resolved via discussion. Where there is unresolved disagreement between the reviewers, the third reviewer will be consulted. The details of eligible studies will be stored in a bibliographic software package (RefWorks). Each study may have several associated trials, if those studies are acknowledged identification of duplicates, each article will be considered only once. In order to verify study eligibility at the time of data abstraction, a study verification form is needed (Appendix II).

Assessment of methodological quality

Quantitative papers selected for retrieval will be assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardised critical appraisal instruments from the Joanna Briggs Institute Meta Analysis of Statistics Assessment and Review Instrument (JBI-MASTARI) (Appendix III). Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer.
Data collection

Details of all included studies will be extracted independently by one reviewer using the JBI Data Extraction Form for Experimental and Observational Studies (Appendix IV). Data extracted from included papers will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives. A second reviewer will independently check for its accuracy. Any differences in opinion will be resolved through discussion with the reviewers. When the information regarding the study is unclear, the reviewer will try to contact authors to provide further details.

Data synthesis

Data will be extracted by two independent reviewers. The results of included studies will be subject to double data entry in order to minimise the risk of errors. For the dichotomous data, relative risk/risk ratio (RR), odds ratios (OR), corresponding 95% confidence intervals (95% CI) will be calculated and used as summary measure of effect for each study.

For continuous data, we will present the mean difference and corresponding 95% CI for each study using the same scale; while for the continuous data collected using different scales, the standardised mean differences and their 95% confidence interval will be calculated. The studies will be assessed for clinical heterogeneity by considering the settings, populations, interventions and outcomes. If appropriate, quantitative results will be combined into a meta-analysis using the JBI-MAStARI for evaluation of the overall effects of an intervention. We will assess the extent of statistical heterogeneity using the $I^2$. We will use a fixed effect model where there is no evidence of clinical or statistical heterogeneity between studies; while a random effects model will be used in the absence of clinical heterogeneity but with the presence of statistical heterogeneity. If statistical pooling of results of the included studies is not appropriate or possible, the findings will be summarised in narrative form.

In order to investigate whether the review is subject to publication bias, a funnel plot is needed for examining any asymmetry. If there is asymmetry, reasons other than publication bias will also be considered such as language bias.
We plan to evaluate the following comparisons by subgroup analysis:

- one form of education program versus other form of education program
- programs involving multiple methods of providing education compared to those using a single method
- different combinations of multiple methods of providing education
- timing of breastfeeding education (prenatal, postnatal and combination thereof)

Conflicts of interest

No conflicts of interest identified.
References


Appendix I: Detailed search strategy

1. MEDLINE
2. exp Prenatal Care/
3. exp Postnatal Care/
4. exp Breast Feeding
5. antenatal.mp.
6. postnatal.mp.
7. or/ 1-5
8. exp Health Education/
9. exp Patient Education as topic/
10. woman education.mp.
11. client education.mp.
12. breastfeeding program.mp.
13. education program.mp.
14. or/ 7-12
15. 6 and 13
16. exp Self Efficacy/
17. exp Efficacy/
18. exp Self concept/
19. confidence.mp.
20. or/ 15-18
21. 14 and 19
22. breastfeeding duration.mp.
23. 20 and 21
24. randomized controlled trial.pt.
25. 22 and 23
Appendix II: Study verification form

The effectiveness of breastfeeding education on maternal breastfeeding self efficacy and breastfeeding duration

Verification of Study Eligibility

Author/s and Year: ____________________________

Journal Title: ____________________________

Record Number: ________________________

Type of Participants

Pregnant women intending to breastfeed, postpartum women intending to breastfeed

Over 18 years old  □□

Have a cesarean, instrumental, or spontaneous vaginal delivery  □

Have given birth for the first time to an infant or infants  □□

Type of Interventions

Studies that have compared the effect of breastfeeding education on impact of maternal self efficacy  □□

Studies that have compared the effect of breastfeeding education on impact of breastfeeding duration  □□

Type of Outcome Measures

The assessment of

Primary outcomes: breastfeeding duration, maternal self efficacy  □□

Secondary outcomes: exclusive breastfeeding, breastfeeding complications (e.g. mastitis and breast abscess)  □□
**Type of Studies**

<table>
<thead>
<tr>
<th>Study Type</th>
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<tbody>
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<td>Quasi-experimental studies</td>
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If you have not ticked **at least one box in each category** please do not proceed with the rest of data form.
### JBI Critical Appraisal Checklist for Experimental Studies

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<th>Question</th>
<th>Yes</th>
<th>No</th>
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<td>1. Was the assignment to treatment groups truly random?</td>
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<td>2. Were participants blinded to treatment allocation?</td>
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<td>3. Was allocation to treatment groups concealed from the allocator?</td>
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<td>4. Were the outcomes of people who withdrew described and included in the analysis?</td>
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<td>5. Were those assessing outcomes blind to the treatment allocation?</td>
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<td>6. Were the control and treatment groups comparable at entry?</td>
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**Overall appraisal:** Include [ ] Exclude [ ] Seek further info. [ ]

**Comments (Including reasons for exclusion):**

________________________________________________________________________

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Appendix IV

JBI Data Extraction Form for Experimental/Observational Studies

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<tr>
<th>Study Method</th>
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<td>Sample size</td>
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| Interventions      |               |               |           |
| Intervention 1     |               |               |           |
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| Intervention 3     |               |               |           |

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<thead>
<tr>
<th>Clinical outcome measures</th>
<th>Outcome Description</th>
<th>Scale/Measure</th>
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## Study results

### Dichotomous data

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<th>Intervention ( ) number / total number</th>
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### Continuous data

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<th>Intervention ( ) mean &amp; SD (number)</th>
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## Authors Conclusions

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## Comments

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