Effectiveness of Home Visiting Programs To Prevent Maternal Depression: A Systematic Review of RCTs

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ABSTRACT

Background: During prenatal and post-partum period, 10-20% of women experience depression. The quality of life and functional capacity of these women were also significantly impacted by depression. This condition also has an adverse effect on fetal development and newborn. Furthermore, home visit have been used to reduce maternal depression. However, the evidence of this still low. Hence, this review aims to evaluate the effectiveness of home visiting in preventing maternal depression. **Method:** Articles for this systematic review were collected from several databases (PubMed, Scopus, Google Scholar, and ScienceDirect) using terms related to maternal depression, prevention, and home visiting. The quality of included studies were assessed using the Newcastle-Ottawa Scale (NOS). **Results:** This systematic review is comprised of 13 high quality randomized clinical trials with 4.804 participants. Eleven studies indicate that home visiting effectively reduce depressive symptoms and a study shows that mothers receiving home visiting are twice less likely to develop depressive symptoms. Home visiting are also beneficial for low-income women amidst the low rate of mental health services. Only two studies state that there is no evidence that home visiting effectively reduces depressive symptoms and increases caregiving quality. However, some studies state that the mother's cognitive, child growth, and maternal depression may improve with home visiting integrated with cognitive behavioral therapy, counseling, education such as lectures, or video. **Conclusion:** Home visiting are effective in preventing maternal depression. Further studies are needed to compare the effectiveness of the intervention plan in home visiting.

Keywords: Maternal depression, prevention, home visit

INTRODUCTION

Women undergo emotional, physical, and social changes when their obligations as a mother grow.[1] They may develop maternal depression, a depressive condition that can affect a woman during pregnancy and up to 12 months after birth.[2] This condition has been one of the main causes of death for young women and significantly increases the burden of suicide.[3-4] The neglected child, self-harm, and family breakdown are also consequences of maternal depression.[5] During the prenatal and post-partum periods, around 20% of women experience clinically significant symptoms of depression.[6] Low-income families of all races, ethnicities and geographical locations bear a disproportionate share of the burden.[7]

Maternal depression raises a higher risk of preterm delivery, poorer growth or delay in development, low birth weight, infant under-nutrition and stunting. This condition also may indirectly affect fetal physiological development and thus affect children's cognitive growth later.[8] Research shows that maternal depression during pregnancy affects the hypothalamic–pituitary–adrenal (HPA) axis to be more reactive to stress.[9] Therefore, children may find difficulties in learning.

Unfortunately, maternal depression is still not well addressed. It is still underdiagnosed and left untreated.[7,10] Furthermore, a mother is the primary target of current preventative interventions such as early baby feeding and breastfeeding counselling, hygiene promotion, immunization, health education, and health-seeking behaviours. The effectiveness of these programs consequently depends on the mothers' functional willingness, openness to the message, and capacity to implement the suggested intervention, all of which will be influenced by their mental

health.[11] Therefore, it is very important to address maternal depression and assess preventive measures such as home visiting programs.

A home visiting program is an early intervention for mothers and their infants, parents and children, or families. These programs aim to raise awareness of children's early life development, the role of parents in influencing these years, and the long-term effects of these years on a child's health and development as they age.[12] The advantage of home visiting programs is that the service is provided to socially isolated or economically disadvantaged families in their homes. Home visitors can give services more customized manner by giving the programs in a home setting.[13]

Most literature and reviews about home visiting programs focus on child maltreatment.[13] To our knowledge, this is the first systematic review focusing on the effectiveness of home visiting programs as a prevention method for maternal depression. This review may fill the literature gap and, therefore, be used as a reference by policy-makers to prevent maternal depression.

Methods

Search Strategy
This systematic review used a literature search from several databases such as PubMed, Scopus, Google Scholar, and ScienceDirect. The search was done from October 8th to October 13th using keywords listed in Table 1. Systematic Analysis approaches were used in this study, including PICO Analysis (P (Population): maternal depression, I (Intervention): home visiting programs, C (Comparison): N/A, O (Outcome): reduced depressive symptoms).

The inclusion criteria for the study are randomized controlled trial studies within the past ten years and must be written in English. Studies included must use home visiting as an intervention and include females with maternal depression or pregnant women as the study population. Meanwhile, the exclusion criteria are unpublished manuscripts, dissertations, books, editorials, meta-analyses, systematic reviews, and literature reviews. Studies that did not assess depression or depressive symptoms as an outcome were excluded.

A flow diagram (Figure 1) illustrates the study selection process. Three independent reviewers conduct data selection, extraction, and analysis process. Dissimilarities were resolved through discussions and general agreements between the reviewers. PRISMA search strategy was used to evaluate the selected study based on the title and abstracts. The full text will be evaluated if the information in the abstract is insufficient. Studies that met the inclusion criteria were included (Table 3).

Data Extraction
Data regarding the author's name, year of publication, study design, country of the study, the sample size in the study, mean age of the study population, frequency of home visits, by whom the intervention was conducted, and types of intervention given during home visiting sessions were extracted.

Outcome Definitions
The primary outcome observed in this study is depressive symptoms. Sad emotions, loss of interest in or enjoyment in everyday activities, exhaustion, and overwhelming feelings of guilt and worthlessness were defined as depressive symptoms.[14]

Quality Assessment
Newcastle-Ottawa Scale (NOS) was used to assess the quality of the chosen studies. There are three main aspects assessed; selection of the study groups (four points), comparability of the groups (two points), and outcome (three points). Only studies with scores ranging from 8-9, considered good quality and 4-6, considered moderate quality, were included. A study of less than five is considered poor. Any dissimilarities were resolved through discussions between the reviewers. The results of each study assessed are shown in Table 2.

RESULTS

Literature Search
A total of 88.104 studies were identified through online databases (27 studies from Pubmed, 76.400 studies from Google Scholar, 48 from Scopus, 2.424 from Science Direct, and 9.205 from PMC). The screening was done based on the title and abstracts. After removing duplicates and excluding studies other than randomized clinical trials, the full text was assessed for eligibility based on inclusion and exclusion criteria. Thirteen studies were acquired for this systematic review.[15-27] The selection process is shown in Figure 1.

Quality Assessment
The results of the quality assessment of each study are shown in Table 2. There were 11 good-quality studies and two moderate-quality studies. There were no studies with poor quality. Therefore 13 studies were included in this systematic review.

Characteristics of the Included Studies
Characteristics of the included studies are listed in Table 3. All studies were randomized clinical trials published between 2013 - 2021 and done in several countries such as Illinois, Berkshire, French, Baltimore, German, Cape Town, Netherlands, Iran, Hawaii, Italy, Tanzania, Southwestern Ohio, and Northern Kentucky. All studies used the home visit as an intervention. During the home visit sessions, five studies were using home visit programs integrated with CBT, 1 study involved counselling sessions, and the rest were educating on infant behavioural problems, parenting skills, child growth, nutrition, promoting mental health or maternal health behaviour, and developing mother-child relationships.

Characteristics of the Studied Population
This systematic review is comprised of 13 high quality randomized clinical trials with 4.804 participants. Only two studies by Ammerman et al. and Sadner et al. were including participants under 18 years old and the rest were including participants in their productive age, ranging from 18-42 years old. Participants from 8 studies coming from

low or middle income country.

Study With Positive Results

A total of 11 of 13 studies show that mothers enrolled in home visiting programs experienced a reduction in depressive symptoms. A study by Milani et al. shows that mothers receiving home visiting are twice less likely to develop depressive symptoms (OR=2.1, P=0.087). The rate of change in depressive symptoms at 6 months was significant in three studies.[16,19,25] McFarlane et al. also indicate that improvement in maternal coping and stress reduction was achieved 6 months post-intervention. Not only that, but home visiting also significantly reduced anxiety and parenting stress in a study by Vismara et al. Interventions given during these home visiting sessions were varied, but 5 of 11 studies that shows a reduction in depressive symptoms were using cognitive behavioural therapy (CBT) targeting low or middle-income population.[15,16,19,24,26]

Study With Negative Results

Out of 13 studies, two failed to show that home visiting programs effectively decreased depressive symptoms. The study by Cooper et al. shows that home-visiting programs have no impact on maternal mood, parenting behaviour, or infant outcome. Like Cooper et al., the study by Missler et al. also failed to give evidence of home visiting effectiveness. Both studies were not targeting the low or middle-income population. In addition, the participants in a study by Missler et al. were relatively high-income and well-educated population. The interventions given during the home visiting session also differed from other studies. They used a booklet, online video and implemented counselling sessions rather than regular home visits.

DISCUSSION

This systematic review has shown that home visiting programs may effectively prevent maternal depression by reducing depressive symptoms. Home visiting programs benefit women living in stressful environments who lack social support. Both stressful environments and lack of social support are the main risk factor for developing maternal depression. Low socioeconomic status also plays a role in the prevalence of maternal depression. Nevertheless, with home visits, it is possible to target these populations who are at high risk for developing maternal depression.[28] In our systematic review, two studies failed to give evidence of the effectiveness of home visiting programs. The study by Missler et al. chose relatively highly educated parents and claimed that these parents may have done their research. Different from low-income populations, they have limited resources in this matter.

Providing the mother with information on parental role and infant eating, sleeping, and crying was also advantageous for reducing postpartum stress and improving caregiving quality.[22] However, another study claimed that having access to information does not always reduce stress.[29] Therefore, many variables still need to be investigated related to the home visiting program. In our systematic review, 5 studies with positive outcomes integrated CBT into their program. Not only providing information, but the programs also help mothers to implement what they have learned by the end of the course. This approach may contribute to the effectiveness of home visiting programs.

Strengths and Limitation

Based on our knowledge, this is the first systematic review that focusing on home visiting programs as an intervention to prevent maternal depression. However, in each of the studies included, there are many differences related to the home visiting program being carried out. Starting from the chosen population, intervention providers, frequency and duration of each home visit session, and intervention given during home visit sessions. Therefore, further studies are needed to determine which intervention needs to be done during each home visit session (i.e. CBT, counselling, education, etc.) and create a comprehensive guide on this matter.

CONCLUSION

Home visiting programs may effectively prevent maternal depression by reducing depressive symptoms. Further studies are needed to compare the effectiveness of the intervention plan in home visiting.

Appendix

Table 1 Literature Search Strategy

| Database	Keywords	Results
Pubmed	(("prevention and control" [Subheading]) AND "Depression, Postpartum"[Mesh]) AND "House Calls"[Mesh]	27
Google Scholar	maternal depression + prevention + home visiting	76.400
Scopus	maternal AND depression AND prevention AND home AND visiting	48
Science Direct	Maternal depression + prevention + home visit	2.424
Pubmed Central (PMC)	(("mothers"[MeSH Terms] OR "mothers"[All Fields] OR "maternal"[All Fields]) AND ("depressive disorder"[MeSH Terms] OR ("depressive"[All Fields] AND "disorder"[All Fields]) OR "depressive disorder"[All Fields] OR "depression"[All Fields] OR "depression"[MeSH Terms])) AND ("prevention and control"[Subheading] OR ("prevention"[All Fields] AND "control"[All Fields]) OR "prevention and control"[All Fields] OR "prevention"[All Fields]) AND ("house calls"[MeSH Terms] OR ("house"[All Fields] AND "calls"[All Fields]) OR "house calls"[All Fields] OR ("home"[All Fields] AND "visit"[All Fields]) OR "home visit"[All Fields])	9.205
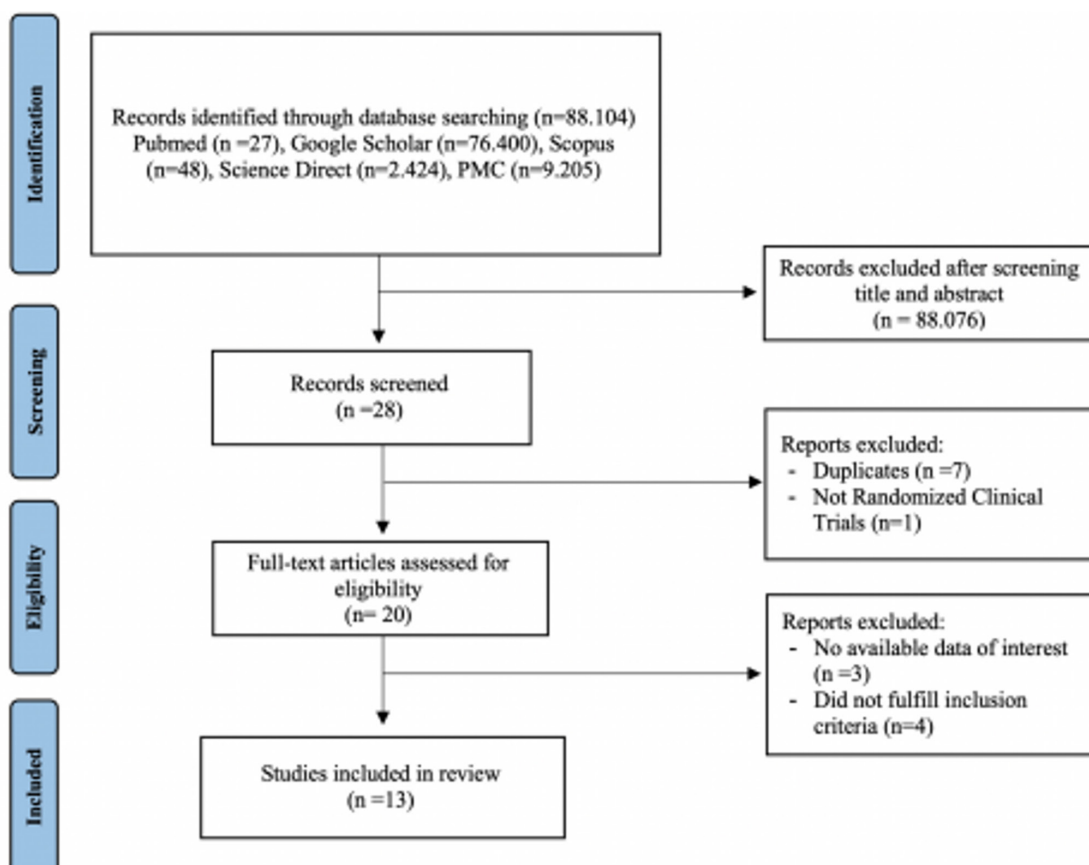
Figure 1 PRISMA diagram of the detailed process of studies selection to be included in the systematic review

Table 2 Newcastle-Ottawa quality Assessment of Randomized Clinical Trials

First Author, year, country	Study Design	Selection	Comparability Exposure Total Outcome	Result
Tandon et al., 2021, Multicentered	RCT	****	* *** 8	Good
Tandon et al., 2018, Illinois	RCT	****	* ** 7	Good
Cooper et al., 2015, Berkshire	RCT	****	* *** 8	Good
Dugravier et al., 2013, French	RCT	***	* ** 6	Moderate
Tandon et al., 2013, Baltimore	RCT	***	* ** 7	Good
Sadner et al., 2018, German	RCT	****	* ** 7	Good
Tomlison et al., 2018, Cape Town	RCT	***	- ** 6	Moderate
Missler et al., 2020, Netherlands	RCT	****	* ** 7	Good
Milani et al., 2017, Iran	RCT	****	* ** 7	Good
McFarlane et al., 2017, Hawaii	RCT	****	* ** 7	Good
Vismara et al., 2020, Italy	RCT	****	* *** 8	Good
Ammerman et al., 2013, Southwestern Ohio & Northern Kentucky (USA)	RCT	****	* ** 7	Good
Bliznashka et al., 2020, Tanzania	RCT	****	* ** 7	Good

Tandon et al., 2021Tandon et al., 2018Tandon et al., 2013, McFarlane et al., 2017, Ammerman et al., 2013,

Table 3 Summary of Included Studies

First Author, year, country	Study Design	Sample Size	Low Income Population	Frequency of Home Visits	Home Visitors	Type of Intervention	Instruments	Outcome
Tandon et al., 2021, Multicentered [15]	RCT	824	Yes	6 sessions, weekly	Health worker/ non-health worker	CBT, Education	QIDS-SR16, MMS, BADS	Reduce depressive symptoms among women with mild depressive symptoms
Tandon et al., 2018, Illinois [16]	RCT	120	Yes	12 sessions	Non-health worker	CBT, Education	BDI-II	Reduce depressive symptoms between baseline, 3 months, and 6 months post-partum
Cooper et al., 2015, Berkshire [17]	RCT	148	No	11 sessions	Health worker	Conselling	EPDS, SCID, BSQ	No impact on depressive symptoms
Dugravier et al., 2013, French [18]	RCT	367	Yes	14 sessions	Health worker	Education	EPDS	Reduce depressive symptoms for woman with minimal depression (EPDS<8)
Tandon et al., 2013, Baltimore [19]	RCT	78	Yes	6 sessions	Health worker	CBT, Education	CES-D, MMS	Reduce depressive symptoms between baseline, 3 months, and 6 months post-partum
Sadner et al., 2018, German [20]	RCT	755	Yes	Varied (weekly, bi-weekly, monthly)	Health worker	Education	No description	Reduce depressive symptoms

Tomlison et al., 2018, Cape Town[21]	RCT	1238	Yes	Minimum of 8 sessions	Non-health worker	Education	EPDS	Does not reduce depression symptoms but benefitted infants
Missler et al., 2020, Netherlands[22]	RCT	138	No (Relatively high income and well-educated population)	No description	Health worker	Education	PSI, EPDS, HADS	No evidence that home visit was effective reducing depressive symptoms
Milani et al., 2017, Iran[23]	RCT	278	No	During 3rd–5th and 13th–15th day after delivery	Health worker	Based on Iranian National Guideline of Maternal and Neonatal Postpartum Cares	EPDS	Reduce depressive symptoms
McFarlane et al., 2017, Hawaii[24]	RCT	95	Yes	6 sessions, weekly	Health worker	CBT, Education	BDI-II, WOC, PSS	Reduce depressive symptoms and improve maternal coping
Vismara et al., 2020, Italy[25]	RCT	77	No description	1 session/week	Health worker	Reflective parenting home visiting program (RPP)	EPDS, STAI, PSI	Reduce level of depression, anxiety, and parenting stress
Ammerman et al., 2013, Southwestern Ohio & Northern Kentucky (USA)[26]	RCT	93	Yes	15 sessions	Non-health worker	CBT	SCID-I, HDRS, EPDS, BDI-II	There is a significant improvement in depressive symptoms
Bliznashka et al., 2020, Tanzania[27]	RCT	593	No description	1 session/4-6 weeks	Non-health worker	Based on Tanzanian and Swahili adapted version of the UNICEF and WHO Care for Child Development package	HSCL-25	Reduce depressive symptoms

Notes:

*Health workers are those who have a background in health or psychology (i.e. nurse, psychologist, psychiatrist). Meanwhile, Non-health workers are those without a background in health or psychology but may receive training beforehand (i.e. community health workers, volunteers, and social workers).

**BADS: The Behavioral Activation Depression Scale; BDI-II: Beck Depression Inventory II; BSQ: Behaviour Screening Questionnaire; CBT: Cognitive behavioral therapy; CES-D: Center for Epidemiologic Studies Depression Scale; EPDS: Edinburgh Postnatal Depression Scale; HDRS: Hamilton Depression Rating Scale; HSCL-25: Hopkins Symptoms Checklist-25; MMS: Maternal Mood Screener; PSI: Parenting Stress Index; PSS: Perceived Stress Scale; QIDS-SR16: The Quick Inventory of Depressive Symptomatology-Self-Report; SCID: The Structured Clinical Interview for DSM; STAI: The State-Trait Anxiety Inventory; WOC: The Ways Of Coping;

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