



# The Effect of We'll App on Social-Support, Self-efficacy, and EPDS for PPD

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**Abstract.** Postpartum depression (PPD) is a common disease in the world, which often results in many social problems. In recent years, many studies have mentioned that social support enhancement can reduce PPD. According to the etiology and treatment methods of postpartum depression and non-clinical intervention, the importance of psychosocial factors is emphasized. Social support is generally considered as an important factor to effectively prevent and reduce postpartum depression. According to the theoretical framework of social support constructed by Leahy-Warren et al. [1], social support is one of the influencing factors that help predict and reduce the risk of postpartum depression. Social support can also indirectly improve maternal parental self-efficiency and effectively reduce the risk of postpartum depression. E-Mental Health (EMH) system is one of the modern effective solutions to psychological problems. It has become a modern social trend to apply electronic mental health service systems to enhance social support. In the past research, Chiou et al. [2] designed a We'll App through the application of EMH to enhance social support, and then enhance maternal self-efficacy, so as to reduce or solve PPD and postpartum depression. This study will continue to carry out clinical trials through We'llAPP, and EPDS, social-support, self-efficiency questionnaires are used to understand the status of maternal emotional disorders, social support and self-efficacy, and conduct clinical research analysis.

**Keywords:** Postpartum depression · Mobile application development · Social-support · Self-efficacy · EPDS

## 1 Introduction

### 1.1 Postpartum Depression

Depression is one of the common diseases in the 21st century. According to the statistics of English literatures, the prevalence rate in the world is 5–8%, about 15% of people have

suffered from or still suffer from depression, and it is even as high as 25% in females [3]. However, female suffer from depression twice as much as male [4–7]. Postpartum affective disorders during pregnancy and childbirth are the most severe among female depression. Maternity and motherhood are necessary stages in the process of human development. Past studies have shown that many postpartum women suffer from postpartum mood disorder. The psychological state of postpartum mood disorder is studied from “postpartum blues” to “postpartum psychosis”. Postpartum depression belongs to a mild depression with a prevalence rate of 50–80%. It occurs within 10 days after delivery [8]. Symptoms include sadness, irritability, uneasiness, anxiety and insomnia. Generally, it does not need special medication or treatment. With adequate nutrition, rest and psychological support, it will gradually improve within about 2 weeks. However, if the depressed mood lasts for more than two weeks and becomes more and more serious, the patients should seek medical treatment as soon as possible. Although transient symptoms do not require medical intervention [9, 10], the patients still need more care and support from family and friends to recover. Maternity often neglects mental health status, and severe cases may increase the risk of postpartum depression [11].

O'Hara and Swain [12] combined 59 studies and found that the prevalence of PPD was 13%. In addition, Meta-analysis of [13] found that psychosocial factors were important predictors: prenatal depression, self-esteem, child care stress, prenatal anxiety, life stress events, social support, marital relationship, history of depression, infant temperament, postpartum depression, marital status, socio-economic status and unplanned pregnancy. Nearly half of PPD women have not been diagnosed, because their symptoms are similar to postpartum physiological changes such as weight loss and fatigue, so they are not easy to be confirmed. Moreover, many postpartum women are reluctant to discuss melancholy with others because the general social perception believes that having children is a happy event, so they are often ashamed to speak or afraid of being stigmatized as melancholy [14]. The Edinburgh Postnatal Depression Scale (EPDS), most commonly used clinically, is a popular tool that can quickly assess the mental status of pregnant and lying-in women.

## 1.2 Social-Support and Self-efficacy

According to the social exchange theory [15, 16] and Bandura self-efficacy theory [17] construct the theoretical framework of social support. Social support is directly related to parenting self-efficacy and postpartum depression, which is helpful to predict and reduce the risk of postpartum depression. One of the influencing factors [13, 18], parenting self-efficacy has a direct negative correlation with postpartum depression. Social support is broadly defined as the material, cognitive and emotional support and assistance given by members or experts in social networks [19, 20]. Members of social networks include family members, intimate partners, friends and peers, with partners, mothers and sisters most frequently contacted [1]. However, it is extremely important for the parturient to obtain substantial assistance from the partner and the mother of the parturient [21], especially the mother of the parturient. Through sharing parenting experience and verbal encouragement, the parenting self-efficacy of parturients can be improved, so evaluative support has a significant correlation with the self-confidence of parturient [22]. However, most parturients are very satisfied with the experience of peer

support. Peer exchange of experience provides emotional, information and evaluation support. Maternal satisfaction is related to the number and duration of peer contact [23]. At present, the social support and parenting self-efficacy of parturients can be detected by the scale. This study used the Multidimensional Scale of Perceived Social Support (MSPSS) created by Zimet et al. [24] to test the function and role of social support.

The perceived material parenting self-efficacy (PMP S-E) tool was used to measure the self-confidence of parturients in various tasks of parenting. The content included 20 questions, which were established from four aspects: infant care style, arousal behavior, perceived behavior or signs, and situational thinking. The score of each question ranged from 1 point (very disagree) to 4 points (very agree), and the internal consistency Cronbach's  $\alpha$  was 0.89.

### 1.3 E-mental Health

E-mental health (EMH) is a modern trend, providing professional functions to solve mental health problems. It provides four service functions through social media, chat rooms, forums, electronic bulletin boards and blogs through the Internet, including (1) information provision [25, 26]; (2) Screening, evaluation and monitoring [27–33]; (3) Medical intervention [34, 35]; (4) Social support (Scharer, 2005).

The popularity of smart phones has transformed EMH into a service mode of mobile medical APP. According to the results of WHO survey on existing mobile medical APPs, depression ranks second only to diabetes [37].

### 1.4 Purpose of Research

Currently, there are few studies on the application of EMH to PDD in Taiwan. The purpose of this study is as follows: (1) To investigate the PPD situation in Taiwan and try to understand the needs of parturients; (2) To investigate the social support status of postpartum women in Taiwan and analyze their social relations. (3) To investigate the self-efficacy of postpartum women in Taiwan (4) To use We'll app as a solution to PPD in Taiwan, and analyze whether there is any difference before and after use.

## 2 Method

The research site was located in Taipei Chang Gung Obstetrics and Gynecology, 60 subjects were openly recruited from the physician clinic and divided into two groups, with 30 cases who agreed to use APP intervention in pregnant and lying-in women experimental group, and 30 cases who did not use APP in control group. The study participants will conduct user clinical trials to test the clinical effectiveness of APP and questionnaire survey after delivery. The content does not affect the health of pregnant and lying-in women and fetuses. The questionnaire consists of four parts: (1) demographic data (2) Edinburgh Postnatal Depression Scale-Taiwan version (EPDS-T) (3) Multidimensional Scale of Perceived Social Support (MSPSS) (4) Maternal Self-efficacy Scale.

At the early stage of this study, the design, development and testing of APP have been completed, and clinical implementation and evaluation will be carried out. At this stage, non-invasive clinical trials will be conducted, and the steps are as follows:

The experimental group brought APP into real life for 6 to 8 weeks, filled in 3 scales (Edinburgh Postnatal Depression Scale 10 questions, Maternal Self-efficacy Scale 12 questions, Social Support Scale 20 questions) for 10 to 20 min at the outpatient clinic 36 to 40 weeks before delivery, started the use of APP immediately after delivery, and filled in 4 experimental questionnaires for 10 to 20 min four weeks after delivery. (Edinburgh Postnatal Depression Scale 10 questions, Maternal Self-efficacy Scale 12 questions, Social Support Scale 20 questions and Usage Assessment Scale 10 questions).

The control group filled in three scales for 10–20 min (Edinburgh Postnatal Depression Scale 10 questions, Maternal Self-efficacy Scale 12 questions, Social Support Scale 20 questions) at the outpatient clinic 36–40 weeks before delivery, and followed the normal life after delivery. Work and rest, and fill in three experimental questionnaires for 10–20 min four weeks and eight weeks after postpartum use. (Edinburgh Postnatal Depression Scale 10 questions, Maternal Self-efficacy Scale 12 questions, Social Support Scale 20 questions). Through this study, the data can be obtained, including maternal user needs, EPDS depression test results, social support status, parenting self-efficacy status, and APP usage status.

The statistical software SPSS 20.0.0 was used for analysis, the confidence interval was set at 95%. Descriptive statistics were used to analyze the basic statistical data, so as to understand the distribution of the basic data of the subjects, and the differences before and after using APP were compared by ANOVA.

### 3 Result

Three 2 (Group Type: APP, Control)  $\times$  2(Time: Pre, Post) ANOVA with repeated measures (Fig. 1) was conducted on the Postpartum Depression (EPDS), Parenting self-efficacy (PMPSE), Social Support (MSPSS).

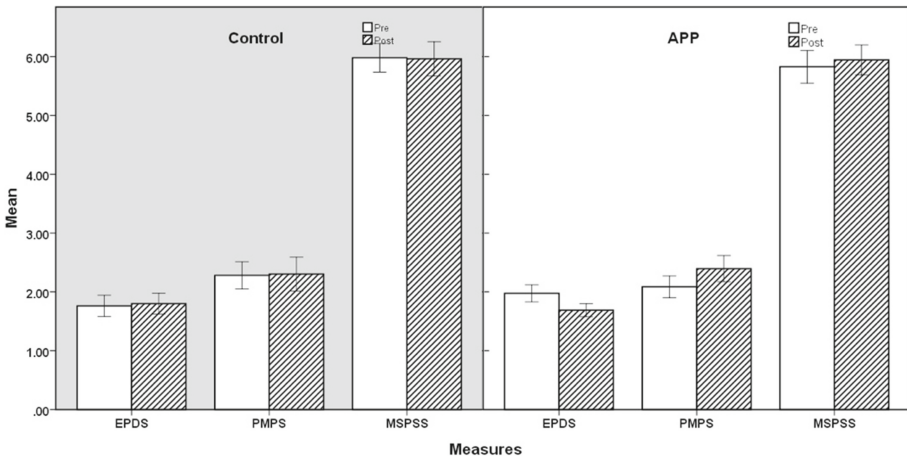
For Postpartum Depression, there was a significant main effect of Time:  $F(1,58) = 6.726, p = 0.012, \eta^2_p = 0.104$ ; and there was a significant interaction between Time and Group Type:  $F(1,58) = 11.251, p = 0.001, \eta^2_p = 0.162$ ; but there was also no significant main effect of Group Type:  $F(1,58) = 0.285, p = 0.595$ .

For Parenting self-efficacy, there was a significant main effect of Time:  $F(1,58) = 4.143, p = 0.046, \eta^2_p = 0.067$ ; but there was also no significant main effect of Group Type:  $F(1,58) = 0.135, p = 0.715$ ; and there was no significant interaction between Time and Group Type:  $F(1,58) = 3.126, p = 0.082$ .

For Social Support, there was no significant main effect of Time:  $F(1,58) = 0.186, p = 0.668$ ; and there was also no significant main effect of Group Type:  $F(1,58) = 0.333, p = 0.566$ ; and there was no significant interaction between Time and Group Type:  $F(1,58) = 0.360, p = 0.551$ . Although the results of Social Support were not significant, it could be seen that there was a slight increase in the post-test data of the APP use group compared to the pre-test, while there was a slight decrease in the post-test data of the control group compared to the pre-test (Table 1).

**Table 1.** Means and standard deviations

Group	Measures	Mean (SD)	
		Pre	Post
APP	EPDS	1.977(0.389)	1.690(0.298)
	PMPSE	2.087(0.496)	2.395(0.597)
	MSPSS	5.827(0.745)	5.944 (0.682)
Control	EPDS	1.763(0.485)	1.800(0.475)
	PMPSE	2.282(0.617)	2.303(0.773)
	MSPSS	5.980(0.653)	5.961 (0.770)



**Fig. 1.** Results of ANOVA

## 4 Discussion

The results of this study suggest that the use of MBI We'll App can effectively decrease their postpartum depression. These findings may be relevant to lifestyle changes in women following pregnancy. Mindfulness therapy can reduce impulsivity in various ways to increase awareness of one's own experience and thus increase control of impulsivity. This allows women to adjust their behavior to the greatest extent possible and reduce the internal anxiety and discomfort associated with role change. MBI We'll App training does not view life's stresses as difficulties or disasters, but as an adjustable way to relieve stress. Through mindfulness training, the emotional information of postpartum depression patients is offset, so that the negative memory is occupied by positive emotions such as mindfulness, love, compassion, etc., get rid of the accustomed uncomfortable thinking mode, and promote the postpartum women to adapt to the new life and new role as soon as possible [39]. Long-term mindfulness training can lead to a decrease in the density of gray matter in the amygdala, which is the brain tissue that produces,

recognizes and regulates emotions, suggesting that mindfulness training can effectively regulate emotions [40]. Mindfulness practice alone has been shown to have positive health effects, improving chronic pain, reducing perceived stress and depressive symptoms during pregnancy, and promoting mental health. After the improvement of the level of mindfulness, the pregnant women are able to deal with their negative emotions in an open, accepting, non-judgmental and non-reactive manner in the face of labor induction events, and focus on the present body, mind and activities, so as to reduce the symptoms of anxiety and depression. Mindfulness emphasizes awareness of one's own feelings, thoughts, and judgments, thereby automating and reducing redundant thoughts, negative thoughts, and avoidance behaviors. After the improvement of the level of mindfulness, the puerpera have rich psychological resources in the face of stressful environment, will view the personal stress response from a positive perspective, and show good adaptation results, which is completely consistent with the effect of mindfulness coping. When women engage in cognitive integration, they take their thoughts as reality, such as the belief that they are stupid and incapable of raising children, which can lead to anxiety and depression. When women become aware of the present and live in the here and now, they activate their self-management system and promote inner harmony, which can reduce depression [42].

The improvement of maternal Parenting self-efficacy is mainly because the physiological state of the puerpera has been changed by the MBI We'll App, and the negative emotional state of the puerpera, such as anxiety, tension and fatigue, has been relieved after the application of the APP. In the face of stressful events, women often judge self-efficacy based on their heart rate, blood pressure, breathing and other physiological arousal levels. Different physical reaction state will affect the achievement level of the activity, the calm reaction makes people calm, confident, and then to behavioral response indicators to confirm or achieve the confidence before the activity, so improve the maternal self-efficacy. Individuals with postpartum depression are often affected by the experience of failure. Once faced with negative life events such as bringing up children, they will think that they will repeat the mistake of failure, so they will have discomfort feelings such as tension and anxiety. Scholars call this phenomenon as negative stimulation and excessive connection between emotion and self. This is when an individual is overly immersed in his or her previous experience and future imagination associated with current events, and this association is usually negative or threatening, so repeatedly, if this phenomenon occurs, over time, forming a habit or automated way of thinking, when individuals once encountered with children, would have a failure of automation beliefs, anxiety, namely individual effectively cope with the negative emotions, self-efficacy is low, so we will adopt the way of escape from the test to cope with depression, although escape way can temporarily alleviate depression, but at the same time also strengthened the escape behavior, depression cannot get effective treatment. The power of mindfulness is to automate and change the way people think. First, the belief that an individual has failed to cope with negative emotions does not immediately go into automation; Secondly, to change the individual's thinking mode, prompting individuals to no longer avoid the way, but to regard depression as an object existence, do not bring in too much subjective evaluation, and then effectively deal with depression.

With the increase of individuals' experience in effectively dealing with negative emotions, the corresponding sense of self-efficacy will also be improved. After all, individual successful experience is one of the most important information sources of self-efficacy. MBI We'll App training improves maternal self-efficacy, thus improving individual physiology, maintaining physical and mental stability, enhancing self-confidence, helping patients adopt positive coping styles and promoting positive health behaviors. The higher the self-efficacy, the better the level of self-management. For patients with high level of mindfulness, they are able to focus on the present emotional experience, more likely to show confidence in the acceptance and management of the disease, promote the improvement of their internal self-efficacy level, and the projected external performance is the improvement of the patient's self-management level of the disease [43, 44].

The increase in maternal social support is not significant after MBI We'll App training. The more aware they are of themselves and their surroundings, the more aware they are of the present, and the abler they are to accept things in the present without judgment. This awareness and acceptance of the present can minimize maternal emotional distress. In other words, the higher the maternal level of mindfulness, the less social support needed. The state of mindfulness requires that the maternal psychology is always in the attention of what is happening in front of her, but also experience the state of their own feelings, so that the psychological state is in the state of mindfulness, can pull people out from the painful thinking and emotions, reduce the damage caused by the symptoms, known as the decentralized process. These mechanisms can free consciousness from rigid frameworks about itself and the world. When a mindful state of consciousness can be established, the mother can reorient her environment and develop mental resilience. MBI We'll App training can make the maternal consciousness function become stronger, such as stable attention, clear awareness, can accept and bear pain, resolve the conflict and transcend the soft mentality of obstacles, so that the thinking from the conflict and obstacles free. "Attention" is the directed attention to this consciousness, "awareness" is the awareness of oneself and the external environment, through the directed awareness individuals can fully understand the internal and external world rather than being limited to a certain mind.

## 5 Conclusion

This study will continue to carry out clinical trials through We'll APP, EPDS, social-support, and self-efficiency questionnaires are used to understand the status of maternal emotional disorders, social support and self-efficacy, and conduct clinical research analysis. Future research with the newly developed We'll APP tools and processes will explore the facilitators of and barriers to its implementation in different primary care settings. Future work should also more systematically examine whether and how intervention processes may reinforce or contribute to pregnant women's feelings of being stereotyped, and how intervention processes can be designed to avoid stereotype threat, which has the potential to reduce the effectiveness of interventions intended to promote pregnant women's health.

Our empirical research did not end with that conclusion: We engaged in a transdisciplinary follow-up project aiming to further articulate our suggested improving design

We'll APP, with concrete elements. However, the insights from this next stage in our research would go beyond the scope of this article, and will follow in a future publication.

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