WEB-BASED COGNITIVE BEHAVIOURAL THERAPY FOR WOMEN WITH POSTNATAL DEPRESSION

Chief Investigator: Professor Jeannette Milgrom

Parent-Infant Research Institute

Main Messages

- Every year, 40,000 women in Australia will experience Postnatal Depression (PND). Yet, fewer than 50% of women seek help.

- Our results show that our fully developed online program, MumMoodBooster, is an effective treatment option for women with clinically diagnosed with PND:
  - 71% of women who received the program were no longer depressed following treatment (no longer met diagnostic criteria for depression)
  - MumMoodBooster is a viable, effective treatment option accessible to large numbers of women in metropolitan, rural and remote areas
  - Women engaged well with the program
  - Satisfaction with the program was highly positive

- The program integrates best-practice Cognitive Behavioural Therapy (CBT) principles and is tailored to perinatally depressed women including infant and partner issues.

- This is the first fully developed and evaluated online treatment for women diagnosed with PND according to DSM criteria.
Every year, Postnatal Depression (PND) affects at least 40,000 women in Australia. It has serious consequences for maternal mental health and infant development. Despite available treatments, fewer than 50% of women seek help, even when identified as depressed. Reasons for poor treatment uptake include, fear of stigma, feelings of failure, poor understanding of depression or what help is available, concern about medication which may be passed through breast milk, and finding it too difficult to attend face-to-face counselling at a clinic.

Poor uptake of clinic-based treatments suggests a Web-based treatment can play a major role in tackling this public health problem, particularly as an increasing number of women will be identified as depressed through the National Perinatal Depression Initiative.

We have previously developed and tested, and have now evaluated (this study), a new interactive, Web-based treatment targeted to women with PND. In this study, we compare our MumMoodBooster internet treatment for PND (delivered with low-intensity telephone support) to Usual Care. We used a parallel 2-group randomised controlled trial aiming to recruit N = 50 participants, with a 12-week follow-up. A total of 43 women participated in this trial.

Our results provide evidence that our treatment is an effective treatment option for women with PND. Seventy one percent of women who completed the program were no longer depressed following treatment, while only 16% of those who received best-practice usual care were no longer depressed at the end of the same time period. In addition, the online program had a large impact on the reduction of the symptoms of anxiety and stress that frequently accompany PND.
Women engaged well with the program and reported that it was highly satisfactory.

This online program allows treatment to happen in a woman’s own time and from the privacy of her home. Thus it offers considerable potential to overcome the well-known barriers of time management and perceived issues of stigma which hinder help-seeking, empowering women to take effective steps to overcome emotional health difficulties. This modern and cost-effective treatment option once made available nationally, can help reach a larger number of women, particularly those who may not have previously accessed traditional forms of treatment. It will also help to relieve the burden on existing health services, which is particularly important given the national guidelines for implementation of PND screening through the National Perinatal Depression Initiative, which will result in an increase in the number of women being identified as depressed.

Context

Prevalence and Consequences of PND: In Australia approximately 40,000 women annually suffer PND by the time their baby is 3 months old. PND, defined as an episode of major or minor depression beginning in the 1st year post birth, lies between Baby Blues and Postpartum Psychosis in severity and prevalence. Left untreated, PND has significant deleterious effects on the mother (her mental health, her relationship with her infant, her potential suicidal behaviour), her family (interrupted employment, partner’s mental health, relationship problems), and her child’s development. Yet despite these negative effects, fewer than 50% of women seek help, even when identified as depressed. Barriers include fear of stigma, feelings of failure, poor understanding of depression or what...
help is available, concern about medication which may be passed through breastmilk \(^6\), and finding it too difficult to attend weekly sessions at a clinic \(^7\).

**Internet Interventions for Mental Health Problems:** Internet based mental health treatment represents a burgeoning area of development \(^8, 9\), with encouraging results for a range of problems including panic disorder, anxiety, and posttraumatic stress disorder \(^10, 11, 12\). There is growing, good-quality evidence that Web treatments are just as effective as face-to-face therapy for symptoms of depression, anxiety and panic disorder \(^13, 14, 15, 16, 17\). To date, however, no published study has examined the efficacy of Internet treatment for women with PND, despite the special characteristics of this population.

**The Value of Guided Support in Enhancing Web-Based Treatment:** Reviews of the evidence \(^8, 14, 18\) report that purely self-guided Internet interventions do benefit depressed individuals, but further gains are achieved with guided support. Guided human support (ranging from a technician-level coach to a more highly skilled therapist) has been shown to increase adherence to online mental health treatments \(^19, 20\) and also provides a “safety net” for individuals who may need additional help should their situation worsen. Alliance with a ‘trustworthy’ coach is central to this model and a number of studies have now shown that a strong online working alliance can be achieved \(^11, 21\). The emerging picture is that very encouraging therapeutic effects can be achieved through structured Internet programs, supported by low intensity guidance (typically < 3 contact hours in a six week program).

**Development and Pilot Testing of our Internet Intervention:** Development of the *MumMoodBooster* program was achieved by a successful international collaboration between leading researchers. Prof. Milgrom (Chief Investigator), a leading expert in the identification and treatment of PND, worked in close collaboration with Drs. Danaher and
Seeley (Oregon Research Institute) who have very considerable expertise in the innovative design and evaluation of Web-based behavioural interventions. Drawing on our Getting Ahead of Postnatal Depression program we used a systematic, iterative development process\[22\] consistent with a staged approach for the development and testing of behavioural interventions\[23, 24, 25\].

**Usability Testing:** Twenty-two women tested user-system interactions\[26\]. Women were asked to “think-aloud” as they viewed screens, Videos, and engaged in interactive activities. Sessions were held in both Australia (n=14) and in Iowa (n=8). Participant comments were overwhelmingly positive: e.g., “really hopeful, like you can do something about it,” and “I think this is wonderful, because you can do it at home.” System Usability Scale results indicated *MumMoodBooster* to have excellent usability: Mean= 86.2 (SD=2.13).

**Feasibility Trial:** Postnatal women (n = 53) screened at risk of PND (i.e., scoring >12 on the Edinburgh Postnatal Depression Scale\[5\]) were recruited to a feasibility trial. Only one participant did not fully meet DSM-IV criteria for Major or Minor depression. A fortnightly measure of depressive symptoms was provided by the Patient Health Questionnaire (PHQ-9)\[27\]. Results, using growth curve modelling, showed that participants’ symptoms were statistically significantly reduced (coefficient = -2.5, p<0.05) with a meaningful reduction (e.g., large effect size of r =0.75). Website usage data indicate that participants have been highly engaged, having uniformly visited all 6 online sessions, reviewed videos, tracked mood and pleasant activities, and received calls from coaches. Hence, our pilot data provided support for the acceptability, feasibility and efficacy of the intervention in a clinical sample.
**Current RCT**

In the current RCT, with a targeted sample of 50 participants, we aimed to evaluate the benefits of the *MumMoodBooster* intervention with low-intensity guided support compared to usual care. Given that current evidence points to similar efficacy between online and face-to-face CBT for depression in general, our study seeks first to establish whether a PND-specific online program is clinically effective. To date, there has been no published research of this kind.

**Implications**

The use of information technology in the treatment of mental health difficulties has great potential to increase access and reduce health system treatment costs as part of a stepped-care model of treatment. Economic analysis of computerised and Internet CBT accessed in primary care has shown this model to be cost effective.

PND is under-diagnosed, under-treated and not only affects the health and quality of life of each sufferer and their partner, but also puts their infants at risk of a range of developmental problems. Providing high quality evidence of the program’s efficacy, this program could have far reaching public health benefits for women with PND. Once made widely available, this Internet intervention for PND will increase access to treatment, particularly to those in rural and remote regions with limited services. As internet treatment addresses some of the known barriers to help-seeking (such as stigma, difficulties accessing clinics, getting out of the house), it is anticipated that more women will seek treatment. A sustainable roll-out would require funding to support the maintenance of the complex websites involved and to fund the telephone coaching component and related administration. Additional components such as monitoring the web forum would also require sufficient resources. It allows treatment to happen in a woman’s own time and from the privacy of her home. Thus it offers considerable potential to overcome the well-known
barriers of time management and perceived issues of stigma which hinder help-seeking, empowering women to take effective steps to overcome emotional health difficulties. This program will not only potentially increase access to treatment to those in metropolitan areas of Australia but importantly it will increase access to those in rural and remote settings with limited transport, few childcare resources, and poor access to mental health services. Furthermore, in Australia, with the National Perinatal Depression Initiative (NPDI) aiming to assess every pregnant women and new mother for possible symptoms of depression, in the very near future the numbers of women identified as being depressed and requiring referral to effective, accessible treatment will rise sharply.

The major practical outcome of this research is an evidence-based Internet treatment program for PND. The results from this study have provided Level 1, high quality evidence for the efficacy of the MumMoodBooster program. This validated Internet treatment for PND once made available will increase the number and flexibility of available options for stepped-care management. Upon the successful completion of our national NHMRC funded trial, scheduled to end Dec 2015, and with the appropriate resources, we expect to make this treatment publically available. The NHMRC trial aims to establish further evidence of efficacy of the MumMoodBooster program using a larger sample (N=210) and by comparing MumMoodBooster directly to the ‘gold standard’ face-to-face CBT treatment.

We expect to publish at least 2 major articles in peer-reviewed scientific journals, some smaller publications, and to deliver several presentations at professional conferences. We believe we are the first to evaluate the effectiveness of Internet treatment for PND and look forward to disseminating our findings. We will advocate for provision of web-based CBT as part of perinatal mental health policy at conferences, in discussions with community groups, as well as professional groups and government.
In summary, the effectiveness of this online program is highly significant because:

1. PND is highly prevalent, with enormous effects on maternal and infant wellbeing.
2. There are substantial barriers to clinic-based treatments and uptake is disappointingly low. Internet treatment gives women more direct and interactive control over their own treatment schedule.
3. Cognitive Behavioural Therapy (CBT) is effective in treating PND and can now be successfully delivered via the Internet.
4. No other fully evaluated Internet interventions currently exist for diagnosed PND.
5. The project directly advances the BBVCoE Priority Area of Translating Research Evidence into Clinical Practice.

**Approach for Current RCT**

*Experimental design:* This is a parallel 2-group RCT involving 43 participants. The main outcomes were recovery from the depressive episode and reduction in severity of symptoms of depression and anxiety. Following baseline data collection, participants were randomised in a 1:1 ratio to either the Internet intervention with coaching or the usual care condition (control condition). Post-test data was collected 9 weeks later and follow-up data at 12 weeks post enrolment. Women in the usual care condition received full access to the MumMoodBooster Program following study participation (i.e., after the completion of their 12 week follow-up assessment).

*Recruitment:* Women were recruited via Maternal and Child Health Centres in rural and metropolitan Victoria, and via Internet advertising (Google AdWords), social media campaigns (Facebook/Twitter) and newspapers (Herald-Sun).
Basic pre-screening: Eligible mothers were aged 18 years and older, 6 weeks to 1 year postpartum, had home Internet access, were familiar with the Internet and e-mail, and able/willing to give informed consent. Potential recruits were further screened with the Edinburgh Postnatal Depression Scale (EPDS: see Table 1) and those scoring 12-23, inclusive, on the EPDS were considered for further involvement. Women with a score > 0 and < 3 on item #10 of the EPDS (thoughts of self-harm) were asked a series of questions to determine intentionality, lethality, access to means, and history of suicide attempts. Women deemed to be at risk for suicide were excluded at the screening stage (e.g., a score of 3 on item #10 of the EPDS) and referred to receive immediate crisis attention.

Diagnostic Assessment: Eligible women were assessed by telephone by a clinical psychologist using the Structured Clinical Interview for DSM-IV (SCID). On the basis of the SCID assessment (and the Risk Management protocol of Simon et al) [28], further exclusion criteria were: a) current substance abuse, manic/hypomanic symptoms or depression with psychotic features meeting DSM-IV criteria; b) risk of suicide; or c) current treatment for depression (medication or psychotherapy). Those diagnosed with a major or minor depressive episode and meeting all other criteria were randomised once baseline data were collected and informed consent obtained.

Randomisation: Women were randomised to either the intervention (n = 21) or usual care (n = 22), using a ‘gold standard’ allocation procedure (i.e., a pre-generated permuted blocks allocation schedule, with allocation concealment ensured by central administration consistent with CONSORT standards [29]).

Intervention Condition: The structure of the MumMoodBooster Internet intervention is shown in Figure 1. The program consisted of six interactive sessions that were sequentially
accessed and designed to encourage optimal engagement and behaviour change (30 mins maximum per week). Guided support from a telephone coach was used to assist women in their use and practice of particular strategies. Initial steps of the program provided explicit direction whereas latter steps encouraged participants to assume greater responsibility for managing their own plan for change. Each session commenced by reviewing previous material prior to presenting new content and concepts. The program’s charting function was used to help participants see the functional relation of mood and activity levels. Information from past sessions was used to reinforce gains made, to tailor subsequent program content, and provide ipsative feedback. Although participants were allowed to set their own pace, of particular importance as women with PND are often overwhelmed by infant care, the program encouraged the completion of all six sessions within 9 weeks. A printable summary was used to describe key content covered in each session and provided a tailored list of recommended home practice activities. The major areas covered in each session are listed in Figure 1. Participants were granted unrestricted access to browse modules on different topics ranging from relaxation, problem solving, to getting support for parenting (upper portion Figure 1). Participants also had unrestricted access to a Web forum for peer support. Additionally, in recognition of the important role of partners and paternal depression in the treatment process for PND, partners received access to our developed module on You and Your Partner as well as a free-standing Partner Support Website.
Throughout the study, automated e-mail prompts served as reminders for data returns. Telephone coaches accessed a secure administrative website to view status reports of participants’ program usage to make support consistent with progress. The Web forum for participants was monitored daily, all postings and potentially damaging talk (e.g., about suicide) were redacted and individuals contacted guided by our Risk Management Protocol.

**Usual Care Condition:** Usual care participants received the same in depth assessment as those in the intervention to exclude those needing counselling/crisis intervention. Women in this condition received usual care with their nurse or GP who may refer her to other services/agencies as necessary, as would normally happen where specialised programs are not available. Usual care condition participants also received the same automated e-mail prompts (to encourage data return) as the Intervention condition. The usual care participants were also provided with links to general Internet resources on mental health.
and once completed their final follow-up assessment (12 week follow-up), received full access to the MumMoodBooster program.

Safety Monitoring: Participants in both the Intervention and Usual care group were monitored via safety calls at 5 occasions: at baseline, at weeks 3, 5 and 9, and at 12 week follow-up. We used the successful protocol of Simon et al.\cite{28} that checks for depressive symptoms and adverse effects. As needed, safety monitoring provided crisis intervention and referrals to mental health specialty care and a reminder of emergency contacts provided at baseline assessment.

Measures: Measures used were collected by automated online questionnaire and by telephone. The Structured Clinical Interview for DSM-IV (SCID) assessed major Axis I and II psychiatric disorders using DSM-IV criteria at baseline and at 12 week follow-up. At baseline and 12 week follow-up, depression and anxiety symptom severity was measured by the Revised Beck Depression Inventory (BDI-II) and the DASS-21. To monitor participant safety and measure changes in depressive symptoms over time, participants completed the 9-item Patient Health Questionnaire (PHQ-9) at enrolment and at 3, 5, 9, and 12 weeks post-enrolment. As this measure was used to help monitor participant safety, it was administered live by the phone coach over the telephone. Additional data collected include, sociodemographic data and program usage.

Data Analysis: Continuous outcomes (e.g., symptom severity) were analysed in general linear models, accommodating baseline values as covariates. Categorical outcomes (e.g., diagnostic status) were analysed using contingency tables and $\chi^2$ tests. Consistent with CONSORT standards\cite{30,29}, all primary analyses involved planned contrasts of the intervention condition vs. control condition. We also explored acceptability and program usage.
**Sample Size:** A sample size of $n = 25$ per group gives us 80% power to detect a meaningful difference on the main outcomes at $p = 0.05$.

**Results**

To date, 173 women have registered to be assessed for eligibility on the study recruitment website. Of these, we have recruited 43 women into the trial (86% of target sample size). Not all women referred to the study meet eligibility criteria (e.g., women currently on antidepressant medication are excluded) which is necessary for trial but will not be once program is disseminated.

After applying basic exclusion criteria (age; medication usage etc.) we had 81 potentially eligible women. After conducting full psychiatric intake assessments, we have arrived at our current cohort of $N = 43$ participants with a depressive disorder, satisfying 84% targeted sample (with 1 further pending). We will continue to increase our sample size and follow-up the remainder of our cohort at a no cost extension.
Figure 2. Participant flow through the study (CONSORT diagram).

Referrals
N = 173

Assessed for eligibility
n = 168

Met basic eligibility
n = 81

Completed psychiatric Assessment
n = 48

Depressed & Eligible
n = 46

Randomised
n = 43

Intervention
n = 21

Usual Care
n = 22

9 week Follow-up
n = 17/20*

9 week Follow-up
n = 18/20*

12 week Follow-up
n = 13/16*

12 week Follow-up
n = 18/19*

Attrition, n = 5
- Declined, n = 4
- Not contactable, n = 1

Did not meet basic eligibility, n = 87

Attrition, n = 32
- Declined, n = 5
- Not contactable, n = 26
- No longer depressed, n = 1

Awaiting psychiatric assessment, n = 1

Not eligible, n = 2
- Substance use, n = 1
- Not depressed, n = 1

Attrition, n = 3
- Not contactable or did not return data, n = 3

Note:* Thus far, 86% and 84% of the cohort have reached the 9 and 12 week follow-up, respectively.
Baseline characteristics of mothers in Table 1 and Table 2 show that the two groups are broadly comparable. The mean age of mothers was in the expected range and their infants, as expected from prevalence estimates, averaged 6.3 months. The mean EPDS of 16.2 reflects the recommended threshold for requiring further depression assessment being above 12. At assessment, 93.0% of the cohort was diagnosed with a major depressive disorder and 7.0% diagnosed with a minor depressive disorder. As reported in other studies of major risk factors for PND, 67.4% of the cohort had a past major depressive disorder.

### Table 1: Demographic Data of Study Cohort at Enrolment

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n = 21)</th>
<th>Usual Care (n = 22)</th>
<th>Total Sample (n = 43)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M(SD)</td>
<td>Range</td>
<td>M(SD)</td>
</tr>
<tr>
<td>Mother’s Age (years)</td>
<td>31.7 (4.6)</td>
<td>25-42</td>
<td>31.5 (4.3)</td>
</tr>
<tr>
<td>Baby’s age (months)</td>
<td>6.52 (2.8)</td>
<td>2-11</td>
<td>6.15 (3.1)</td>
</tr>
<tr>
<td>EPDS</td>
<td>16.6 (3.1)</td>
<td>13-23</td>
<td>15.8 (2.8)</td>
</tr>
</tbody>
</table>
Table 2: Continued Demographic Data of Study Cohort at Enrolment

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n = 21)</th>
<th>Usual Care (n = 22)</th>
<th>Total Sample (n = 43)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Born in Australia</td>
<td>18 (85.7)</td>
<td>21 (95.5)</td>
<td>39 (90.7)</td>
</tr>
<tr>
<td>DSM-IV Diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major Depression</td>
<td>20 (95.2)</td>
<td>20 (90.9)</td>
<td>40 (93.0)</td>
</tr>
<tr>
<td>Minor Depression</td>
<td>1 (4.8)</td>
<td>2 (9.1)</td>
<td>3 (7.0)</td>
</tr>
<tr>
<td>Past Major Depression</td>
<td>14 (66.7)</td>
<td>15 (68.2)</td>
<td>29 (67.4)</td>
</tr>
<tr>
<td>Relationship status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>17 (81.0)</td>
<td>18 (81.8)</td>
<td>35 (81.4)</td>
</tr>
<tr>
<td>De Facto</td>
<td>1 (4.8)</td>
<td>2 (9.1)</td>
<td>3 (7.0)</td>
</tr>
<tr>
<td>Single</td>
<td>3 (14.3)</td>
<td>2 (9.1)</td>
<td>5 (11.6)</td>
</tr>
<tr>
<td>Separated</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not finish school</td>
<td>0 (0.0)</td>
<td>1 (4.5)</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td>High school only</td>
<td>2 (9.5)</td>
<td>3 (13.6)</td>
<td>5 (11.6)</td>
</tr>
<tr>
<td>Certificate level</td>
<td>4 (19.0)</td>
<td>3 (13.6)</td>
<td>7 (16.3)</td>
</tr>
<tr>
<td>Diploma level</td>
<td>5 (23.8)</td>
<td>4 (18.2)</td>
<td>9 (20.9)</td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>6 (28.6)</td>
<td>7 (31.8)</td>
<td>13 (30.2)</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>4 (19.0)</td>
<td>4 (18.2)</td>
<td>8 (18.6)</td>
</tr>
<tr>
<td>Number of children (including most recent baby)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7 (33.3)</td>
<td>7 (31.8)</td>
<td>14 (32.6)</td>
</tr>
<tr>
<td>2</td>
<td>7 (33.3)</td>
<td>11 (50.0)</td>
<td>18 (41.9)</td>
</tr>
<tr>
<td>≥3</td>
<td>7 (33.3)</td>
<td>4 (18.2)</td>
<td>11 (25.6)</td>
</tr>
<tr>
<td>Family Income</td>
<td></td>
<td></td>
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<tr>
<td>Up to $20,000</td>
<td>0 (0.0)</td>
<td>1 (4.5)</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td>$20,001-$40,000</td>
<td>0 (0.0)</td>
<td>1 (4.5)</td>
<td>1 (2.3)</td>
</tr>
<tr>
<td>$40,001-$60,000</td>
<td>2 (9.5)</td>
<td>1 (4.5)</td>
<td>3 (7.0)</td>
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<tr>
<td>$60,001-$80,000</td>
<td>3 (14.3)</td>
<td>6 (27.3)</td>
<td>9 (20.9)</td>
</tr>
<tr>
<td>$80,001 or greater</td>
<td>13 (61.9)</td>
<td>13 (59.1)</td>
<td>26 (60.4)</td>
</tr>
<tr>
<td>Did not wish to divulge</td>
<td>3 (14.3)</td>
<td>0 (0.0)</td>
<td>3 (7.0)</td>
</tr>
</tbody>
</table>
**Participant Engagement/Program Usage:**

Women in the study are engaging well with the online treatment and weekly safety monitoring/coaching calls are operating as designed and women’s feedback on the peer-support forum is positive. Most women in the intervention complete the treatment once recruited. Of those who have completed the program, 73% of women allocated to the MMB intervention have completed all 6 sessions. All participants have completed four or more sessions. This retention and participation is highly satisfactory and reflects an online program exceeding retention compared to others reported in the literature. The website forum allowed mothers to post and view content; 66% of those who have completed the program posted on the forum and all participants viewed forum content, and on average viewed 25 posts. The *MumMoodBooster* partner support website was accessed by 73% of participants’ partners. The average number of library articles accessed was four out of a possible eight.

**Satisfaction with treatment:**

Women have provided positive feedback. The following quotes are examples:

- “It’s very little steps, but one morning I woke up and found the desire and strength to go to a playground, which was physically and mentally too overwhelming before.”
- “Content overall was really good”
- “Simple but not too simple – easy to understand and apply”
- “Library feature was really good”
- “Activities to increase positive thinking were very helpful”
Table 3: Between Group (Intervention vs. Usual Care) Average Scores (M) and Standard Deviations (SD) of Postnatal Depression (BDI-II), Anxiety, and Stress

<table>
<thead>
<tr>
<th></th>
<th>Depression (BDI-II) M(SD)</th>
<th>Anxiety (DASS Anxiety) M(SD)</th>
<th>Stress (DASS Stress) M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>25.3 (6.4)</td>
<td>9.5 (7.3)</td>
<td>21.5 (7.7)</td>
</tr>
<tr>
<td>Usual Care</td>
<td>26.3 (8.6)</td>
<td>6.7 (5.3)</td>
<td>20.7 (7.2)</td>
</tr>
<tr>
<td><strong>Post-test (9wks)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>Not Assessed</td>
<td>3.5 (4.8)</td>
<td>12.5 (7.4)</td>
</tr>
<tr>
<td>Usual Care</td>
<td>Not Assessed</td>
<td>5.7 (4.0)</td>
<td>18.7 (7.3)</td>
</tr>
<tr>
<td><strong>Follow-up (12wks)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>11.2 (10.6)</td>
<td>2.2 (3.1)</td>
<td>11.2 (5.6)</td>
</tr>
<tr>
<td>Usual Care</td>
<td>23.2 (7.9)</td>
<td>5.1 (2.5)</td>
<td>19.0 (10.6)</td>
</tr>
</tbody>
</table>

Figure 3. Depression Symptoms (BDI-II)
As shown in Table 3 and in Figures 3, 4, and 5, postnatal depression, anxiety, and stress symptoms improved among those who received the intervention, while those in usual care did not experience this same improvement. At 9 weeks follow-up, average stress symptoms in the intervention group were statistically significantly lower than that of the usual care group, after controlling for baseline values. At 12 weeks follow-up, average depression,
anxiety and stress symptoms in the intervention group were statistically significantly lower than that of the usual care group, after controlling for baseline values.

Table 4: Depressive Diagnosis at Baseline and Post Test

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Usual Care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maj. Dep. %</td>
<td>Min. Dep. %</td>
</tr>
<tr>
<td>Baseline</td>
<td>95.2</td>
<td>4.8</td>
</tr>
<tr>
<td>12 week follow-up</td>
<td>28.6</td>
<td>0</td>
</tr>
</tbody>
</table>

|                  | Maj. Dep. %  | Min. Dep. %| Not Dep. %|
| Baseline         | 90.9         | 9.1        | 0         |
| 12 week follow-up| 73.7         | 10.5       | 15.8      |


As can be seen in Table 4, of those who received the intervention, 71.4% were no longer depressed, compared to only 15.8% in the usual care group over the same time period (84.2% remained depressed).

Figure 6. Depression changes over time (PHQ-9)

As can be seen in Figure 6, a substantial reduction in depression occurred from entry to 12 weeks follow-up in the intervention group (7.1 point drop). However, for the usual care
group, depression fluctuated slightly and only a small reduction was noticed over the same
time period (3.1 point drop).

Summary
This final report reflects preliminary analyses, the technical details of which will be further
reported in peer-reviewed scientific publications. Full analysis of data is not yet possible as a
few participants are still active in the trial. Nevertheless, results to date clearly demonstrate
successful recruitment, good adherence to treatment and positive results in term of
reducing depression, anxiety and stress. The study was conducted in a highly rigorous
manner meeting all requirements for clinical trials.

Of the 173 women recruited, 43 have been randomized with an additional participant in the
enrolment stage (the eligibility criteria are necessary in the research phase of the project,
but once disseminated in the real world these can be broadened e.g., including women on
antidepressants). We will continue to recruit subjects over the next month and follow-up
remaining cohort as a no-cost extension. We will complete a full analysis of the data and
prepare the data for publication (a copy of publication will be provided to beyondblue).

Other key findings include:

- Moderately severe depressed sample: the program attracted a sample with
  relatively high depression scores and a majority with a major depressive
  disorder.
- Good engagement was evidenced by high session attendance.
- Satisfaction with the program continued to be positive as shown in our
  feasibility study.
• These preliminary results suggest that the MumMoodBooster intervention may be a suitable treatment option for women with PND. Full analysis of data will be conducted once the entire cohort has been followed-up and papers will be submitted for publication in peer-reviewed scientific journals.

Additional Resources


Further Research

We are currently engaged in a large (n=210) randomised trial designed to directly compare MumMoodBooster with best-practice specialised face-to-face psychological treatment for postnatal depression. Other research areas include the adaptation of the MumMoodBooster program for depressed pregnant women as well as testing its efficacy as a purely self-guided online therapy (without telephone support).
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