

## Manuscript Details

<b>Manuscript number</b>	APN_2018_194
<b>Title</b>	Self- screening using the Edinburgh Post Natal Depression Scale for mothers and fathers to initiate early help seeking behaviours
<b>Article type</b>	Research Paper

### Abstract

The forthcoming birth of a new baby and the life changes that occur can present parents with a range of challenges. While recognised in mothers, postnatal depression is not well researched in fathers; especially considering that up to 25% of men report experiencing depression in the ante and postnatal periods. The aim of this study was to test a self-screening tool and referral pathway pamphlet for expectant women and their partners. We used a single blinded randomised controlled study design. The sample, comprised 70 dyads, was randomised to either care as usual or to the self-screening tool and referral pathway pamphlet intervention. The self-screening tool included the Edinburgh Postnatal Depression Scale (EPDS). Other questionnaires used to survey the dyads were the Kessler Psychological Distress (Kessler-10) and the Maternity Social Support Scale (MSSS). The gender differences in the EPDS, Kessler-10 and MSSS scales are represented by differences of 1.0 points on EPDS, 1.0 points on Kessler-10, fathers were reporting less psychological distress than mothers in all cases. No difference was observed in perceived social support. The attrition between time-points was mostly men. Cultural and socio-demographic factors may affect generalisability of the findings. The self-screening tool and referral pathway pamphlet provided to dyads may have some benefit in assisting couples in the perinatal period to detect and seek help for early symptoms of distress.

**Keywords** post-natal depression; parents; quality of life; parenthood; coping; resilience

**Taxonomy** Quality of Life, Resourcefulness, Children, Stress and Coping, Resilience

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## Research Data Related to this Submission

There are no linked research data sets for this submission. The following reason is given:  
Data will be made available on request

Friday, 15 June 2018

Dear Editor

Please accept this paper for peer review entitled: Self- screening using the Edinburgh Post Natal Depression Scale for mothers and fathers to initiate early help seeking behaviours.

The paper has not been submitted elsewhere for review and ethical approvals were sought and receive in accordance with the Declaration of Helsinki of the World Medical Association. The research was funded by St Vincent's Private Hospital Melbourne Ltd. The funder had no part in the research process.

There are no conflicts of interest to declare.

Kind regards

Karen-leigh Edward

**Title:** Self- screening using the Edinburgh Post Natal Depression Scale for mothers and fathers to initiate early help seeking behaviours

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**Acknowledgement:** Alessandra Galletti for reformatting the manuscript.

**Conflict of interest:** None to declare

**Funding Sources:** This project was funded by St Vincent's Private Hospital Melbourne Ltd

## **Abstract**

The forthcoming birth of a new baby and the life changes that occur can present parents with a range of challenges. While recognised in mothers, postnatal depression is not well researched in fathers; especially considering that up to 25% of men report experiencing depression in the ante and postnatal periods. The aim of this study was to test a self-screening tool and referral pathway pamphlet for expectant women and their partners. We used a single blinded randomised controlled study design. The sample, comprised 70 dyads, was randomised to either care as usual or to the self-screening tool and referral pathway pamphlet intervention. The self-screening tool included the Edinburgh Postnatal Depression Scale (EPDS). Other questionnaires used to survey the dyads were the Kessler Psychological Distress (Kessler-10) and the Maternity Social Support Scale (MSSS). The gender differences in the EPDS, Kessler-10 and MSSS scales are represented by differences of 1.0 points on EPDS, 1.0 points on Kessler-10, fathers were reporting less psychological distress than mothers in all cases. No difference was observed in perceived social support. The attrition between time-points was mostly men. Cultural and socio-demographic factors may affect generalisability of the findings. The self-screening tool and referral pathway pamphlet provided to dyads may have some benefit in assisting couples in the perinatal period to detect and seek help for early symptoms of distress.

## **Introduction**

The mental health of women during pregnancy and after birth and the need for identification of mental illness, such as postnatal depression (PND), is well described in the literature (Ballard & Davies, 1996, Austin & Lumley, 2003, Buist et al., 2009). Peripartum depression is defined as women being depressed antenatally and any time up to four weeks following the delivery of their baby (the symptomatology is not considered any different from other depressive conditions) (American Psychiatric Association, 2013). Approximately 12 to 20% of women experience antenatal depression (Leigh & Milgrom, 2008), and about 10 to 15% of women experience postnatal depression (Ballard & Davies, 1996, Austin & Lumley, 2003). The forthcoming birth of a new baby and the life changes that occur following the birth of a baby can present parents with a range of new demands on mothers and fathers, and more recently the mental health of fathers is being considered (Davé et al., 2010, Edward et al., 2014). Fathers are also at risk of depression in the antenatal and postnatal periods, where it has been reported between 4 to 25% of men experience depression in the ante and postnatal periods (Ballard & Davies, 1996, Kim & Swain, 2007, Fletcher et al., 2006).

PND in fathers is a significant problem since research evidence suggests that peripartum depression in the mother is the most common correlate for the onset of paternal depression (Wee et al., 2011, Letourneau et al., 2012b). Furthermore, paternal depression can be associated with a personal history of depression (Areias et al., 1996) where a history of depression and high antenatal symptom scores for depression and anxiety are also considered the strongest predictors of paternal depression in the postnatal period (Ramchandani et al., 2008). Due to a paucity of

evidence a more detailed assessment of fathers' mood during the peri-partum period is needed so that the condition can be promptly recognised and treated (Schumacher et al., 2008).

Paternal depression can have a damaging impact on the couple's relationship and also negatively impact the parent-child relationship (Wee et al., 2013). Paternal depression is also related to detrimental consequences for the development of the child, where the child can be at an increased risk of experiencing emotional and behavioural problems (Schumacher et al., 2008). Paulson and colleagues (2006) explored the individual and combined effects of postpartum depression in mothers and fathers and parenting behaviour. In their study, a national sample of 5089 cases, 14% of mothers and 10% of fathers exhibited levels of depressive symptoms that were associated with clinical diagnoses. Their results confirms other findings of a high prevalence of postpartum maternal depression and also highlights that postpartum depression is a significant issue for fathers as well. Paulson and colleagues revealed that mothers who were depressed were approximately 1.5 times less likely to engage in healthy feeding and sleep practices with their child. In both mothers and fathers, depressive symptoms were negatively associated with positive developmental activities with the infant (such as reading and singing songs) (LeFrançois, 2012, Paulson, 2010, Paulson & Bazemore, 2010, Paulson et al., 2006). Mental health problems in the postpartum period are thought to also increase likelihood for disagreements and disengagement within the parent's relationship (Letourneau et al., 2012b). However, evidence does indicate that possible protective factors exist for the onset of paternal depression, such as a more euthymic mood in mothers (their partner) in the first 12 months following the birth of their child and

higher perceived levels of partner support including good social support (Castle et al., 2008, Matthey et al., 2000, Wee et al., 2011).

For fathers, the potential stigma related to depression may represent a barrier to help seeking behaviours and subsequent referral for treatment. Routine screening and assessment of both men and women needs to occur during periods of interaction with health professionals across pregnancy and also in postnatal period, however this is not routinely undertaken for men in clinical practice in midwifery. Screening for depression in fathers is often underestimated and underperformed or never performed at all (Matthey et al., 2003, Clare & Yeh, 2012, Edmondson et al., 2010b, Fisher et al., 2012, Goodman, 2008, Lai et al., 2010, Matthey, 2008, Tran et al., 2012). The Edinburgh Postnatal Depression Scale (EPDS) devised as a screening measure for postpartum depression in women is appropriate in terms of sensitivity and specificity of the scale to be used in fathers (Edmondson et al., 2010a, Edward et al., 2014) although cut-offs are different to those applicable in women (Edward et al., 2014). It is important to note that the EPDS does not diagnose postpartum depression but can alert the clinician for the clinical need for a diagnostic interview, which is the gold standard for diagnosis of depression in the postpartum period (Dennis, 2005). While the EPDS is used clinically, it is also being applied to real life situations where consumers can access and easily administer the EPDS to themselves, receiving instant mood feedback increasing their ability to self-monitor mood and to link with their general practitioner if their score is indicative of depressive symptoms (Drake et al., 2014).



Given the importance of screening for risk of postpartum depression in both expectant mothers and fathers, and the imperative to offer a pathway to effective and timely treatment, the objective of this study was to test a clinically relevant self-screening tool (i.e. the EPDS, a widely accessible and available screening tool) and develop a referral pathway pamphlet for expectant women and their partners. We aimed to examine the effectiveness of providing a referral pathway pamphlet which included written information regarding PND risk for both mothers and fathers, self-screening using the EPDS and a referral pathway once scores hit the cut-off (where the cut off point for father was 2 points lower than for mothers i.e.: if fathers scored >7 they were advised to speak with their general practitioner about any symptoms of distress they maybe experiencing) (Matthey, 2008). We hypothesised that dyads who received a self-screening and referral pathway pamphlet in the antenatal period would report lower psychological distress at 12 months following the birth of their baby.

## **Methods**

### *Research Design*

This research was undertaken using a single blinded randomised controlled study design.

### *The intervention – Screening tool and referral pathway pamphlet*

The intervention was designed by the researchers for the purpose of this study. The intervention included a self-screening and referral pathway that was a one page (A4 size) pamphlet. There were two pamphlets designed specifically for a) expectant mothers and b) expectant fathers (i.e. this was due to different cut off points on the EPDS for males and females). The referral tool for expectant mothers comprised of general PND information, statistics of maternal PND, the EPDS and instructions on

how to complete and score it, and advice regarding referral to their General Practitioner (GP) should the participant be distressed or concerned about their EPDS score. The referral tool for expectant fathers was identical to mothers in regards to information about PND but risk factors for paternal depression were given. The fathers were also advised to complete the EPDS and given the same advice to consult their GP if they were concerned about any of the information on the pamphlet or their EPDS score. The pamphlets were validated by a selection of the hospital's maternity staff and patient experience co-ordinators for content and clarity of information.

#### *Recruitment and randomisation*

A research assistant constructed participant packs using opaque envelopes. The envelopes included copies of the participant information letter and consent forms, questionnaires and the pamphlets for each dyad (i.e. an expectant mother and father). The referral pamphlets were included with questionnaires in only half of the envelopes. In order for the research team to identify the dyad who received the referral pamphlets a code was written on the questionnaires and consent forms which the dyad returned to the researcher.

A researcher responsible for data collection recruited participants at their antenatal education session held at the participating hospital, and provided information about the study and obtained written informed consent if couples elected to participate in the study. For participation, both expectant mother and father had to consent, such that only dyads were included in this study. The researcher handed out the envelopes at random, unaware of which dyad received the intervention (referral pamphlet and questionnaires) or control (no pamphlet and questionnaires)

conditions. All participants were instructed to provide written consent and then complete the baseline questionnaires provided in the envelope. Participants who had received the referral pamphlet were instructed to take it home and read and complete it at their leisure.

### *Data Collection*

Data were collected at a large private hospital in Melbourne, Australia, between April 2014 and February 2015. The hospital has up to 2400 deliveries per year.

Participants were followed up at 12 months by a researcher who was blinded to the dyad allocation; all follow-up data was collected by March 2016. Demographic variables were recorded at baseline (i.e. antenatally, the expectant mothers were in their final trimester) for each dyad and data included: age range, marital status (whether married or de facto /partnership), number of children, country of origin, living arrangements, highest level of education, employment status, level of support and whether or not the participant had been previously diagnosed with a mood disorder.

### *The questionnaires*

The questionnaires used at baseline and for the 12 month follow up included the *EPDS*, the *Kessler Psychological Distress (K10)* and the *Maternity Social Support Scale (MSSS)*.

The *EPDS* (used antenatally) has been used extensively to assess symptoms of mood disorder such as anhedonia and reactivity, self-blame, anxiety, panic, coping, sleeplessness (due to unhappiness), sorrow, tearfulness and thoughts of self-harm

in the perinatal period for women (Cox et al., 1987). The *EPDS* is a 10-item self-report scale that includes questions that inquire about depressive symptoms and anxiety symptoms (Matthey et al., 2001). Respondents indicate on a Likert-type 4-point scale the response that best describes the way they have been feeling over the past 7 days. Items are scored from 0 to 3 with a resulting range of 0 to 30. A low score indicates low risk of depressive symptoms; a cut-off score of 12 / 13 has been reported with a 80-100% sensitivity of detecting major and minor depression in mothers postnatally and a cut-off score of 14 / 15 was optimal for antenatal depression screening expectant mothers (Matthey et al., 2001, Matthey et al., 2006). Edmondson et al. (2010a) reported an optimum cut-off score for fathers was > 10, with a reasonable specificity (78.2%) and sensitivity (89.5%) to identify cases of major depression when applied to fathers seven weeks postnatally. This result is similar to Matthey et al. (2001) who found in an Australian sample cut off score for men was > 10 for depression (including both minor and major depression).

To measure psychological distress, The *Kessler Psychological Distress Scale (K10)* was used, it is a short screening tool. The K10 scale is a self-report measure which involves 10 questions about emotional states each with a 5-point Likert-type response scale; hence scores may range from 10 to 50. A score under 20 indicates the respondent is likely to be well, a score between 20 and 29 indicates a mild-to-moderate mental disorder, and a score over 30 indicates a severe mental disorder (it is estimated that 1 in 4 respondents seen in primary care will score 20 and over) (Kessler et al., 2002, Andrews & Slade, 2001) .

The *MSSS* is a 6-item, 5-point Likert-type rating scale that measures social factors associated with postnatal depression (i.e. friendship network, family support, help from spouse/partner, conflict with spouse/partner) (Webster et al., 2000). The total possible score is 30 with cut-off points suggested by Webster et al. (2000) as follows: 0-18 (low social support), 19-24 (medium support), and >24 (adequate support). This scale was used to measure participant's perception of their social support which can be a determining factor for the onset of depression (Leinonen et al., 2003, Letourneau et al., 2012a).

#### *Sample size calculations*

Based on a confidence level of 95% (CI=8) and  $p < 0.05$  based on 80% occupancy rate at the participating site and allowing for a 30% exclusion rate and a 10% attrition rate from baseline the sample size we would require for the study is estimated to be  $n=140$ .

#### *Data analysis*

Analyses were conducted on three outcome measures: the EPDS score; the K10 score and the *MSSS* score. Outcome measures were collected at baseline (i.e. antenatally; expectant mothers were in the last trimester of their pregnancy) and after 12 months (i.e. postnatally). Baseline scores and 12-month scores on all outcomes were disaggregated by gender, to assess whether women and their partners have similar levels of depression during pregnancy and postnatally. The correlation between outcome measures at baseline was evaluated to assess the suitability for multivariate analysis. Multivariate analyses were followed up with univariate analyses in the case of significant findings, to investigate the sources of such associations.

The main analysis aimed to assess the primary hypothesis that scores on the depression scales are different in those dyads who received the intervention. All variables were disaggregated and summarised across treatment groups. Categorical variables with a high number of categories, including low-frequency categories, were combined for analysis to ensure that each category had a sufficient number of individuals to support statistical analysis. Group composition was assessed to identify any controlling variables required to be included in the analysis of group effects.

The correlation between outcome measures at follow-up was evaluated to assess suitability for a multivariate treatment in an analysis controlling for gender, baseline scores, and any variables which had been identified from the descriptive analysis as controlling variables. Multivariate analyses were followed up with univariate analyses in the case of a significant finding to investigate the sources of such associations. A repeated measures doubly multivariate analysis of variance was also conducted on all outcome measures to investigate time-dependent trends in the data.

### *Ethical considerations*

Ethical approval was received by the relevant hospital Human Research Ethics Committee [HREC-A-097/11]. Informed consent was received from all participants before data collection was undertaken.

## **Results**

### *Gender comparisons*

The sample (n=140), comprising 70 dyads were recruited to the study (35 dyads in the control and 35 dyads in the intervention). Baseline outcome scores are summarised across genders in Table 1.

Insert tables 1 and 2 here

High attrition occurred with 43.5% of participants (mostly males) lost to follow-up at 12 months. There was 56.5% of the participants who provided usable data at baseline remaining in the study by 12 months. Corresponding 12-month outcome scores are summarised across genders in Table 2.

Female baseline scores were substantively higher (that is, not significant it still may be of importance) than male scores on the EPDS and Kessler-10 scales; however, the gender difference was reduced on both scales by 12 months. Female baseline scores were nearly identical to male scores on the MSSS scale, with females reporting slightly higher scores for social support after 12 months.

Correlational analyses indicated that the EPDS, Kessler-10 and MSSS scores were moderately correlated both at baseline and after 12 months, indicating that a multivariate treatment was appropriate for the analysis of these measures at either time point. Multivariate analysis of variance (MANOVA) conducted on baseline EPDS, Kessler-10 and MSSS scores revealed that during pregnancy, women have significantly higher levels of depression than their partners (Wilk's  $\Lambda=0.916$ ;  $F_{3,136}=4.41$ ;  $p=0.008$ ). The size of the gender effect, as measured by the partial- $\eta^2$  statistic was 0.084, indicating an effect of low magnitude.

Follow-up ANOVAs indicated this gender difference to be grounded primarily in the EPDS scale ( $F_{1,138}=10.7$ ;  $p=0.001$ ) and the Kessler-10 scale ( $F_{1,138}=3.62$ ;  $p=0.059$ ), with no significant gender difference detected by the MSSS. The significant gender differences in the EPDS and Kessler-10 scales are represented by differences of 1.7 points on EPDS and 1.2 points on Kessler-10, such that fathers are reporting less depressive symptoms and psychological distress than mothers.

Corresponding MANOVAs conducted on the same three measures at 12 months revealed that postnatally there is no evidence for a significant difference in levels of depression between men and women, although women have higher levels of depression than their partners (Wilk's  $\Lambda=0.947$ ;  $F_{3,74}=1.39$ ;  $p=0.252$ ). The size of the gender effect, as measured by the partial- $\eta^2$  statistic was 0.053, indicating an effect of low magnitude. The gender differences in the EPDS, Kessler-10 and MSSS scales are represented by differences of 1.0 points on EPDS, 1.0 points on Kessler-10 and 0.5 points on the MSSS, such that fathers are reporting less psychological distress than mothers in all cases and very little differences were seen in perceived social support as measured by the MSSS.

### *Assessment of intervention*

The sample is further summarised descriptively across treatment groups in Table 3 below, for the 78 participants who provided valid data at follow-up. This comprised of 30 dyads (60 individuals), plus 18 individuals (17 females and 1 male) who completed the follow-up questionnaires without their partner. While missingness was predictable from gender, separate variance t-tests indicated no evidence for a systematic relationship between missingness and any of the other variables.



Insert table 3 here

Table 3 above indicates that the sample appeared to be reasonably balanced across treatment groups at baseline with respect to most variables. Some differences in marital status and availability of external support were apparent between groups. These variables were hence included as controlling variables (ie: a variable which in itself is not of specific interest, but should be accounted for as its presence may affect variables which are of specific interest), in the analysis of follow-up scores by treatment group. Such imbalances following randomisation are to be expected in an analysis of a limited sample size on which several attributes are measured.

Multivariate analysis of covariance (MANCOVA) revealed no evidence that participants assigned to the intervention group scored significantly differently on the EPDS, Kessler-10 and MSSS scales assessed jointly at follow-up, controlling for baseline scores, gender, marital status and availability of external support ( $\Lambda=0.951$ ;  $F_{3,68}=1.16$ ;  $p=0.331$ ). Follow-up ANOVAs also revealed no evidence for a difference between groups on any individual scale, with the most substantive difference occurring on the EPDS scale ( $F_{1,70}=2.33$ ;  $p=0.131$ ). That is, while this result is not significant it still may be of importance. The magnitude of this effect was small (partial- $\eta^2=0.032$ ), and corresponded to a mean difference between the groups of 0.62 points in favour of the treatment group on this scale; arising from mean follow-up scores of 4.52 (SD 3.00) in the control group and 3.89 (2.93) in the treatment group.

The controlling factor of marital status was significantly associated with scale scores at follow-up ( $\Lambda=0.869$ ;  $F_{3, 68}=3.42$ ;  $p=0.022$ ); with follow-up ANOVAs indicating that the effect was primarily grounded in differences on the EPDS scale ( $F_{1, 67}=4.26$ ;  $p=0.043$ ). On this scale, participants who were married ( $n=60$ ) reported a mean score of 4.53 (SD 3.02) at follow-up, compared to a participants who were not married ( $n=18$ : mean 3.17 (SD 2.60)) at follow-up; hence participants who were married scored 1.37 points higher on this scale than those who were unmarried. None of the other controlling variables (including gender) were found to be statistically significant; however, follow-up scores on the Kessler-10 and MSSS scales were significantly correlated with corresponding baseline scores.

A doubly multivariate repeated measures ANOVA, which also found marital status to be significantly associated with scale scores assessed jointly, confirming the findings of the MANCOVA, revealed no evidence for significant time-dependent relationships or interactions between the reporting period and treatment group ( $\Lambda=0.969$ ;  $F_{3, 71}=0.757$ ;  $p=0.522$ ). Marginal mean scores are shown in Figures 1(a), 1(b), 1(c). Despite the finding of non-significance, a sizeable time  $\times$  treatment interaction exists ( $F_{1, 73}=2.87$ ;  $p=0.094$ ), as can be observed in Figure 1(a) below.

## **Discussion**

This study aimed to evaluate the effectiveness of a depression self-screening and referral pathway pamphlet given to dyads of expectant mothers and fathers. The study aimed to evaluate the efficacy of the self-referral pathway pamphlet to assist new parents in reducing psychological distress in the first 12 months following the birth of their child. The results of this study suggest that while there was no significant differences found between the control and treatment groups for their

scores on for depression, psychological distress and social support, the treatment group at 12 months follow-up did report a notable difference in the EPDS scores. Our sample collectively reported low levels of psychological distress in the ante and post natal periods and very high levels of partner and social support at both time points, making it difficult to interpret this as any remarkable effect of the intervention. Our sample who collectively reported lower levels of depression is incongruent with previous research findings where typically 12 to 20% expectant mothers (Leigh & Milgrom, 2008) and 10 to 15% of mothers report depression postnatally (Ballard & Davies, 1996, Austin & Lumley, 2003). Furthermore, studies suggest that up to 4 to 25% of men experience depression in the ante and postnatal periods (Ballard & Davies, 1996, Kim & Swain, 2007, Fletcher et al., 2006, Da Costa et al., 2015). Our sample was possibly representative of a higher socio-demographic population of first time parents (that is, the majority of participants were tertiary educated and full time employed), which in itself is a protective factor for the onset of depression (Edward, 2005). Da Costa et al. (2015) revealed that socio-demographic correlates of depressed mood among expectant fathers included men who were of an older age, in a minority group, lower household incomes and who were unemployed, and those factors were not seen in our sample. They also suggest that lower perceptions of social support were significantly correlated with higher depression scores. Our sample reported high levels of social support ante and postnatally with over half the sample identified the existence of external support networks (e.g. grandparents/extended family to help care for their child). This finding was not generally expected as previous studies indicate that the transition from partnership to parenthood can cause a strain on the relationship quality and increase the incidence of conflict and potentially social disengagement (Kluwer, 2010, Kluwer & Johnson,

2007, Bielawska-Batorowicz & Kossakowska-Petrycka, 2006). Our results confirm that high levels of perceived social support and satisfaction in the marital/partner relationship, in combination with the correlated high socio-economic factors are protective for the onset of depression and anxiety in the peripartum periods for both males and females. This combination of protective factors may result in more advanced and effective communication skills for individual's further assisting couples to transcend potential relationship harmony threats or disruptions as a consequence of the birth of a child. Ensuring couples are aware of any maladaptive communication or behaviours in the peripartum period that could threaten their relationship are considerations for clinicians in caring for couples (e.g. effective communication techniques, stress management interventions, financial and household management skills and this may include referral to psychological support and relationship counselling).

When we collected data at the 12 month follow up we discovered some mothers and fathers had experienced some psychological distress (those scoring on the upper ends of each scale) but they had already sought help from their family and medical practitioners and were coping well at the time of the contact by the research team. This may indicate that the self- screening and referral pathway pamphlet may have facilitated individuals to recognise symptoms of distress and act to seek help. Some mothers described the pressures of motherhood and returning to work as the main source of stress in the 12 months post natal period. Interestingly, two of the dyads were no longer in a relationship for reasons unknown to the research team.

*A gender issue*

The findings of this study revealed that females suffer greater levels of depression during pregnancy than do their male partners; however, this difference disappears within 12 months of the postnatal period. This may be due to the cut off scores in the EPDS for men that need to be a consideration. For example Edmondson et al. (2010a) recommends (using a UK sample of men) that the optimal cut off score be  $>10$  for men and decrease it  $> 8$  to include Generalised Anxiety Disorders. Also argued by Matthey et al. (2001) (in an Australian sample) who found that when anxiety disorders were also included the optimal cut-off score for men should be reduced to  $> 5/6$  and for women  $>7/8$ . In the 12 month follow up our dyads reported some gender differences, while not significant but warrants mention, the sample of men reported slightly higher scores on the EPDS than at baseline and the women reported less psychological distress on EPDS than at baseline. This finding may be related to different expectations between males and females following the birth of a baby in particular with regards to changes to intimacy between the couple, specifically sexual activity (Wee et al., 2013), warrants further investigation.

### *Timely interventions*

A small beneficial effect of treatment, and a time  $\times$  treatment interaction was observed such that those in the control group suffered a worsening of depressive symptom scores between baseline and follow-up reporting time points, while those in the treatment group experience an improvement which was greater in magnitude than the worsening of those in the control group. This finding supports the notion of the benefits of timely interventions (including self-screening using the EPDS) where early detection of symptoms of distress can prompt individuals to seek help.

Depression and other mental illnesses are linked with considerable costs to the

person, their carers, their families and their community. Detection of potential depression in parents can lead to timely referral to appropriate services, minimising the potential for a protracted experience of depression.

### **Limitations**

While our sample size was good there were some limitations of the study that need to be taken into consideration. The self-report tool and telephone follow up could introduce reporting bias. The attrition observed in the study between time-points were mostly men and the time lag from baseline to 12 months. This attrition may be related to a number of factors such as return to work and availability, disinterest due to no feelings of distress or anxiety, or avoidance due to feelings of distress or anxiety. The cohort we used has a cultural context being an Australian cohort affecting the cut off scores of the EPDS for males. Also, the cohort were all highly educated, there were no Aboriginal or Torres Strait Islander participants and perceived social supports very high throughout the study affecting generalisability.

### **Conclusions**

Depression is the most common mental disorders encountered around the world and exists on a continuum where major depression is common. While it is well known women are twice as likely to develop depression, mental disorders such as depression also affect men and is indiscriminate in incidence amongst socio-demographic groups. The self-screening tool and referral pathway pamphlet provided to couples may have some benefit in assisting individuals in the perinatal period to detect and seek help for early symptoms of distress. The ease of use of the

EPDS for individuals similar to those who were represented in our sample i.e.: well-educated and generally well supported.

### **Implications to clinical practice**

Screening for distress or depressive symptoms in the perinatal period should be for mothers and fathers. The authors suggest routine screening of both the mothers and the fathers to occur across the perinatal period. The use of the Edinburgh Postnatal Depression Scale (EPDS) for screening of distress and depression in men needs to be linked to guidelines related to perinatal care which currently focuses on the mothers. In addition, the results of this study indicates that for individuals in developed countries who are well-educated and generally well supported, self-screening using the EPDS with instructions related to referral pathways may assist in early detection and prompt help seeking behaviours interrupting the continuum of unchecked depression.

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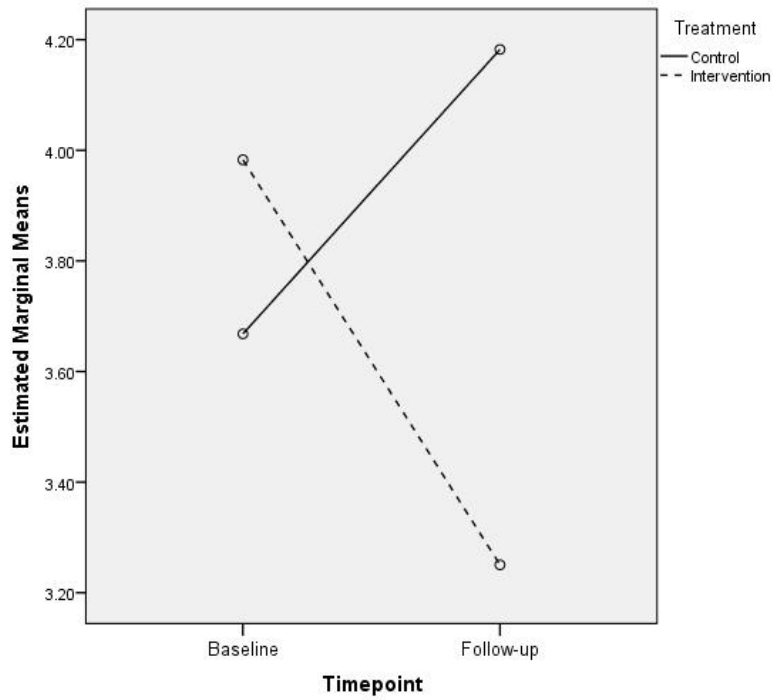
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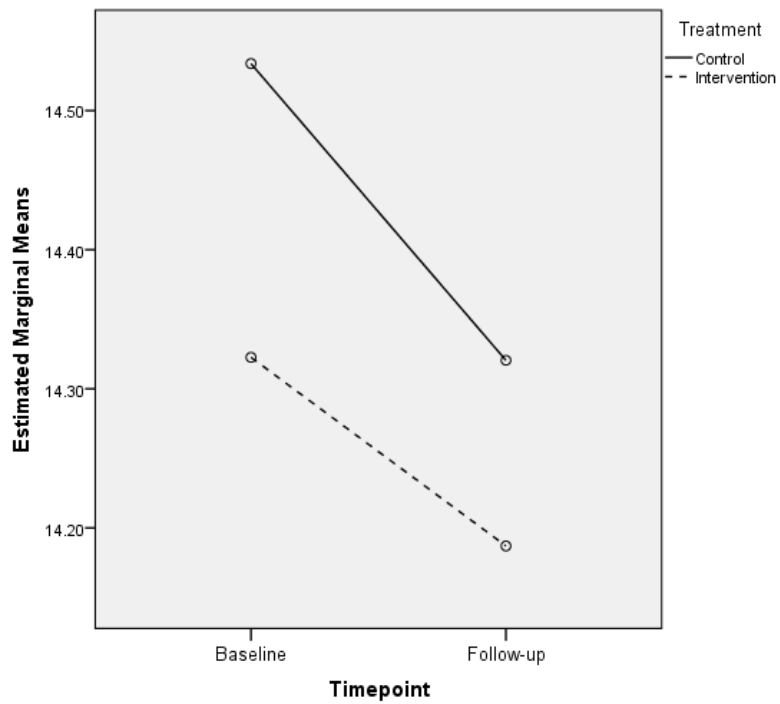
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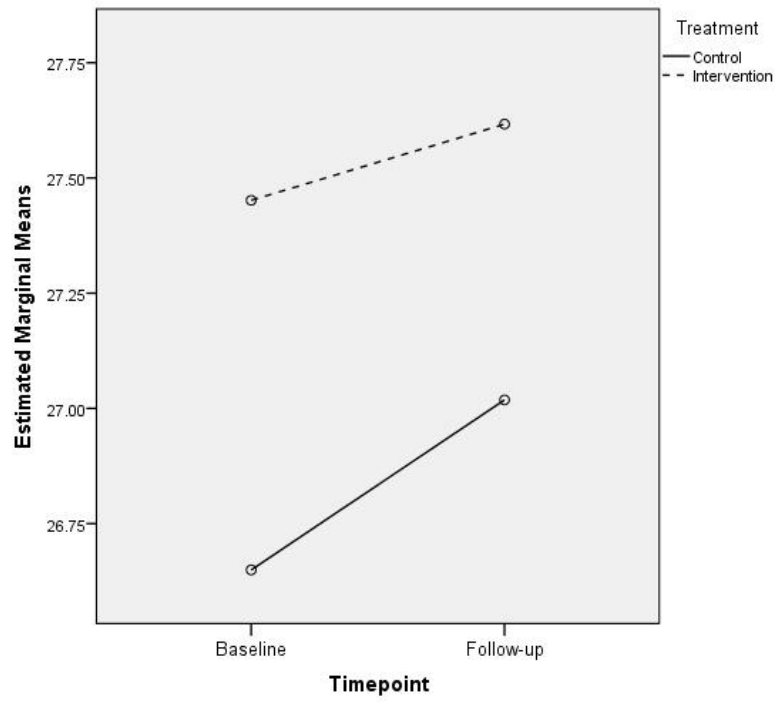
**Figure 1(a): marginal mean EPDS scores disaggregated by treatment: measured at baseline and follow-up**



**Figure 1(b): marginal mean Kessler-10 scores disaggregated by treatment measured at baseline and follow-up**



**Figure 1(c): marginal mean MSSS (maternal social support scale) scores disaggregated by treatment: measured at baseline and follow-up**



**Table 1: Descriptive summary of sample by treatment group at baseline (antenatally)**

Outcome measure at baseline	Mean (SD)		
	Females (n=70)	Males (n=70)	All (n=140)
EPDS	5.17 (3.18)	3.47 (3.20)	4.32 (3.28)
Kessler-10	15.2 (3.96)	14.0 (2.98)	14.7 (3.54)
MSSS	27.3 (2.19)	27.3 (2.45)	27.3 (2.32)

**Table 2: Descriptive summary of sample by treatment group at 12 months (postnatally)**

Outcome measure at 12 months	Mean (SD)		
	Females (n=47)	Males (n=31)	All (n=78)
EPDS	4.62 (3.09)	3.61 (2.70)	4.22 (2.95)
Kessler-10	14.2 (3.78)	13.9 (2.86)	14.1 (3.41)
MSSS	27.6 (2.10)	27.1 (2.83)	27.4 (2.40)

**Table 3: Descriptive summary of sample by treatment group**

Categorical Factor	Frequency (valid %)		
	Control	Intervention	All
Age (years)			
Under 30	10 (14.7%)	14 (20.0%)	24 (17.4%)
31-35	35 (51.5%)	27 (38.6%)	62 (44.9%)
36-40	17 (25.9%)	18 (25.7%)	35 (25.4%)
41-45	4 (5.9%)	9 (12.9%)	13 (9.4%)

Over 45	2 (2.9%)	2 (2.9%)	4 (2.9%)
Marital status			
Married	46 (67.6%)	60 (85.7%)	106 (76.8%)
<i>De facto</i> /Partnered	20 (29.4%)	9 (12.9%)	29 (21.2%)
Never married	2 (2.9%)	1 (1.4%)	3 (2.2%)
Number of children			
0	61 (89.7%)	63 (90.0%)	124 (89.9%)
1	5 (7.4%)	3 (4.3%)	8 (5.8%)
2 or more	2 (2.9%)	4 (5.7%)	6 (4.3%)
Nationality			
Australian	53 (77.9%)	57 (81.4%)	110 (79.7%)
Non-Australian	15 (22.1%)	13 (18.6%)	28 (20.3%)
Living arrangements			
Lives with partner/children only	66 (98.5%)	67 (95.7%)	133 (97.1%)
Lives with partner/children and relatives	1 (1.5%)	3 (4.3%)	4 (2.9%)
Highest education level			
Secondary education or equivalent	4 (6.0%)	6 (8.6%)	10 (7.3%)
Tertiary education	30 (44.8%)	38 (54.3%)	68 (49.6%)
Higher education	33 (49.3%)	26 (37.1%)	59 (43.1%)
Employment status			
Full time employment	60 (89.6%)	64 (91.4%)	124 (90.5%)
No full time employment	7 (10.4%)	6 (8.6%)	13 (9.5%)
Level of support			
External support	21 (55.3%)	32 (71.1%)	53 (63.9%)
No external support	17 (44.7%)	13 (28.9%)	30 (36.1%)

Outcome measures	Mean (SD)		
EPDS (baseline: <i>n</i> =138)	4.54 (3.58)	4.11 (2.97)	4.32 (3.28)
Kessler-10 (baseline: <i>n</i> =138)	14.9 (3.82)	14.4 (3.24)	14.7 (3.54)
MSSS (baseline: <i>n</i> =138)	27.0 (2.35)	27.5 (2.27)	27.3 (2.32)
EPDS (follow-up: <i>n</i> =78)	4.52 (3.00)	3.89 (2.93)	4.22 (2.97)
Kessler-10 (follow-up: <i>n</i> =78)	14.2 (2.48)	13.9 (4.24)	14.1 (3.43)
MSSS (follow-up: <i>n</i> =78)	27.1 (2.69)	27.7 (2.07)	27.4 (2.41)