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Abstract

OBJECTIVE: Giving birth and adjusting to a new baby can be difficult and stressful for new mothers. Negative mood may occur during this time and can affect women, their parenting and the infant's development. This pilot study evaluated a brief online self-help intervention designed to promote positive mood in mothers of babies and toddlers. **METHOD.** Women in the UK who had given birth within the previous 18 months were randomly allocated to the online self-help intervention (n=40) or active comparison group exercise (n=40) which was matched for time and structure. Mood was measured before and after the intervention. Acceptability was examined at the end of the trial. **RESULTS.** The self-help intervention was acceptable to the majority of women and significantly increased positive mood compared to the comparison condition. This effect persisted after controlling for self-esteem, anxiety and depression. These results suggest that a simple self-help intervention focused on changing beliefs about oneself as a mother can have an immediate impact on women's mood. **CONCLUSION.** Further research is need to see whether these improvements continue long-term and what processes underlie these improvements.

Significance

What is already known about this topic? The postnatal period is associated with increased risk of psychological disorders and symptoms. Psychological therapies such as CBT are effective treatments for postnatal depression but women with moderate symptoms may have difficulty accessing these services. Online self-help exercises could provide an accessible alternative but have not been evaluated with postnatal women.

What this article adds? Many women experience mild to moderate affective symptoms after the birth of their baby. This study demonstrates that a brief, simple, on-line self-help intervention designed to tackle negative self-beliefs positively affects women's mood. This intervention may offer an accessible means of supporting women experiencing sub-clinical levels of postnatal affective symptoms.

Keywords: Self-help; intervention; postnatal; mood; motherhood

Evaluation of Brief Online Self-help Exercises for Postnatal Women to Improve Mood: A Pilot Study.

Whilst pregnancy and birth are usually positive experiences, women can find the associated postnatal emotional and physiological adjustments difficult^[1]; 10 to 15% of new mothers will experience postnatal depression^[2]. Many more women may experience sub-threshold symptoms of depression or anxiety, rendering them ineligible for treatment.^[3] Negative affect after birth can be detrimental to both mother and infant. For example, depression is associated with long-term adverse physical and psychological outcomes in offspring, including developmental delays and behaviour problems^[4,5]; similar findings have been reported for perinatal anxiety^[6]. Many women report moderate symptoms of anxiety, depression and other negative mood states such as difficulty adjusting^[7]. Treating all of these would place a significant burden upon healthcare resources. Consequently, effective, inexpensive and easily accessible interventions are required.

Women with postnatal depression or anxiety often report thought patterns pertaining to worries about their baby, its health, or their competence as a mother^[8]. Thought content and mood are inter-related^[9], and depression^[10] is associated with negative automatic thoughts, negative beliefs about oneself and others, and memory biases^[11]. This pattern is seen in postnatal women with symptoms of depression^[8]. Consequently, targeting women's negative beliefs about themselves as a mother may be a simple, effective way to influence mood positively. This intervention may also increase self-efficacy - a person's confidence in their personal capability - which increases resilience at times of hardship^[12]. Interventions have increased self-efficacy in other populations^[13, 14], but very little research has investigated means of influencing beliefs in new mothers.

Treatment approaches in the UK focus predominantly upon postnatal depression. Recommendations for mild to moderate symptoms include self-help strategies and brief

Cognitive Behavioural Therapy (CBT) or Interpersonal Therapy (IPT)^[15], with evidence of effectiveness of both these approaches^[16, 17, 18, 19]. However, access and cost can prove considerable barriers^[20]. Self-help therapies, such as computer programmes or bibliotherapy overcome both these issues, offering an attractive alternative. Such therapies have been shown to be effective in the treatment of depression and at improving self-esteem in clinical samples^[21]. The greatest effectiveness appears to be with interventions that employ CBT techniques such as changing dysfunctional cognitions^[22]. Software packages for home-based personal computer are now available and have been evaluated positively by users for convenience, confidentiality, reduced stigma and efficacy^[23]. Intensive computerised CBT programmes have been identified as beneficial for severe postpartum depression, although attrition is high^[24]. Universal computerised self-help interventions for women with sub-threshold symptoms require evaluation. Brief, self-help exercises targeting specific difficulties may be a useful adjunct or alternative for all women, especially those experiencing mild or moderate negative symptoms, or who are having difficulty adjusting to motherhood.

This pilot study aims to evaluate a brief online self-help postnatal intervention in a community sample of women who had given birth within the previous 18 months. The intervention was developed to challenge women's negative beliefs about themselves as a mother and focus on their positive mothering qualities. The study considers whether the intervention (i) positively influences mood and (ii) is acceptable to women.

Method

Participants

Participants were recruited via the internet and from community postnatal groups in the south of England. The study was hosted by Bristol On-Line Surveys, an external on-line

survey service, and was reached via a link, advertised on leaflets distributed at group meeting and local/personal on-line forums. The link could not be discovered serendipitously. Women needed to be fluent in English, aged 18 years or over, and have given birth within the previous 18 months; the postpartum eligibility period was extended to 18 months to maximise participant numbers in recognition that women potentially experience negative mood beyond the first year postpartum. Similarly, no exclusions were applied in relation to current or historic psychological difficulties in order to include women who may be vulnerable to negative mood states regardless of their psychological history. The sample was self-selected. Eighty women consented to participate and were randomly assigned, by the external online survey service, on a 1:1 ratio to either the self-help intervention or time-management group in order to ensure equal numbers of participants in each group.

Materials

Participants completed psychological measures of anxiety & depression, self-esteem and mood, and a short demographic questionnaire. They undertook either the intervention exercises or a time-management exercise. We used a time management intervention as an active comparison task in order to match tasks for time, attention and relevance to postpartum women, permitting evaluation of the efficacy of the self-help intervention compared to the task of spending time reflecting on one's life and priorities.

Questionnaire measures. There were three standard measures of psychological state. Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS)^[25]. Mood was assessed using the University of Wales Institute of Science and Technology (UWIST) mood adjective checklist^[26]. Self-esteem was evaluated using the Self-Esteem Scale^[27]. Participants also provided details of any previous or current

psychopathological disorders and of any medication currently being taken to treat psychological disorders.

Hospital Anxiety & Depression Scale. This 14-item self-report screening scale is an established and reliable instrument for detecting the presence and severity of depression and anxiety symptoms. It comprises two 7-item scales, one for depression and one for anxiety, each of which is scored from 0 to 21. Established cut-offs are 8–10 for mild symptoms, 11–14 for moderate symptoms, and 15 or more for severe symptoms. Internal reliability in our sample was high ($\alpha = .89$ and $\alpha = .85$ respectively).

University of Wales Institute of Science and Technology mood adjective checklist. This 24-adjective checklist is designed to measure mood. Participants rate how representative each adjective is of their present mood on a 4-point scale (definitely, slightly, slightly not and definitely not); some items are reverse scored. Higher scores indicate more positive mood. The measure comprises four scales: hedonic tone, tense arousal, energetic arousal and general (total) arousal. The hedonic tone scale contains items relating specifically to mood, e.g. pleased, optimistic, low-spirited. Tense arousal items reflect anxiety, e.g. fearful, anxious, calm. Energetic arousal items are concerned with the extent to which a participant feels, for example, active, energetic, sleepy, dull. Internal reliability in our sample was high (energetic arousal $\alpha = .75$, hedonic tone $\alpha = .95$, tense arousal $\alpha = .89$, total scale $\alpha = .93$).

Self-Esteem Scale. This is a 10-item self-report instrument designed to assess global feelings of self-worth. Participants rate each item on a 4-point scale, from ‘strongly agree’ to ‘strongly disagree’. The ratings are summed to obtain a score ranging from 10 to 40. Higher scores indicate higher levels of self-esteem. Internal reliability in our sample was excellent ($\alpha = .93$).

Acceptability. An open-response question was used to get women's evaluations of the acceptability of the self-help exercise. Women were asked: "tell us how you feel about the task you just did". A free text box was provided for women to respond to this question.

Self-help intervention. The self-help intervention focussed upon helping women challenge negative beliefs about themselves as a mother and develop more positive beliefs. The intervention was based upon principles of cognitive therapy that aim to improve self-esteem, mood and cognitions by challenging rigid, negative beliefs and focussing upon positive qualities^[28, 29]. To develop the intervention, we examined the self-help literature regarding general low mood and identified five components considered effective in challenging negative beliefs: self-awareness, consolidation of learning and cognitive change, focus upon strengths, developing positive self-perceptions and reflection^[30, 31]. Women identified five behaviours reflective of a 'good' mother and rated the frequency with which they engaged in these; responses were provided on an 11-point Likert scale. They also completed a series of questions designed to focus upon their strengths and to foster positive perceptions of their development as a mother. For example, "Since you had your baby, in what positive ways have you learnt and developed as a mum?" and "How do you think your friends would describe you as a mother?" Full details are available from the first author on request.

Comparison group exercise. The comparison group exercise was an active self-help time management exercise, based upon materials designed to improve time management skills^[32], and matched to the self-help intervention for time and basic structure. Before starting the exercise, women were asked to rate themselves on how competent they were at managing their time. Responses were provided on an 11-point scale from 0 ('terrible') to 10 ('excellent'). For the first part of the exercise, women read information on time management techniques. Second, they were asked to specify five tasks that it was important for them to

complete. Then they rated themselves on these tasks, on an 11-point Likert scale from 0 ('I never do this') to 10 ('I always do this'). Third, women were asked to reflect on how they could improve their time management. Finally, women were asked to reflect on what these exercises had shown them about their time management skills and to provide a second assessment in relation to their competence at managing time.

Procedure

Ethics approval was received from the University ethics committee. Participants accessing the study recruitment link were provided with information about the study. Those who agreed to participate completed the baseline measures of demographic status, psychiatric history, obstetric history, depression, anxiety, self-esteem, mood and competency ratings. They were then randomised to either the self-help intervention group or to the comparison group. They undertook the exercises relevant to their assigned condition and then completed the ratings of competency and measure of mood for a second time. Women provided feedback on the acceptability of the task before being thanked for their participation and debriefed. The primary outcome was increase in positive mood; the secondary outcome was that women would find the intervention acceptable.

Analysis

Quantitative analysis was performed using SPSS Version 21. Twenty-eight participants omitted up to 5% of required data in their completed questionnaire; missing values for psychological measures only were imputed using the expectation-maximisation algorithm. One participant failed to complete sufficient measures to be included within this.

Overall, the dependent variables were normally distributed, but the energetic arousal subscale for the comparison group was not. Independent variables were also normally

distributed with the exception of comparison group baseline anxiety. These variables could not be resolved satisfactorily with transformations so analyses were performed on raw data; results relating to anxiety and energetic arousal should be interpreted with caution. To test the efficacy of the intervention on mood between conditions and across time, we conducted 2 (pre vs post) x 2 (intervention vs comparison) repeated measures Analyses of Variance (ANOVA). Analysis of Covariance (ANCOVA) was subsequently employed to control for any influence of women's baseline self-esteem, depression and anxiety on mood. T-tests were conducted post-hoc for all significant within-subjects measures.

Qualitative data on acceptability were rated by one of the researchers and then discussed and agreed with the first author. They were categorized into positive, neutral and negative comments and the content was examined for themes. A statement identifying a positive benefit of the intervention, e.g. lifting of mood, was categorized as 'positive'. A comment identifying a lack of benefit – either equivocally or outlining a potential lack of effect, e.g. not being able to focus upon one's positive aspects, was coded as 'negative'. A statement identifying that no personal benefit was derived – perhaps because the woman was already confident of her abilities as a mother – but highlighting potential for the intervention to help others, was coded as 'neutral'. These statements were also reviewed to identify the existence of common themes in the responses.

Results

Sample characteristics

The intervention and comparison groups did not differ significantly on any of the demographic, obstetric or psychiatric history variables (Table 1), nor on any of the baseline measures of mood, self-esteem, anxiety or depression (Table 2). A large proportion of the

sample had mild to moderate symptoms of anxiety (54%) and depression (36%). Severe anxiety and depression were reported by 12% and 8% of the sample respectively.

Efficacy of the self-help intervention

Increase in positive mood. Changes in mood for the intervention and comparison group are shown in Table 2. Mood scores improved in both groups over time; mean differences are greater in the intervention group. Mood score change over time was significant ($F(1, 77) = 57.91, p < .001, \eta^2 = .43$). A significant interaction was identified between condition and time ($F(1, 77) = 20.20, p < .001, \eta^2 = .21$), with the intervention group showing greater improvements (Figure 1). Values of partial eta squared suggest large effects of the task on mood (.01 = small effects, .06 = medium effects, and .14 = large effects^[33]).

Examination of the mood subscales identified significant changes over time on hedonic tone ($F(1, 77) = 39.09, p < .001, \eta^2 = .34$), energetic arousal ($F(1, 77) = 17.26, p = .001, \eta^2 = .18$), and tense arousal ($F(1, 77) = 50.01, p < .001, \eta^2 = .39$). In all cases scores increased, demonstrating positive effects (Table 2). A significant interaction was identified between condition and time on hedonic tone ($F(1, 77) = 30.98, p < .001, \eta^2 = .29$) and tense arousal ($F(1, 78) = 16.64, p = .001, \eta^2 = .18$) but not on energetic arousal ($F(1, 77) = .43, ns$).

After controlling for self-esteem, a significant interaction between time and condition on ratings of mood ($F(1, 76) = 17.89, p < .001, \eta^2 = .19$) remained. Similarly, after controlling for anxiety and depression, significant interactions were noted between time and condition on mood (anxiety: $F(1, 76) = 20.43, p < .001, \eta^2 = .21$; depression: $F(1, 77) = 16.77, p < .001, \eta^2 = .18$). These results suggest the intervention is still effective after taking into account women's self-esteem and symptoms of depression and anxiety.

Post-hoc analyses. To explore significant within-subjects effects relating to mood, we conducted repeated measures t-tests for the total mood score and each of the subscales. This

analysis identified significant increases, for both conditions, in total mood and in all mood subscales with the exception of hedonic tone in the comparison group which failed to reach significance (Table 2).

Acceptability of the self-help intervention.

Seventy-one women provided feedback about the task that they completed; 36 from the intervention group and 35 from the comparison group. Eight women omitted to respond to the question. Significantly more women in the intervention group evaluated the intervention positively compared to the comparison group (89.7% v 64%; $\chi^2(1) = 5.113$, $p = .024$); neutral comments were roughly equivalent in the groups (intervention $N = 7$; comparison $N = 10$). Women who found the intervention useful described four main themes: increased 'reflection', 'affect', 'self-affirmation' and 'restructuring beliefs'. 'Affect' was particularly prominent in the feedback, arising in 44% of comments, with statements such as:

"I was shocked that my mood actually felt substantially lifted after doing these exercises"

Women who evaluated the intervention neutrally mostly commented that they could see the benefit of the intervention but felt they already had positive beliefs about themselves as mothers.

Negative feedback was limited but more diverse. Of the six women who evaluated the intervention negatively, three found it hard to concentrate or to believe in positive aspects of themselves. One suggested this was due to severity of depressed mood:

"not really very helpful. Might be for someone with a more minor case of "baby blues", and not full-on depression"

None of the negative comments inferred that the intervention was harmful, only that it did not work for these particular women. Therefore, there may be two groups for whom the intervention might not work: mothers with severe depression and mothers who hold positive beliefs about their mothering abilities.

Interestingly, 64% of women who did the time management control task evaluated it positively. Women reported that the task had made them think about what was important and what they should focus upon ('prioritisation'). Others talked of feeling more motivated or of feeling better after completing the questionnaire, which suggests that completing the self-esteem and affect questionnaires – rather than the task – may benefit some women.

'Good mum' behaviours. Behaviours listed by women in the intervention group as characterising 'good mothers' were categorised (Table 3). The most common behaviour categories were 'social interaction and play with the baby', 'care for basic needs of the baby', 'create a positive emotional environment' and 'love the baby'.

Discussion

The aim of this pilot study was to assess the efficacy and acceptability of a brief online intervention to promote positive mood in mothers of babies and toddlers. Results showed that the intervention was effective and acceptable to women.

Efficacy of the self-help intervention

The intervention and time-management comparison task both resulted in improved mood; this effect was greater amongst women in the intervention group, suggesting that targeting women's beliefs about themselves as mothers is more effective than targeting time management skills. Changing beliefs about women's maternal qualities may lead to greater confidence in their capabilities and improved mood. This assertion is consistent with the self-

esteem literature^[12]. As such, this intervention seems to offer a simple means of providing universal support for women.

This effect of the intervention on mood is consistent with previous studies of computerised CBT self-help^[18, 24] – although there is some indication effects may reduce over time^[34]. A longitudinal evaluation of our intervention is therefore necessary to determine whether the impact upon mood is transient or sustained over time. Since women also benefitted from the time management task, the intervention should be compared to other tasks in order to comprehensively evaluate its comparative efficacy. Feasibility of the intervention also needs to be evaluated across social groups, particularly for women who are unable to access the internet in their own homes.

Acceptability of the self-help intervention

Qualitative feedback indicated that the intervention is acceptable and perceived positively by the majority of women. Women who did not perceive the intervention to be useful either had difficulty believing in positive aspects of themselves, or already held positive beliefs about themselves as a mother. Evaluation of acceptability was confined to one question, however, so needs to be explored in more detail before definitive conclusions can be drawn.

Implications for policy and practice.

The results have several implications for policy and practice. Inadequate post-natal mental health care is estimated to cost the UK in excess of £8 million per year^[35]. Self-help interventions, such as this, could be tailored to different needs, enabling women to choose the self-help exercises that are most appropriate for them. Additional measures would be required for those with limited ability to read and write or without internet facilities in order to ensure

equity of socioeconomic outcomes. Such measures include access to internet facilities at local parent-baby groups and health visitor groups and greater use of local library internet facilities.

Limitations

Our results are promising in terms of the potential of this self-help intervention to improve mood in mothers up to 18 months after birth, although a larger longitudinal study is required to evaluate the intervention over time. Assessment of the relative effectiveness of the intervention across particular subgroups is also important, e.g. comparing women with mild to moderate distress or negative beliefs about themselves with women experiencing severe distress. Timing of the intervention for maximum effectiveness should also be considered.

Limitations that future research should address include the sampling and measure of mood. This study is based on a small, self-selected sample of women in the UK with a high proportion of white, highly educated women. The intervention therefore needs to be evaluated in a more diverse sample. The small sample means we were not able to make any meaningful direct comparison between those who had severe psychological distress and those who did not. It also limited the degree to which we could control for confounding variables without impacting adversely upon statistical power. Participation could potentially be increased in future by making the access to the study more visible.

For mood, we used a measure of general mood to examine the wide range of possible negative and positive mood states women might experience. Interestingly, the effect of the intervention on positive mood (hedonic tone) was larger than the effect on negative mood (tense arousal). The impact of the intervention on specific negative affect states, such as postpartum depression would be useful.

In conclusion, this study shows that a brief self-help intervention to encourage women to develop positive beliefs about themselves as a mother significantly improved mood in a sample of women up to 18 months after birth. The intervention was acceptable to women and did not appear to do any harm in the small number of women who evaluated it negatively. This intervention could be offered freely via the internet for women to access at any time and may be particularly useful in the early postpartum period when women are adjusting to motherhood and forming beliefs about themselves as a mother. However, further research is needed to look at timing, efficacy and uptake in different groups of women, and whether positive benefits are transient or sustained over time.

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Table 1.
Sample Characteristics on Demographic Variables

Demographic Variables	Comparison Group ^a	Intervention ^a Group	p
Ethnicity			.071
Caucasian	39 (97.5%)	33 (89.2%)	
Other	1 (2.5%)	4 (10.8%)	
Missing	-	3	
Education			.268
Pre GCSE	0 (0%)	2 (5.0%)	
GCSE	3 (7.5%)	7 (17.5%)	
A Levels	6 (15.0%)	3 (7.5%)	
Diploma	8 (20%)	8 (20.0%)	
Degree	13 (32.5%)	15 (37.5%)	
Postgraduate	10 (25%)	5 (12.5%)	
Missing	-	1	
Marital Status			.475
Married	27 (67.5%)	27 (69.2%)	
Cohabiting	10 (25.0%)	8 (20.5%)	
Living Apart	1 (2.5%)	2 (5.1%)	
Other	2 (5.0%)	2 (5.0%)	
Missing	-	1	
Parity			.990
First Baby	23 (57.5%)	21 (53.8%)	
Second Baby	12 (30.0%)	13 (33.3%)	
Third Baby	4 (10.0%)	4 (10.3%)	
Fourth/more Baby	1 (2.5%)	1 (2.6%)	
Missing	-	1	
Obstetric			.980
Normal Delivery	24 (60.0%)	22 (56.4%)	
Assisted Delivery	8 (20.0%)	8 (20.5%)	
Emergency C-Section	4 (10.0%)	4 (10.3%)	
Planned C-Section	4 (10.0%)	5 (12.8%)	
Missing	-	1	
Psychiatric History			
Pre-Birth Diagnosis	6 (15.4%)	9 (22.5%)	.420
Post-Birth Diagnosis	8 (20.5%)	11 (27.5%)	.468
Current Medication	6 (15.4%)	7 (35.0%)	.085

Note: GCSE = General Certificate of Secondary Education; Marital Status: Other = Separated, Divorced or Single; Normal Delivery = Normal Vaginal Delivery, Assisted Delivery = Forceps or Ventouse; Pre-Birth Diagnosis and Post-Birth Diagnosis = Clinical Diagnosis of mental health disorders before and after birth.

^a N=40

Table 2

Mood: Descriptive statistics pre and post intervention.

Group		N	Time 1		Time 2		Mean difference
			Mean	s.d.	Mean	s.d.	
Intervention Group	Total Mood	40	58.40	13.90	68.82	12.70	10.42****
	Hedonic Tone	40	20.58	6.36	25.05	5.18	4.47****
	Tense Arousal	40	19.45	5.43	23.60	5.18	4.15****
	Energetic Arousal	40	18.37	4.05	20.17	3.93	1.80***
	Anxiety	40	9.76	4.62	-	-	
	Depression	40	8.28	5.31	-	-	
Comparison Group	Total Mood	39	61.69	13.05	64.37	14.06	2.68***
	Hedonic Tone	39	23.14	6.03	23.46	6.51	0.26 ^{ns}
	Tense Arousal	39	21.17	5.05	22.32	5.45	1.31*
	Energetic Arousal	39	17.33	4.07	18.65	4.11	1.11**
	Anxiety	39	9.62	3.51	-	-	
	Depression	40	6.41	4.18	-	-	

*p<.05, **p<.01, ***p<.005, ****p<.001. t-test df = 38 (comparison group) and 39 (intervention group).

Table 3

Behaviours listed by women as characterising a good mother

Behaviour	Examples	Number of times mentioned*
Social interaction and play with baby	Listen, spend time with baby, read to baby, play, have fun, laugh, sing.	58
Meet baby's basic needs	Feed, keep safe, breastfeeding, change nappies, bath baby.	53
Create a positive emotional environment for baby	Be calm, act as a role model, provide stability, be consistent.	42
Love baby	Kiss, cuddle, show affection	31
Stick to a routine	Get your baby in a good routine, get baby to sleep regularly, have a good routine.	7
Show altruism	Put baby first	5
Be available for baby	Be there for them, stay in to babysit	5
Time for self	Get rest, time for herself without feeling guilty	4
Look after home and family	Keep the house tidy, cook nice meals for family, spend time with partner with and without the baby	4
Provide for baby	Buy nice toys for them, provide for them financially, treat her children	3
Foster health of baby	Keep baby healthy	2
Use own instinct	Use their own instincts	1
Self-development	Read books about how to be a good mum	1
Accept help	Allow others to help when they offer	1
Lose weight	Lose the baby weight	1

* Based on the 40 women in the self-help intervention group who were asked to list 5 behaviours. However, some women combined 2 or more behaviours into 1 comment so the total number of behaviours mentioned = 218.

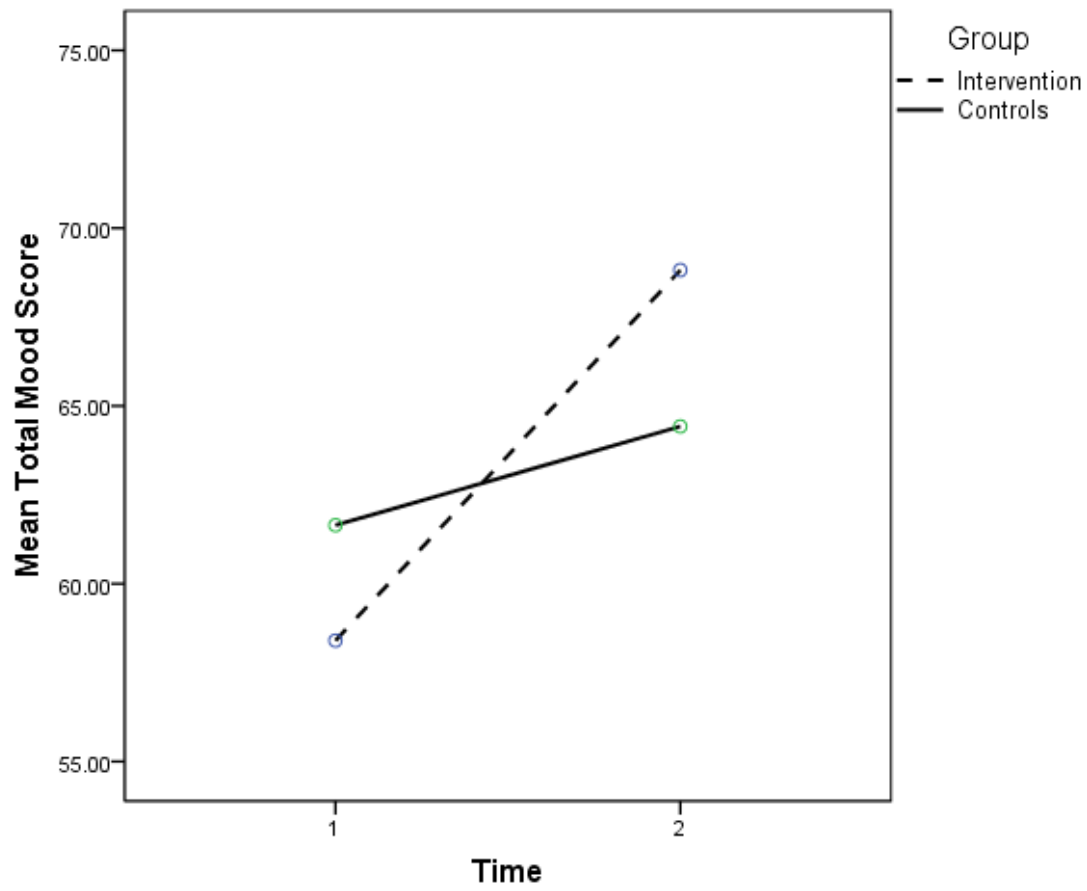


Figure 1: Increase in total mood scores ($p < .001$) (unadjusted)