



**Exercise as an adjunct treatment for postpartum depression
for women living in an inner city – a pilot study**

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ABSTRACT

To examine the effectiveness of exercise in the management of postpartum depression, women living in an inner-city, who were diagnosed using the Structured Clinical Interview for DSM-IV (Perinatal Version) (SCID-PN), were randomly assigned to an exercise group ($N = 12$) or control group ($N = 12$). A focus group was carried out to explore women's views of the trial. There were no significant differences between the two groups for SCID-PN. Although women who had engaged in the exercise viewed it positively (based on focus group data), low adherence to exercise meant that significant improvements in postpartum depression were not found.

Key words: postpartum depression; postnatal depression; pram walking; randomized controlled trial; women.

INTRODUCTION

Postpartum depression (PPD) is a serious and debilitating psychiatric disorder (American Psychiatric Association, 2000). Although exercise has been shown to alleviate PPD (Amstrong, & Edwards, 2004; Daley, Jolly, and MacArthur, 2009), interventions have often been limited to pram (also known as stroller, or buggy) walking carried out in warmer climates and among women who are existing exercisers, well educated, motivated, with good levels of social support, which may account for the positive findings. The objective of the current study was to conduct a pilot randomized controlled trial to examine the effectiveness of a mixture of pram walking, facility-based group exercise, and self-initiated, home-based exercise, specifically targeted at women living in an inner city, where adverse weather conditions and high levels of social deprivation prevail. This study has relevance to an international audience owing to the prevalence of PPD (Almond, 2009).

MATERIALS AND METHODS

The randomized controlled trial was carried out in Stoke-on-Trent, a UK city ranked in the bottom 5% nationally for deprivation (Department of Communities and Local Government, 2011). Women scoring ≥ 12 on the Edinburgh Postnatal Depression Scale (EPDS) at their routine visit six weeks' postpartum, who gave their written informed consent, were interviewed using the Structured Clinical Interview for DSM-IV (Perinatal Version) (SCID-PN) (American Psychological Association, 2000). Exclusion criteria included: non-diagnosis of depression using DSM-IV; medical contraindication to exercise; severe mental illness; and engagement in >1 hour/week of moderate/vigorous exercise in the perinatal period. This study was approved by the West Midlands Research Ethics Committee (09/H1203/72).

All eligible women were randomly assigned to either an exercise or control group, using a computer-generated random number table. Randomization was obscured from

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2
3 researchers involved in follow-up data collection. Descriptive characteristics of participants
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5 in each group are given in Table 1. To satisfy an a priori sample size estimate (Clark-Carter,
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7 2010), 22 women were required.
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10 Participants randomized into the exercise group were initially given a face-to-face 60-
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12 min consultation to motivate them (using a behavior change approach) to undertake 150
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14 min/week of moderate intensity exercise, which participants could achieve, depending on
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16 individual circumstances and preferences, by attending structured, group exercise sessions
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18 (pram-walking, or facility-based exercise to music with free childcare), and/or by undertaking
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20 self-initiated exercise. Structured sessions lasted 60 min at an intensity equivalent to 40-65%
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22 predicted (Sykes & Roberts, 2004) maximum oxygen consumption (VO_2max). Participants
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24 randomized into the control group were instructed to continue with their usual healthcare
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26 program.
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30 Data were collected on study entry (baseline), following 12 weeks of intervention (3
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32 months), and at 3 months post-intervention (6 months). The primary outcome measures were
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34 change in SCID-PN diagnosis and EPDS score. Perceptions and acceptability of the exercise
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36 program were explored in a focus group on study completion. The qualitative data obtained
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38 were analyzed using thematic framework analysis to identify emergent themes (Ritchie &
39
40 Spencer, 1994) by two independent researchers.
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44 A series (at 3 and 6 months) of ANCOVAs were used to determine if, after
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46 adjustments for baseline values, the intervention significantly improved EPDS scores. A Chi^2
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48 test was used to indicate whether SCID-PN diagnosis significantly changed at 3 and 6
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50 months.
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53 54 55 **RESULTS/DISCUSSION** 56 57 58 59 60

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3 The views expressed by participants as a result of the intervention were generally positive:
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5 *It's been really, really good. It has totally transformed me...I felt brilliant! [Katie].* Four
6
7 overarching themes emerged from the focus group data. One of these was about boosting
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9 mental health, confidence and resilience (*It just gives you that boost of confidence that you*
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11 *need to get yourself picked up and get going again because when you're depressed...you just*
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13 *do nothing, but cry all day [Bev]).* The women appreciated the opportunity that the exercise
14
15 classes gave them to socialize and have some time for themselves, which added to their
16
17 confidence and resilience (*I thought it was good, not just the exercise part of it, it was just*
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19 *socially to get out of the house without my baby and just having some 'me time' [Sally]).*
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21 Another theme was about communication and motivation; the women highlighted how much
22
23 they had learned from and were motivated by the instructors, appreciating also the emotional
24
25 support offered (*I found that all the little exercises that she gave me really sort of tuned*
26
27 *myself in a bit...I felt a little bit more sort of in control rather than 'I feel terrible all the time*
28
29 *and I don't know what to do' [Angela]).* Under the theme, 'motivation to exercise in the
30
31 future', most women reported continuing with pram walking as it was deemed the most
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33 convenient, involved getting them out of the house, and did not require transport, a particular
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35 time, money, or childcare (*At least if you're doing the pram walking you're doing something*
36
37 *together, but something really fun, something that gets you up and going. [Bev]).* Despite
38
39 these positive findings from the focus group data, there was no significant effect of exercise
40
41 on SCID-PN diagnosis after 3 months ($\chi^2 = .792, p = .37$), or 6 months ($\chi^2 = .188, p = .66$).
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43 There was also no significant effect of exercise on EPDS after 3 ($F(1,21) = .304, p = .59, \eta^2 =$
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45 $.02$), or 6 months ($F(1,21) = 2.00, p = .173, \eta^2 = .10$). Data are given in Table 2.
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53 One reason for the lack of statistical effect may be due to low exercise adherence.
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55 Only 24% of group exercise and 14% of pram walking sessions were attended, and the mean
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57 amount of exercise undertaken was 61.6 ($SD = 38.4$) min/week; these figures are low
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3 compared to those reported elsewhere (Armstrong & Edwards, 2004; Daley et al., 2009). This
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5 low adherence was despite efforts to provide exercise choice, and despite motivational text
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7 messages used to encourage compliance, which focus group attendees reported as
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9 appreciating. The low adherence could be explained by the perceived barriers to exercise (the
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11 fourth theme emerging from the focus group data), which were identified as being: lack of
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13 motivation (*'I did struggle with motivation because I find it very difficult to let myself go and*
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15 *do things I enjoy...and if I was having a real down day, I'd just stay in'* [Angela]); lack of
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17 time; transport issues; and adverse weather conditions. These barriers are consistent with
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19 others' findings (Carter-Edwards et al., 2009; Ko et al., 2013). To improve adherence in
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21 future studies, a behavior change approach, which focuses specifically on addressing these
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23 perceived barriers to exercise should be considered.
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28 The low adherence could be further explained by the particular cohort of participants,
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30 who were not previous exercisers, and were all referred by a medical professional (rather than
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32 being self-referred), both of which contrast the characteristics of participants in other studies
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34 (e.g., Daley et al., 2012). In addition, participants had a number of socio-economic issues that
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36 are associated with PPD, such as lack of social support, marital/partner difficulties, low
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38 income/socio-economic status, and low educational attainment (Haas et al., 2005; Ersek &
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40 Brunner Huber, 2009). Exercise may, therefore, not alleviate PPD when there are adverse
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42 socio-economic factors that are considered unsurmountable, and which may influence
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44 adherence.
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49 Twelve weeks of a mixture of pram walking, facility-based group exercise, and self-
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51 initiated, home-based exercise were viewed by women with PPD as being favorable, despite
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53 findings that, statistically, there was no improvement in PPD symptoms. For future research
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55 on the effectiveness of exercise in the management of PPD for women living in a deprived,
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3 urban area, consideration should be given to encouraging exercise adherence; the study
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5 should be replicated elsewhere with a larger cohort.
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Table 1 Descriptive characteristics (mean and standard deviation [SD]) at baseline in control and exercise groups in the final sample of $N = 22$. All participants were of Caucasian origin. There were no significant differences ($p > .05$) in age, body mass, height, body mass index (BMI), and age of child among exercise intervention and control groups at baseline, using independent t -tests.

	Control	Exercise
	($n = 11$)	($n = 11$)
Age, mean (SD), years	27.0 (5.5)	25.0 (5.1)
Height, mean (SD), cm	163.7 (5.4)	164.9 (5.3)
Body mass, mean (SD), kg	78.7 (20.1)	85.3 (29.6)
Body mass index, mean (SD), (kg/m^2)	30.0 (6.9)	32.3 (7.7)
Age of child (months)	4.27 (1.49)	5.18 (2.27)
Parity, n		
<i>Primiparous</i>	5	7
<i>Multiparous</i>	6	4
Marital status, n		
<i>Married/living with partner</i>	8	9
<i>Never married</i>	3	2
Highest education level, n		

<i>University undergraduate degree</i>	2	0
<i>Continued school until 18 years</i>	1	6
<i>Left school at 16</i>	8	5
Prior employment status, <i>n</i>		
<i>Full-time work</i>	7	6
<i>Part-time work</i>	0	1
<i>Unemployed</i>	4	5
Smoking status, <i>n</i>		
Smoker	4	5
Non-smoker	4	3

Table 2. Mean scores, standard deviation and 95% CI from the Edinburgh Postnatal Depression Scale (EPDS) at baseline, 3 months and 6 months for the exercise and control groups.

	Group	Baseline	3 months	6 months
		<i>(n = 11)</i>	<i>(n = 11)</i>	<i>(n = 11)</i>
EPDS	Control	15.9±2.9 (14.0 to 17.9)	12.7±4.2 (9.9 to 15.5)	12.7±5.8 (8.9 to 16.6)
	Exercise	17.6±4.0 (14.9 to 20.2)	11.8±6.1 (7.7 to 16.0)	8.7±6.9 (4.1 to 13.4)