

available at www.sciencedirect.com

Public Health

journal homepage: www.elsevier.com/puhe

Original Research

Exploratory study to evaluate the provision of additional midwifery support to teenage mothers

D. Cohen^{a,*}, C. Lisle^a, W.R. Williams^a, C.F. Brunsdon^b, T. Batstone^a

^a Faculty of Health, Sport and Science, University of Glamorgan, Glyntaff, Pontypridd CF37 1DL, UK

^b Department of Geography, University of Leicester, Leicester, UK

ARTICLE INFO

Article history:

Received 4 August 2010

Received in revised form

10 May 2011

Accepted 15 June 2011

Available online 19 August 2011

Keywords:

Teenage pregnancy

Midwifery

Social support

Health services

Self-esteem

SUMMARY

Objective: To evaluate the provision of psychosocial interventions of potential benefit to pregnant teenage women.

Study design: Pre-test/post-test, controlled, experimental design.

Methods: One hundred and sixty-four pregnant teenage women received usual midwifery care or usual midwifery care plus additional psychosocial support. Four outcomes were measured at baseline and 4 weeks after delivery: self-esteem (Rosenberg Self-Esteem Scale), physical activity (International Physical Activity Questionnaire), social support (Short Form Social Support Questionnaire) and smoking behaviour (yes/no).

Results: At follow-up, there were no significant differences in any of these outcomes between the 65 women in the intervention group and the 64 women in the control group who completed both assessments (mean age 17.5 years). There was no difference in use of National Health Service (NHS) services, but the intervention group made greater use of non-NHS services, such as family planning or help with housing or benefits problems.

Conclusion: The very low self-esteem of the women in the study may indicate that the intervention was not sufficiently robust to impact on mental health and lifestyle, although a longer follow-up may be needed to confirm this. Discrepancy in the evidence provided by formal and informal data suggests that project benefits may have been more evident if the evaluation had included a qualitative element to address the complexity of the client group and intervention.

© 2011 The Royal Society for Public Health. Published by Elsevier Ltd. All rights reserved.

smaller studies on adolescent mothers in the USA have reported rates of postnatal depression as high as 56%.^{5,6}

Reid and Meadows-Oliver⁵ commented on the evident reciprocal associations between self-esteem and depression, and social support and depression. Parenting programmes are one way of improving maternal psychosocial health, including depression and the associated risk factors of depression, anxiety and low self-esteem. In a review of parenting programmes for teenage mothers, Coren *et al.*¹ identified improvements in self-esteem in two of the three published studies. However, the studies reporting benefits of the programmes were small scale and lacked randomization.

A Cochrane systematic review identified four randomized controlled trials of parenting programmes provided in individual and group sessions.⁷ The trials reported more favourable outcomes for the intervention group on measures including attitudes, knowledge, self-confidence and maternal identity of the mother, and mother–infant interaction and communication. A follow-up review included 10 additional non-randomized studies from the USA with diverse programme content in terms of delivery, content, duration and drop-out rate.¹ Two of the three studies investigating maternal self-esteem reported improvements resulting from the programmes; however, the studies were small scale and lacked randomization.

There is evidence that teenage mothers also have lifestyles that increase the risk of coronary heart disease (CHD), including poor diet and smoking.^{8,9} Compared with other pregnant women, teenage mothers make less use of mainstream antenatal services which can help them make lifestyle choices.¹⁰ Literature relevant to the ‘fetal programming’ hypothesis suggests that maternal nutrition and low birth weight influence the long-term risk of CHD.¹¹ An intervention to improve the health-related behaviour of teenage mothers should aim to reduce long-term risk and establish healthy lifestyles for babies after birth.

A project to provide enhanced midwifery support to teenage mothers was funded by the Welsh Assembly Government as part of its Inequalities in Health initiative. The project was undertaken by the Pontypridd and Rhondda NHS Trust which is based in Rhondda Cynon Taf, an area of high multiple deprivation with a higher prevalence of CHD and mortality than the Welsh average.¹² The project was designed *inter alia* to address a number of factors, such as diet, smoking, physical activity and self-esteem, which impact on the health and well-being of the mother and developing fetus. In this light, the aims of the project were specified as ‘To establish

individual clients. As qualified midwives, project staff already possessed the skills and knowledge required to support clients in this way. One major difference between the project and mainstream trust services was that the project midwives could respond quickly to diverse needs unrelated to the clinical focus of the pregnancy. An ‘action research’ approach was followed over the first 2 years of the project to identify which elements worked best and modify the range of services accordingly.

Recommendations for change made by project midwives were discussed and approved by the Project Steering Committee. In this way, the project evolved until it had a defined ‘intervention’ to supplement normal midwifery services to pregnant teenagers. Much of the project development addressed the training of project midwives to provide a more comprehensive service with enhanced health and psychosocial support to better suit the daily needs of teenage mothers.

The following broadly describes the development of the project (the intervention) to an end-stage ready for evaluation:

1. Informal and pragmatic training of project midwives (i.e. depending on what was available and without assessment or attainment of qualifications) across a range of areas, including child protection, motivational interviewing, preparation for parenting, sexual health promotion and contraceptive advice, and baby massage.
2. Links created by project midwives with other agencies, including staff involved in smoking cessation, genito-urinary health, substance misuse, health visitors and Sure Start.
3. Creation of a favourable environment for behavioural change through measures such as establishing peer support groups and referral links to specialist services.
4. Introduction of the Young Mums Project services to improve lifestyle (including dietary, budgetary, smoking cessation and physical activity advice and encouragement) to reduce risks related to pregnancy and reproductive health.

The number of teenagers who could be taken on by project midwives was constrained by the level of funding from the Inequalities in Health initiative. By the time the project was developed as an intervention, it was evident that the number of eligible teenagers far exceeded the capacity of the project, and a mechanism to restrict numbers was needed. The Project Steering Committee decided that this could be achieved by randomly allocating half of all eligible women to receive the intervention, with the other half forming a control group for

approximately 5 min to complete.¹³ This tool has been validated for use with adolescents and provides a Likert score of 0–30 or 10–40, dependent on the scoring of the ‘strongly disagree value’ as 0 or 10. Scores were allocated on the 0–30 scale in this study;

- social support, as measured by the Short Form Social Support Questionnaire.¹⁴ This six-item questionnaire rates satisfaction with social support and number of available support persons;
- smoking. As extensive advice on why women should not smoke during pregnancy is part of usual antenatal care, the scope for the intervention to achieve significantly greater effects was limited. Accordingly, a simple binary measure (smoking/not smoking) was used;
- physical activity, as measured by the International Physical Activity Questionnaire (short form). This measures the time spent doing/not doing physical activities;¹⁵ and
- uptake of other services. One objective of the project was to bring a number of other services/activities to the attention of the women and to encourage their use. Accordingly, the research midwife asked each participant to recall the number of contacts she had had with various services over the previous 12 weeks.

Data were also recorded on 11 outcomes of pregnancy and labour (antenatal problems, induction of labour, gestation at delivery, length of labour, artificial rupture of membranes, mode of delivery, analgesia, labour complications, Apgar score, method of feeding and low birth weight (< 2500 g and < 1500 g).

Self-esteem was chosen as the primary outcome measure, mainly because of the prominence given to psychosocial health in the project’s stated aim. Self-esteem interacts with the risk factors relating to smoking, drinking, exercise and diet.^{16–19} Self-esteem is a modifiable personality trait,²⁰ and evidence shows that teenagers with low self-esteem are more likely to lead lifestyles that put themselves at risk, and are less likely to ask for advice in relation to health or lifestyle.²¹

Recruitment

Project midwives were employed by the Pontypridd and Rhondda NHS Trust to work solely on the project (i.e. during the period of the project, they did not deliver usual midwifery care). A research midwife who was independent of the project midwife team was employed by the University of Glamorgan

under 16 years, the Fraser principles on competence rather than age were followed. Competence was judged by the research midwife; where there were doubts, the client was excluded from the study. There were no other exclusion criteria.

Although all the validated outcome tools were designed for self-administration, some of the questions on the self-esteem and social support instruments had the potential to cause distress in members of this vulnerable group. Accordingly, the research midwife, who was in a position to identify any problems and take appropriate action, administered all tools. This high-cost method ensured the safety of respondents, increased response rates and limited the amount of missing data.

Timing of the intervention and delivery

The intervention focused on the antenatal period. The baseline assessment was undertaken, unblinded, by the research midwife as soon as possible after referral, and, in the case of the intervention group, prior to contact with the team of project midwives. The final assessment was administered 4 weeks after delivery or as near to that time as possible. As women presented themselves at different stages of pregnancy, the time between the initial and final assessment varied. Data analysis was undertaken by a different research assistant at the University of Glamorgan who was blind to the study group allocations.

To minimize potential contamination, participants allocated to the control group were not introduced to the groups or antenatal classes accessed by the intervention group. Major differences between project and mainstream service provision were that project midwives could give support at a time that suited the client, and most of the project work was delivered during pregnancy on a one-to-one basis in the clients’ homes.

Ethics

From an ethics perspective, it was emphasized that, for evaluation purposes, the project was to be regarded as an experiment set up to provide evidence of effectiveness, rather than as a service of the trust. Women allocated to the control group would not be disadvantaged in any way, as they would receive all the services which they would otherwise receive as part of

Results

In total, 164 women were recruited to the trial (83 in the intervention group, 81 in the control group). Of these, 65 in the intervention group and 64 in the control group completed the final questionnaire. Recruited participants were aged between 15.1 and 19.4 years. The mean age was 17.4 [standard deviation (SD) 1.36] years in the intervention group and 17.6 (SD 0.87) years in the control group. A large number of exclusions occurred before randomization ($n = 156$), as difficulty in obtaining informed consent together with progression of the pregnancy frequently meant that potential clients were timed out of participation in the trial. The project midwives found that pregnant teenagers frequently led turbulent lives.

Those completing the study showed similar baseline characteristics. Scores for the outcome measures were also similar at baseline, apart for physical activity where the scores of the control group were significantly higher ($P = 0.04$), as shown in Table 1.

Differences in gestational age at recruitment led to variation in the number of days between baseline and follow-up (range 8–181 days), but this was balanced between groups: mean values of 63 (SD 22) days for the intervention group and 67 (SD 14) days for the control group. Changes from baseline to follow-up are shown in Table 2. Self-esteem scores rose slightly in both groups, but the difference was not significant. The intervention group showed a large increase in physical activity; the difference in change scores approached but did not reach significance. Neither normal midwifery care nor normal care supported by the extra services of the project appeared to have any impact on social support ratings of availability and satisfaction.

While the difference in the number of smokers who quit at baseline is similar, this figure may be misleading. Four women in the intervention group and seven women in the control group who were non-smokers at baseline became smokers at follow-up. As the questionnaire did not ask about smoking history, it is possible that some of the 'non-smokers' at baseline had only given up on discovering that they were pregnant, and returned to smoking following the birth of their baby.

The number of low-birth weight and very-low-birth weight babies was higher in the intervention group, but low birth weight was too rare an event for inferences to be made through statistical analyses.

It was felt that contact with the project midwives could impact on the uptake of other NHS services, either increasing

Table 1 – Baseline comparison of intervention and control groups.

Demographic and baseline characteristics	Intervention group $n = 65$	Control group $n = 64$	P-value
Age (years), mean (SD)	17.4 (1.36)	17.6 (0.87)	
Body mass index, mean (SD)	23.2 (4.74)	24.1 (5.19)	
Parity, n (%)			
0	59 (91%)	56 (88%)	
1	5 (8%)	8 (12%)	
2	1 (2%)	0 (0%)	
Self-esteem			
Mean (SD)	18.20 (3.26)	18.50 (4.24)	0.69 ^b
Median	19.0	19.0	
Physical activity			
Mean (SD)	926.5 (474.8)	1086.1 (458.7)	0.04 ^a
Median	864.0	1154.0	
Social support (availability)			
Mean (SD)	3.35 (1.95)	3.35 (1.57)	1.00 ^a
Median	3.08	3.08	
Social support (satisfaction)			
Mean (SD)	5.30 (0.87)	5.42 (0.75)	0.47 ^a
Median	5.50	5.67	
Smokers, n (%)	32 (49%)	28 (44%)	3.84 ^c

SD, standard deviation.

Scoring: self-esteem 0–30 (higher scores indicate higher self-esteem); physical activity: MET-min/week (moderate activity ≥ 600 MET-min/week, high activity ≥ 1500 MET-min/week); social support availability (number of support persons available); social support satisfaction 1–6 (6 = high satisfaction).

a Student's t-test.

b Mann–Whitney test.

c Chi-squared test.

groups was the Benefits Agency, with about half as many women being in contact with local authority housing departments. The intervention appears to have had greatest impact on use of the Family Planning Association (18 intervention vs 1 control), smoking cessation counselling (23 intervention vs 10 control) and drug support teams (5 intervention vs 0 control). Intervention clients made greater use of all but one non-NHS service.

Discussion

The results indicate that the intervention did not impact

Table 2 – Changes in scores: intervention vs control groups.

	Intervention group n = 65	Control group n = 64	P-value
Self-esteem			
Mean (SD)	1.15 (3.79)	2.11 (3.76)	0.16 ^a
Median	1.0	1.0	
Physical activity			
Mean (SD)	250.69 (587.02)	87.06 (428.79)	0.06 ^b
Median	2.0	0.0	
Social support (availability)			
Mean (SD)	−0.21(1.46)	−0.18(1.41)	0.61 ^b
Median	0.0	0.0	
Social support (satisfaction)			
Mean (SD)	0.0 (1.86)	0.16 (0.72)	0.55 ^b
Median	0.0	0.0	
Smokers at baseline who quit	27 (84%)	22 (78%)	0.34 ^c
Birth weight (< 1500 g)	3	1	–
Birth weight 1500–2500 g	5	3	–

SD, standard deviation.
–, numbers too small for statistical testing.
a Student's t-test.
b Mann–Whitney test.
c Chi-squared test.

Although there are no cut-off points for defining high and low esteem by the Rosenberg Scale, comparisons with similar populations are informative. As scoring varies between different studies, the proportion of the total score achieved provides a useful comparative measure. Thus, in this sample of 129 teenage mothers, the baseline value was 0.61 of the

Table 3 – Use of National Health Service services in the 12 weeks before the follow-up assessment: intervention vs control groups.

	Intervention group (n = 65)	Control group (n = 64)
	n (median, range)	n (median, range)
Community midwife (home)	62 (6, 1–13)	64 (6, 2–18)

Table 4 – Use of non-National Health Service services in the 12 weeks before the follow-up assessment: intervention vs control groups.

Agency	Intervention group (n = 65)	Control group (n = 64)
	n (%)	n (%)
Benefits agency	55 (85%)	52 (81%)
Local authority housing department	30 (46%)	26 (41%)
Smoking cessation counselling	23 (35%)	10 (15%)
Infant feed counsellor	20 (31%)	17 (27%)
Family planning association	18 (27%)	1 (2%)
Condom card scheme	9 (14%)	5 (8%)
Further education college	8 (12%)	5 (8%)
Social services	6 (9%)	5 (8%)
Drug support teams	5 (8%)	0 (0%)
Books and babies	4 (6%)	2 (3%)
Genesis creche	3 (5%)	4 (6%)

total score. In comparison, the values for adolescent populations of Australian mothers ($n = 72$) and pupils of mixed race attending US non-mainstream schools ($n = 148$) were 0.86 and 0.75, respectively.^{25,26} Values of 0.80 and 0.68 have been cited for non-depressed and depressed adolescent university students ($n = 1677$) in China.²⁷ The esteem score achieved by the young mothers in Rhondda Cynon Taff is low in comparison with scores in the above studies, which may indicate that the intervention was not sufficiently robust to raise their level of self-esteem.

Although the intervention provided much professional support, it had little effect on the availability of or satisfaction with the social support available to each client. Many definitions of self-esteem include a social component, and higher scores on the Short Form Social Support Questionnaire have been shown to be correlated with higher self-esteem.²⁸ Given the results on self-esteem, the absence of significant differences in the assessment of social support is not surprising.

A previous study of routine midwifery clients in their late twenties, randomized to receive usual care or increased domestic visits from support workers in their first postnatal month, also showed no significant benefits in terms of health (Short Form 36) or NHS service costs.²⁹ However, psychological intervention (cognitive-behavioural and person-centred approaches with the option of a selective re-uptake inhibitor) from specifically trained health visitors may provide

of pregnancy and delivery of a baby. The greater increase in physical activity in the intervention group was close to reaching significance, which demonstrates an encouraging trend for the project intervention on this dimension.

There was no evidence that the intervention had a substitution effect on the use of other NHS services, but it did appear to affect the use of non-NHS services. The small numbers using individual services means that these results need to be interpreted with caution, but overall, there was some success in this area. This is particularly evident with regard to contacts with the Family Planning Association, where 18 of 65 women in the intervention group attended compared with only one of 64 women in the control group.

Clearly, these results need to be interpreted in the light of the limited statistical power resulting from the constrained sample size. They highlight the importance of adopting a co-ordinated approach to development and evaluation which was not possible here. Bearing in mind these caveats, these results suggest that, in overall terms, the intervention did not significantly affect the main project outcomes. At the same time, there was much anecdotal evidence that those delivering and receiving the project services regarded it as a success; as demonstrated, for example, by the unwillingness of many of those in the intervention group to 'let go'. An internal audit undertaken during the period of the trial showed that women in the control group were discharged within 4 weeks after birth compared with between 2 and 6 months for the intervention group. Reasons for delayed discharge included problems with housing, parenting, drug and alcohol misuse, domestic abuse and behavioural problems, which are all social rather than health-related issues. The project provided extra assistance in all these areas, which appears to have been highly valued by those receiving its services. These benefits were not captured by the outcome measures used in this evaluation. In order to take full account of the inherent complexity of the enhanced service provision, the inclusion of a more substantive qualitative element in the project would have been beneficial.³⁰

Further limitations of this study include deficits in the measurement of natural support systems available to participants (i.e. partner and/or family), postnatal depression, breastfeeding duration, comprehensive information on smoking behaviour, and the measurement of longer-term outcomes as 4 weeks post partum may not have been sufficient to capture changes in some outcomes, particularly physical activity.

An intention to provide a summary measure of the overall

an appropriate intervention for enhanced midwifery services for the client group, although the study findings suggest that this should include a qualitative element to capture the full range of valued effects. Further research on the mental health profile of this local population of teenage mothers is warranted to improve current services.

Ethical approval

South East Wales Research Ethics Committee (04/WSE02/79).

Funding

Welsh Assembly Government Inequalities in Health Fund (Project 04/WSE02/79).

Competing interests

None declared.

Acknowledgements

The authors wish to thank Ms. Heather Rothwell, who was the original research midwife on the project; and members of the Pontypridd & Rhondda NHS Trust, particularly Dr. Paul Davies, Project Board Chair and Mrs. Kath McGrath, Director of Midwifery Services, who was the grant holder for the project.

R E F E R E N C E S

1. Coren E, Barlow J, Stewart-Brown A. The effectiveness of individual group-based parenting programmes in improving outcomes for teenage mothers and their children: a systematic review. *J Adolesc* 2003;26:79–103.
2. Logsdon MC, Birkimer JC, Simpson T, Looney S. Postpartum depression and social support in adolescents. *J Obstet Gynecol Neonatal Nurs* 2003;34:46–54.
3. O'Hara MW. Postpartum depression: what we know. *J Clin Psychol* 2009;65:1258–69.
4. Morrell CJ, Slade P, Warner R, Paley G, Dixon S, Walters SJ, et al. Clinical effectiveness of health visitor training in psychologically informed approaches for depression in postnatal women: pragmatic cluster randomised trial in primary care. *BMJ* 2009;338:a2975.
5. Reid V, Meadows-Oliver M. Postpartum depression in

11. Barker DJP. *Mothers, babies and health in later life*. Edinburgh: Churchill Livingstone; 1998.
12. National Assembly for Wales. *Health in Wales*. Cardiff: Rep Chief Med Officer (Wales); 2002.
13. Rosenberg M. *Society and the adolescent self image*. Middletown CT: Wesleyan University Press; 1989.
14. Sarason IG, Levine HM, Basham RB, Sarason BR. Assessing social support: the social support questionnaire. *J Pers Soc Psychol* 1983;44:127–39.
15. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003;35:1381–95.
16. Glendinning A, Inglis D. Smoking behaviour in youth: the problem of low self-esteem. *J Adolesc* 1999;22:673–82.
17. Steinhausen HC, Metkhe CW. The validity of adolescent types of alcohol use. *J Child Psychol Psychiatry* 2003;44:677–86.
18. Strauss RS, Rodzilsky D, Burack G. Psychological correlates of physical activity in healthy children. *Arch Pediatr Adolesc Med* 2001;155:897–902.
19. Braet C, Tanghe A, Bode PD, Frankx H, Winckel MV. Inpatient treatment of obese children: a multicomponent programme without stringent calorie restriction. *Eur J Pediatr* 2003;162: 391–6.
20. Harter S, Whitesell NR. Beyond the debate: why some adolescents report stable self-worth over time and situation, whereas others report changes in self-worth. *J Pers* 2003;7: 1027–58.
21. Jacobson LD, Wilkinson CE. Review of teenage health; time for a new direction. *Br J Gen Pract* 1994;44:420–4.
22. Fisher J, Astbury J, Smith A. Adverse psychological impact of operative obstetric intervention: a prospective longitudinal study. *Aust N Z J Psychiatry* 1997;31:728–38.
23. Kemp VH, Page CK. Maternal self-esteem and pre-natal attachment in high risk pregnancies. *Matern Child Nurs J* 1987; 16:195–206.
24. Marleau JD, Saucier JF. Pregnant women's social status, stress, self-esteem and their infants' sex ratio at birth. *Percept Mot Skills* 2000;91:697–702.
25. McVeigh C, Smith M. A comparison of adult and teenage mothers's self-esteem and satisfaction with social support. *Midwifery* 2000;16:269–76.
26. Connor JM, Poyrazli S, Ferrer-Wreder L, Grahame KM. The relationship of age, gender, ethnicity and risk behaviors to self-esteem among students in nonmainstream schools. *Adolescence* 2004;39:457–73.
27. Song Y, Huang Y, Liu D, Kwan JS, Zhang F, Sham PC, et al. Depression in college: depressive symptoms and personality factors in Beijing and Hong Kong college freshmen. *Compr Psychiatry* 2008;49:496–502.
28. Robinson K. The relationships between social skills, social support, self-esteem and burden in adult caregivers. *J Adv Nurs* 1990;15:788–95.
29. Morrell CJ, Spiby H, Stewart P, Walters S, Morgan A. Cost and effectiveness of community postnatal support workers: randomised controlled trial. *BMJ* 2000;321:593–8.
30. Moffatt S, White M, Mackintosh J, Howel D. Using quantitative and qualitative data in health services research – what happens when mixed method findings conflict? *BMC Health Serv Res* 2006;6:28.

