Can a community-led intervention offering social support and health education improve maternal health?: a repeated measures evaluation of the PACT project run in a socially deprived London borough at 6 month follow-up

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Research article

Keywords: maternal health, pregnant, community engagement, mental health, depression, anxiety

Posted Date: August 13th, 2019

DOI: <https://doi.org/10.21203/rs.2.12773/v1>

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Abstract

Background Social adversity can significantly influence the wellbeing of mothers and their children. Maternal health may be improved through strengthened support networks and better health literacy. Population level health improvement requires the optimizing of the collaboration between statutory services (e.g. midwifery and health visiting services), civic organisations (e.g. churches, schools) as well as community groups and parents themselves. Key elements in improving community engagement are co-production and community control. This study evaluates a co-produced and community-led intervention developed for ante-natal and post-natal mothers, offering social support and health education. The intervention was based in a deprived south London borough. **Methods** A pre-post design was used to assess changes in the maternal health of mothers before and 6 months after attending a weekly intervention offering two key elements: social support for mothers and children (called Mumspace), and health education for mothers (called Parent University). Measures used included depression (PHQ-9), anxiety (GAD-7), health literacy (New Vital Signs), social capital (ASSIS) and a satisfaction measure. **Results** Sixty-one mothers were recruited at baseline and 58 mothers (95.1%) followed up after 6 months. The PACT intervention attracted some “difficult to engage” mothers, specifically Nigerian (26.2%) and Latin American (9.8%) mothers, the proportion of which was 5.8% and 3.6% above that in census records. Significant improvements were found on depression and anxiety for all the mothers, but particularly significant changes were found for those with more severe problems at baseline. There were also improvements in health literacy for those with poor literacy at baseline, overall social capital as well as 4 out of the 8 specific aspects. Satisfaction with the service was high. **Conclusions** This community-led social support and health education intervention has engaged “difficult to engage” mothers, as well as found very positive outcomes from a 6 month follow-up of mothers. Improvements were found on mental health, with particularly marked changes in depression and anxiety of mothers with more severe problems. Improvements in health literacy and social capital were also found. This is a promising intervention for the maternal mental health of mothers. A more rigorous controlled trial is recommended to further examine its effectiveness.

Background

There is increasing evidence that social adversity has detectable effects on children, with these found early in development, with as well as evidence in utero, as well as later in childhood [1–3]. The importance of caring for the health of the mothers, not only for the sake of mothers but also for their children, is widely recognised [2, 4]. Ways of improving the maternal health include strengthening their support networks [2, 5], and improving their health literacy [6].

In order to reduce onset and burden of disease in populations facing high levels of social adversity, more effort and funding has to be devoted to prevention by improving the social determinants of health, particularly for young children [1–5]. Social determinants of health refer to social conditions including early childhood development, access to good quality education and decent living conditions. These approaches need to be applied at the community level, prior to referral to specialist health services. The

importance of communities being involved in their own health is widely recognised. It is likely that population level health improvement requires transformation of health service delivery by optimizing the use of community social capital. This would involve developing co-operative social networks among statutory services (e.g. midwifery and health visiting services, children's centres), civic organisations (e.g. churches, mosques, schools) as well as community groups and parents themselves. The UK National Institute for Health and Clinical Excellence in its public health guidance makes specific recommendations for enhancing community engagement, key themes within which are co-production and community control [7].

This paper describes the evaluation of an intervention developed for ante-natal and post-natal mothers which was co-produced and community-led, involving mothers themselves, statutory services (e.g. midwives) and local civic organisations (e.g. churches). The project was based in the south London borough of Southwark, which has high levels of multiple deprivations. The present project follows a pilot study which co-created a social support and health education project with local mothers. It also demonstrated the feasibility of local community leadership leading to perceived community control, and to improvements in social capital and mental health [8]. In this subsequent larger phase, a more structured health education programme as well as social support system has been offered. The community groups involved also wished to change the name of the project, from "*Strengthening Babies' Futures*" to *Parents and Communities Together* (PACT). As part of this process, the community groups worked with clinicians and researchers to plan together the strategy, approach and activities of PACT.

Like the pilot study, PACT involved collaboration between a community organising Charity, Citizens-UK and an academic Health Sciences, centre, King's Health Partners [9]. Citizens-UK is the largest community organising Charity in the UK [10]. It uses the 'broad-based' community organising model and methodology, which is well theorised, deriving from the work of Saul Alinsky in Chicago [11, 12] and which is applied by community organisations throughout the U.S.

Key features of the approach include building trust-based reciprocal relationships among individuals in already existing communities, particularly civic institutions (e.g. churches, schools), fostering networks among diverse institutions (health, voluntary/statutory, academic), developing community leadership, and working towards goals decided by communities. Citizens-UK employs paid, trained professional community organisers who work with volunteer community leaders. The broad-based community organising approach is well-suited to optimise community engagement using principles of co-production and community leadership as recommended by NICE as noted above. As in the Pilot Study, research clinical psychologists in King's Health Partners provided advice on evidence-based methods of reducing psychosocial stress, contributed to developing health education workshops and led on the evaluation methodology. New to this larger phase was the involvement of community maternity services, midwifery and health visiting who added their health knowledge and skills to the collaboration and evaluation.

The broad aim of this collaboration between Citizens-UK and King's Health Partners is to make use of the resources, leadership, social capital and potential peer leadership in existing civic institutions (e.g.

schools, churches) and to combine this with community health services (e.g. midwifery, health visiting) and clinical academic resources to translate evidenced-based health improvement technologies to benefit local mothers and children. It also uses the tools of community organising to build the capacity of local parents and communities to work with local statutory partners to provide social support for parents which improve children's early developmental outcomes and parental mental health outcomes.

We evaluated the PACT project using two sampling frames and designs. In one, the sampling frame was mothers who accessed PACT as a result of community organising, and the research design was assessment before and after the intervention. The sampling frame in the second evaluation was mothers attending midwifery who accessed PACT following recruitment into a research project with a quasi-experimental, case control design. This second evaluation, which also included assessment of infants 12 months post-natally, will be reported separately.

The main questions for this evaluation of the PACT project are who is accessing the intervention as a result of community organising and whether participation in the project led to improved mothers' mental health.

Method

Design

The aims of the study were:

- 1) To investigate the characteristics of mothers attending the intervention
- 2) To evaluate the effects of attending the intervention at 6 months' follow-up on maternal mental health, social capital, and health literacy.

A repeated measures design was used to assess changes between baseline and the 6 month follow-up.

Ethical approval was given by the King's College London Research Ethics Committee, REC Reference number HR15/162334.

Setting

This project was set in an inner-city London borough, focusing on two particular electoral wards with high levels of social deprivation and immigration. The intervention was based in three local hubs: one church, one church-related centre and one community centre. There were four part-time members of staff including a project manager (0.6 wte), a health visitor (0.6wte) and two group leaders (0.6 wte and 0.4 wte) who are mothers from the area themselves. In addition, there were 5 volunteers at a hub at any one session to help with childcare. In addition, there were local PACT Parent champions were ordinary parents/ key individuals from civic organisations (e.g. children centre, local primary school, churches and mosques) and community organisations (e.g. charities). They were trained to take on a new role in their

local community, speaking to other parents and signposting them to local services in the Borough, including PACT, and promoting the benefits of using such services for their children and the wider family.

Intervention

The aim of PACT was to use the tools of community organising to build the capacity of local parents and communities to work with local statutory partners to improve children's early developmental outcomes and parental mental health outcomes.

The PACT intervention aimed to improve social support (through Mumspace) and health education (formally through Parent University as well as informally in Mumspace).

a) The social support groups (Mumspace) were held weekly and ran for 2 hours. There were ongoing weekly groups at each of the three local hubs. Parents spent part of the session playing with their children and talking to other parents over a cup of tea and then part of the time in a separate space when volunteers helped with their children. They also participated in parent led workshops, on such topics as parenting, immunisations, importance of play and going back to work, motherhood, caring for children, parenting, and personal concerns. Topics for workshops were decided by participants in quarterly meetings. The greater joint decision-making created a welcoming and non-judgmental feel that reduced barriers that some communities report when accessing local statutory provision. There was also a Spanish-speaking group but this was not evaluated.

b) "Parent university" was a 12-week health education course co-designed with parents, health visitors and midwives which was co-led by parents and professionals. Parents with older children co-facilitated the group, with an emphasis on peer sharing rather than didactic teaching. Each session comprised a talk on a topic followed by discussion. Topics covered birth and childcare, mental health aspects in parenting, how hormones impact on feelings, health behaviours that benefit baby's healthy development, nutrition, infant learning, parenting skills and minor ailments. The parent university was co-ordinated by a health visitor and sessions lasted for two hours. Mothers "graduated" at the end of the course if they had completed 8 out of the 12 sessions.

Participants are invited to take part in both groups, and mothers could "graduate" from Parent University into Mumspace and vice versa.

In addition, at one of the sites, there was a "Baby Bank," where child clothing, equipment, and accessories were donated and given to mothers in need. Mothers were also given the opportunity to attend free or highly subsidized educational opportunities provided by PACT such as first-aid courses, parenting courses, healthy eating workshops, pregnancy yoga, meet-ups, etc.

Recruitment to PACT

The PACT project was open to any mother living in the area who wished to attend. A total of 425 mothers participated over the 30 months of the project. Mothers self-referred after being sign-posted, often by the Parent Champion, from nearby civic organisations (e.g. churches, mosques), statutory organisations (e.g. local health visiting teams, midwives, maternity clinics, Childrens' centres), 'leafleting' or word of mouth. The Baby Bank also played a role in recruitment because mothers who initially came for the donated baby supplies would then be signposted to the intervention by volunteers and group leaders.

Inclusion criteria for research project were that: Participants had to be over 18, female, the parent of at least 1 child, and speak sufficient English to complete the questionnaires. Mothers would also have attended the intervention for less than 2 months at baseline. *The sample size power calculation* was based on pilot study data which showed a pre to post standardised mean difference of $d = .51$ on the GHQ-12 (Bolton et al. 2016). However, given the larger scale of this project, we conservatively expected a 25% lower effect size of 0.38. Based on this expected effect size, a sample size of 54 (significance level 5% and power 80%) was required. Attrition was zero in the pilot but in view of the larger scale of the study, we allowed for a higher rate of 12.5%, increasing the total sample target size to 61.

All mothers participating in the PACT intervention were invited to take part in the evaluation study. Research recruitment ran from May 2016-June 2017, with the last follow-up taking place in December 2017.

Measures

Sociodemographic data

Age, place of birth, ethnicity, occupation, relationship status, number of children, first language, and partner's occupation status were collected. Occupational class was computed by analysing the employment status and occupation title of the household member with the highest classification, using the guidelines by CeLSIUS [13].

'Difficult to engage' groups have been defined in different ways [14, 15]. This term has sometimes been used judgementally and the patient is seen as difficult [16]. In this study, we defined 'difficult to engage' as groups who did not engage with local services because of their socio-demographic factors (e.g. ethnicity) [17, 18]. A local council had commissioned two research projects, which identified 'hidden populations' within the borough, as their low response to the census which was also found to correlate with low engagement with local services [17, 18]. This was found to be related to poor language skills, shifting households, lack of awareness of services, and immigration concerns. We therefore used information about these 'hidden populations' to identify our 'difficult to engage' groups.

Engagement with PACT service

Engagement with the intervention was measured using participants' attendance to the sessions offered by PACT. This included Mumspace, Parent University, and any other PACT workshops or events. The time period measured was from the participant's first session with PACT to the follow-up meeting 6 months later. Levels of engagement were defined as: 1–2 sessions attended = not engaged, 3–4 sessions attended = somewhat engaged, and 5+ sessions attended = fully engaged.

Maternal Mental Health

The *Generalized Anxiety Disorder Questionnaire (GAD-7)* is a widely used and reliable 7-item measure which assesses Generalized Anxiety Disorder [19]. A 3 point Likert scale is used: Not at all (0), Several Days (1), More than Half the Days (2), and Almost all the time (3). Scores of 5, 10, and 15 are the cut-offs for mild, moderate, and severe levels of anxiety [19]. The 'caseness' threshold is defined as ≥ 8 on the GAD-7.

The *Patient Health Questionnaire (PHQ-9)* is a widely used and reliable 9-item measure which assesses Major Depressive Disorder [20]. A 3 point Likert scale is used: Not at all (0), Several Days (1), More than Half the Days (2), and Almost all the time (3). Scores of 5, 10, and 15 are the cut-offs for mild, moderate, and severe levels of depression [20]. The PHQ-9 threshold is ≥ 10 .

Health Literacy

The *Newest Vital Sign UK (NVS-UK)* [21] is a commonly used brief measure for assessing health literacy [22]. Six questions assess participants' ability to interpret health information from a nutritional label on the back of an imaginary carton of ice cream and a wrong answer = 0 and a right answer = 1. The scores are categorised as adequate/high (4 or more), limited/intermediate (2–3) or low (0–1) health literacy [21].

Social Capital

Social capital is a complex construct comprising various components [23, 24] and there is continued debate about its exact definition and measurement [25, 26]. We used several measures for the PACT evaluation which will be more fully presented in a separate paper. We report here the findings from the Arizona Social Support Interview Schedule (ASSIS), a measure of social support, which is one aspect of social capital.

The Arizona Social Support Interview Schedule (ASSIS)

The Arizona Social Support Interview Schedule (ASSIS) captures data about many facets of social support networks and their members, and aims to assess perceived social support and quality of support [27, 28]. The areas of 7 support are Intimate Interaction, Childcare, Material Support, Advice & Information, Positive Feedback, Tangible Assistance, and Socializing). The version administered in this study collected

data about the number of network members for each area of support, satisfaction for each area, and demographic information (e.g. age, sex, ethnicity, years known to participant, proximity) about network members. The outcomes analysed included the total network members for each area of social support, total network size, and total network satisfaction at baseline and follow-up.

Satisfaction with service

The Social Support Programme Acceptability Rating Scale (SSPA-RS) is an adaptation of the Treatment Acceptability Rating Scale [29] which was previously used in the pilot study of this intervention [8]. Areas covered include satisfaction with the programme offered as well as opportunities to help plan the programme. Participants are asked seven questions about different areas of their satisfaction of the programme on a scale from 0 (not at all) to 3 (a great deal) with scores summed into a total score.

Procedure

PACT intervention staff initially approached eligible mothers about the possibility of being involved in a research project. If the mother agreed to be contacted, the staff member would personally introduce them to one of the researchers. The researcher would explain the project which involved answering questions at baseline and after 6 months. They then explained the consent process and gave mothers an information sheet and answered any questions about being involved. It was made clear that research involvement was not related to attendance at Mumspace or Parent University, and that they could drop out of the research at any time and to continue attending with no consequences.

After a cooling off period of 24 hours, the researcher called the potential participant, and if the mother was still willing to participate, the researcher and participant agreed to meet to sign the consent form and complete the baseline assessment. Assessments usually took place at participants' houses, private rooms at intervention sites, or private areas in public spaces, such as local cafes or the library.

As a compensation for the participants' time at both baseline and 6-month assessments, £30 shopping vouchers were given. In the 6 months between baseline and follow-up, research participant mothers were treated no differently to non-participants, and attendance was not incentivized or expected.

After 6-months, participants, regardless of attendance at PACT, were contacted by the research worker to arrange a follow-up and the baseline assessments re-administered together with the satisfaction measure (SSPA-RS).

Results

Of the 90 women who were approached to participate in the study, 29 refused and 61 agreed to take part in the study (67.78%). Of the 61 mothers, 58 participants (95.1%) were re-assessed after 6-months(95%). There were 3 drop-outs, as 2 participants moved away and 1 could not be re-assessed.

Mothers largely lived locally, in Camberwell (51.7%) and Walworth (23.3%) wards in the borough of Southwark.

Engagement

Of the 61 mothers, 93.4% engaged with the intervention to varying extents. In all, 72.1% ($n = 44$) of participants were fully engaged with the project, attending 5 or more sessions offered by the intervention in 6 months. 21.3% ($n = 13$) were somewhat engaged, attending 3–4 sessions. Only 6.6% of participants did not engage with the project, attending only 1 or 2 session.

Sociodemographic characteristics

The average age of participants was 34 (SD = 6.1) (22–53 years). While participants were required to speak English to be involved in the study, most mothers (61.7%) did not have English as their first language. The majority of participants identified themselves as ethnically Black African (51.7%), mainly from Nigeria and Eritrea. The other main ethnic groups were White British (11.5%), White Other (11.5%) who were mainly from Europe, and Latin American (9.8%) who were mainly from Ecuador. The majority of participants themselves were unemployed (62.3%) but when taking into account the participant and partner’s employment status, this reduced to 37.9% of householdsbeing unemployed. Additional demographic data collected is displayed in table 1.

Table 1 about here

We use the term “difficult to engage” to describe mothers who were not engaging with services because of their socio-demographic factors, such as their ethnic background and socio-economic status. It was not meant to be a negatively judgemental term criticising mothers for being difficult[16] but more of a descriptive term about how some mothers have found it difficult to access formal services as they are currently provided. In other words, it is about how the services being provided may not ‘fit’ with the preferences of their clients, in this case, the mothers of young children or those who are pregnant, thus leading to difficulties and hence reduced engagement.

Maternal mental health - Anxiety and depression

Anxiety

At baseline, the mean GAD–7 score was 6.87 (SD 5.6), with a range of 0–20, indicating that, on average, mothers scored in the mild anxiety range. Approximately one-third of the sample (34%; $n = 21$) scored above the ‘caseness’ threshold scoring at or above 8 on the GAD–7 at baseline, and had mean scores of 13.43 (SD 3.87) and a range of 8–20 (see table 2).

At follow-up, there was an overall decline in GAD–7 scores, of approximately 0.4 standard deviations. These differences are statistically significant ($t = 3.36$; $df = 57$; $p = .001$) (see table 2). This gives a Cohen’s effect size [30] of 0.44 for the GAD–7, which is a small/medium effect size.

Of the 21 participants who were ‘cases’, there is a larger decline in scores, of approximately 1.7 standard deviations. This difference is statistically significant ($t = 6.57$; $df = 19$; $p < .001$) (table 2) and equates to a large Cohen effect of size of 1.47. Among this group, 80% ($n = 16/20$) had recovered to below the ‘caseness’ threshold on the GAD–7.

Table 2 about here

Depression

At baseline, the mean PHQ–9 score was 7.66 (SD 6.37), with a range of 0–23, indicating an average score in the mild depression range. Just over one-third of the sample (23/61, 38%) were scored at or above the ‘caseness’ threshold of 10, with a mean score of 14.61 (SD 4.44), range of 10–23. Table 3 shows scores on the PHQ 9 at baseline and follow-up.

At follow-up of all mothers ($n = 58$), there was an overall significant decline on PHQ–9 scores on a paired samples t-test ($t = 3.78$; $df = 57$; $p < .001$). This equates to a Cohen medium effect size of 0.5 (Table 3).

Of the 23 ‘cases’, the decline was statistically significant ($t = 6.17$; $df = 21$; $p < .001$) (table 3), giving a Cohen large effect of size of 1.32. Just over 68% (15/22) had recovered to below the ‘caseness’ threshold on the PHQ–9.

Table 3 about here

Health literacy

When using total scores, no overall pre-post changes were found for health literacy on the Newest Vital Sign UK.

However, a further analysis based on the categorisation of literacy into low ($n = 13$), intermediate ($n = 23$) and adequate/high literacy ($n = 19$) was carried out. This showed significant positive changes among the sub-group of mothers within the low literacy category but not the high or intermediate literacy categories ($\chi^2 = 16.1$, $df = 4$, $p = 0.003$) (table 4).

Table 4 about here

Social support/social capital

When the social capital data was analysed, significant increases between baseline and 6 month follow-up were found on 4 out of the 9 areas (see table 5).

There were positive changes in total satisfaction ($p < 0.05$), total number of people for advice/information ($p < 0.001$), the total number for intimate interaction ($p < 0.05$), total number of people for pregnancy/childcare support ($p < 0.05$). The support reported for tangible assistance just missed significance ($p = 0.057$).

Reported changes in support with material aid, positive feedback, socialising and the support network size were not significant.

Table 5 about here

Satisfaction with programme

High rates of satisfaction were reported on the SSPRA-RS with a total score of 15.23 out of a possible 21 (table 6). Participants rated highly how much they liked the programme that was provided (2.54), whether it was provided or not (2.32), liked the people providing the support (2.73), the programme making life better (2.3) and generally being satisfied with the programme (2.59).

Table 6 about here

Discussion

The aim of PACT was to improve children's early development and parental mental health outcomes. A basic premise is that it is likely that population level health improvement requires transformation of health service delivery by optimizing the use of community social capital. It aims to develop social capital by increasing the capacity of local parents and communities to work with local statutory partners. It also aimed to improve community engagement, a key component of improving public health by using co-production and community control in developing and running the programmes.

The PACT project is an unusual community project because it is collaboration of 3 organisations—firstly, a charity, Citizens UK which uses community organising with health, secondly, a university partner, and thirdly, statutory maternal health organisations (e.g. midwifery, health visiting).

The PACT project was run in Southwark, a highly deprived borough in London. The results from this study support the results from the previous study where community organising was successfully applied to health for the first time [8]. The results of this evaluation show that PACT was very successful in engaging a diverse population of mothers as well as effecting change.

1. Access

Gask et al [31] have described how a potentially large number of barriers can stop 'difficult to engage' groups accessing services. These barriers relate to different factors that may make engaging with present services difficult. These can include cultural norms, GP obstacles as well as the psychosocial intervention itself. However, the PACT project did successfully engage a diverse group of people from different ethnic groups, with just under 52% identifying themselves as Black African, with 26.2% Nigerian, and 9.8% Latin American. This contrasts with the 2011 Census records which report only 4.7% Nigerians and 2.7% Latin Americans live in the borough of Southwark [32]. Further, PACT participants have a different profile compared with patients attending the local psychology service (Southwark IAPT) where approximately 60% identified themselves as "white British" [33]. In IAPT, patients are largely referred by their GPs whereas PACT participants are more similar to those who refer themselves, who do not go through their GP [34] and who are more likely to be more representative of the local population [35].

Several factors may contribute to this. Firstly, PACT's notable success with diversity and two 'hidden populations' in the borough of Southwark may be due to the project's involvement with local mosques and churches, which often provide supportive services to recent immigrant groups unaware of or unwilling to engage with statutory services [17, 18]. Secondly, the collaborative and grassroots structure of PACT may contribute to culture of community engagement. As PACT is primarily run by women from the area, involving only one health professional, a health visitor, it probably fits in with a commonly found pattern of people preferring to seek informal help from friends, family and trusted non-professionals rather than professionals [36]. Participating mothers also co-produce interventions by choosing, designing, and often running the daily programmes. The community-led PACT intervention may therefore provide a feasible gateway to health and social services for populations who may feel more insecure and otherwise be unlikely to engage with the statutory services. Thirdly, how mothers perceive their problems also affects help-seeking and engagement. African women are more likely to see mental health problems as caused by social problems rather than medical problems [37]. Because PACT was not set up as a mental health service but as a service for all mothers, it would have made it easier for African women to engage.

- High engagement with those with depression and anxiety

Even though mothers were referred from a variety of sources including health as well as faith organisations, the level of mental health distress of participants was very high. About a third of mothers scored above the clinical threshold on the depression and anxiety measures used. Data from representative population samples is scarce. For a nationally representative German sample, Kocalvent et al. ([38]) found a prevalence of moderate to high depression, using the PHQ-9 ≥ 10 caseness threshold, as 5.6%. Further, NHS data for 2016-17 shows prevalence of depression in adult population (18+) in general practice registers in the borough of Southwark as being 7.5%, and estimated common mental disorders in the population as 18.3%.

These figures of 30% are among the highest in London, reflecting the relatively high multiple deprivation of the borough. They also suggest that the rates of anxiety and depression in the sample are higher than the average in the borough, and that the PACT project is able to engage distressed community participants at higher than base rates in the local areas.

- Effectiveness of intervention for depression and anxiety

The PACT intervention of offering social support and health education led to improvements at 6 months in depression as well as anxiety for the whole sample, with significant changes equating to a small effect size for anxiety and a medium effect size for depression. The results of this study therefore show that the intervention was likely to be effective in improving the mental health of the mothers.

Further, there were even more marked improvements for mothers who initially started off on depression and anxiety as 'cases'; the significant changes equated to large effect sizes for both anxiety and for depression. Another analysis showed that 80% of mothers who were 'cases' recovered to below case thresholds on their anxiety scores and 68% recovered to below threshold on their depression scores. However, it needs to be noted that the analysis is likely to be underpowered because the numbers were very small.

Distress scores were not systematically shared with the intervention team. Mothers who were categorised as 'cases' could therefore be referred to health professionals for support if mothers disclosed their distress to staff. The possibility of this process therefore systematically affecting the results is therefore unlikely.

- Social capital/support

There were also significant improvements for mothers in terms of social capital/support in the increases in total number of people for intimate interaction, total number of people for pregnancy/childcare support, total number of people for advice/information as well as total satisfaction. This is again quite a significant improvement after 6 months. The fact that mothers felt much more able to talk to others about personal matters, especially to do with their children and felt more able to generally get advice and information compared to baseline is important. This aspect may be helpful in the effects of the intervention being maintained, given that social support and informal help-seeking is a key component of the prevention of depressive problems [39].

- Health literacy

There were no pre-post improvements on health literacy on the NVS (see Table 6) which was probably due to most mothers having reasonable levels of health literacy. However, a further analysis showed that the mothers with low literacy improved significantly, and much more so than the mothers with high or adequate literacy. This probably indicates that the mothers with intermediate or high literacy could not improve any further. The qualitative component of this study which is separately reported [40] shows that mothers reported increased confidence to handle their babies following attendance at PACT.

- Satisfaction

Mothers generally felt satisfied with the programme delivered and who delivered it (see Table 8). However, they did not report that they were particularly involved in the planning and proactively making changes to suit them. Compared to scores from the pilot study [8], results are generally comparable although the co-production items (planning, making changes) were marginally worse (2.13 and 1.8) previously.

Strengths

The strengths of this study include the evaluation of a low-cost intervention with 4 part-time staff (including one NHS employee) and five volunteers per site offering an intervention which mothers seemed to use and enjoy attending, as gauged from attendance figures and satisfaction results. PACT also engaged groups who may have felt too threatened to use statutory services. Finally, the intervention offered appeared to be effective both in terms of improving mental health as well as social support/capital.

Limitations

This is a pre-post study and so the factor of time and extraneous factors affecting improvement cannot be excluded. While difficulties running a randomised controlled trial in the community are widely acknowledged (e.g. MRC complex interventions[41]) a controlled trial is needed for a more rigorous examination of the effects of this intervention.

Conclusions

In summary, this community-led intervention which extensively used co-production to make use of and develop the social capital in the community has led to positive outcomes in terms of access for difficult to engage mothers, as well as improvements for those with more severe mental health problems.

Abbreviations

“Parents and Communities Together” is referred to as *PACT*

Generalized Anxiety Disorder Questionnaire is referred to as *GAD-7*

Patient Health Questionnaire is referred to as *PHQ-9*

Newest Vital Sign UK is referred to as *NVS-UK*

The Arizona Social Support Interview Schedule is referred to as *ASSIS*

Declarations

Ethics approval and consent to participants

Ethical approval was given by the King's College London Research Ethics Committee, REC Reference number HR15/162334. Written consent form was obtained from all participants.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

No competing interests are declared.

Funding

This work was supported by the Guy's & St Thomas' Charity (MAJ141101); and the National Institute for Health Research (NIHR) Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London, to JB and DB This paper represents independent research part funded by the National Institute for Health Research (NIHR) Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

Authors' contributions

JB was the lead author; JB and AL wrote the first draft, DB analysed some of the data, helped design the study and commented on the paper, JN contributed details of the intervention and commented on the paper, MB and ISM helped design the study and commented on the paper. All have agreed to be responsible for their contributions to the paper.

Acknowledgements

We thank the participating member institutions of South London Citizens and individuals within them for their collaboration in the project and especially the mothers who took part.

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Tables

SOCIODEMOGRAPHIC FACTORS	CATEGORIES	NUMBERS	PERCENTAGES
Ethnicity	Black African White British White any other background Latin American Asian	34 7 7 6 3	55.7% 11.5% 11.5% 9.8% 4.9%
Employment status	Unemployed Working part-time Working full-time Student	38 11 10 2	62.3% 18% 16.4% 3.3%
Relationship Status	Married/living with someone Single In a steady relationship Divorced/separated	31 20 5 5	50.8% 32.8% 8.2% 8.2%
Household Occupational Class	Professional Managerial and Technical Skilled non-manual Partly-skilled Unskilled Unemployed Student	7 7 1 14 6 22 1	11.5% 11.5% 1.6% 23% 9.8% 36.1% 1.6%
Highest Educational Qualification	Postgraduate degree Undergraduate Degree BTEC/NVQ or equivalent A level or equivalent GCSE or equivalent	6 25 10 7 6	9.8% 41.0% 16.4% 11.5% 9.8%

Table 1. Sociodemographic details of mothers in the PACT study (n=61)

Table 2: Anxiety scores (GAD-7) at baseline and 6 month follow-up

	Scores	number	Mean (SD)	Significant differences between baseline and follow-up scores
Overall group	Baseline	61	6.87 (5.62)	
	Follow-up	58	4.76 (3.85)	p=0.001, t=3.36, df=57
<u>SUB-GROUPS ON CASENESS</u>				
Cases	Baseline	21	13.43 (3.87)	
	Follow-up	20	6.75 (4.66)	p=0.000, t=6.57, df=19
Non-cases	Baseline	40	3.43 (2.37)	
	Follow-up	38	3.71 (2.91)	

Table 3: Depression scores (PHQ-9) at baseline and follow-up

	Scores	number	Mean (SD)	Significant differences between baseline and follow-up scores
Overall group	Baseline scores	61	7.66 (6.37)	
	Follow-up scores	58	4.83 (4.15)	p=0.000, t=3.78, df=57
<u>SUB-GROUPS ON CASENESS</u>				
Cases	Baseline scores	23	14.6 (4.44)	
	Follow-up scores	22	7.23 (4.84)	p=0.000, t=6.17, df=21
Non-cases	Baseline scores	38	3.45 (2.44)	
		36	3.36 (2.86)	

Table 4: Levels of health literacy on NVS

Levels of literacy	Number
low literacy	13
intermediate literacy	23
adequate/high literacy	19
Total	55

Table 5: Changes in Social support

Factor	number	Baseline	6 month follow-up	t	Significance
Total number of people for Intimate Interaction	58	2.81 (1.83)	3.34 (1.79)	-2.411	0.019
Total number of people for Pregnancy/Childcare support -	58	1.62 (1.3)	1.98 (2.0)	-2.009	0.049
Total number of people for Material Aid -	58	1.81 (1.68)	1.91 (2.17)	-0.388	0.7
Total number of people for Advice/Information	58	1.98 (1.66)	3.21 (3.1)	-3.528	0.001
Total number of people for Positive Feedback	58	3.6 (5.32)	3.33 (2.77)	0.411	0.682
Total number of people for Tangible Assistance	58	2.03 (2.32)	2.52 (2.87)	-1.941	0.057
Total number of people for Socialising	58	3.83 (5.42)	4.07 (3.17)	-0.392	0.696
Support network size total	58	7.72 (6.04)	8.28 (4.62)	-0.758	0.45
Total satisfaction	58	6.16 (0.82)	6.35 (0.53)	-2.062	0.04

Table 6: Satisfaction with programme:

	N	Mean	Std. Deviation	
Did you feel involved in helping to plan what social support you would find helpful?	56	1.55	0.933	
Did you feel able to make changes to the plan to suit your needs during the programme?	56	1.25	0.899	
Was the planned social support actually provided?	56	2.32	0.716	
Did you like the way the programme was provided to you?	56	2.54	0.538	
Did you like the members of the community who were providing the support?	56	2.73	0.522	
On balance, did you find that the programme made life better for you?	56	2.3	0.807	
In an overall, general sense, how satisfied are you with the programme?	56	2.59	0.565	
Total score	56	15.23	3.185	