

Living Smart, Living Fit: A Patient-Centered Program to Improve Perinatal Outcomes in a Community Health Center Population

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Abstract

Background: Depression and obesity/overweight during pregnancy are important public health concerns, as they are frequently associated with poor birth outcomes. The Living Smart, Living Fit[®] (LSLF) program was an intervention program initiated in 2008 to provide comprehensive care to low-income pregnant and postpartum women with elevated body mass index (BMI) and depressive symptoms. It linked patients to clinical care coordinators trained in motivational interviewing who promoted participation in a portfolio of mental and physical wellness activities. **Objective:** The objective of this study was to evaluate the effectiveness of LSLF in improving depression, BMI, birth weight, and smoking status among low-income perinatal patients. **Methods:** Women with Patient Health Questionnaire (PHQ-9) depression scores ≥ 10 and/or BMI > 25 kg/m² at their prenatal intake visit were eligible for enrollment into the LSLF program. Enrolled participants met with clinical care coordinators who encouraged engagement in a portfolio of LSLF activities that included pregnancy/family, physical health, and mental health interventions. Outcomes were measured at the 6-week postpartum visit and included change in PHQ-9 scores, change in BMI, birth weight, and change in smoking status. **Results:** Of the 107 enrollees, 86% participated in some LSLF activity. Participation in pregnancy/family related activities was significantly associated with decreased PHQ-9 scores. Participation in mental health services was significantly associated with increased birth weight. No changes in BMI or smoking status were associated with LSLF involvement. **Conclusions:** The findings of this pilot study indicate that pregnant women with depression or obesity/overweight can benefit from care coordination and a portfolio of activities for mental and physical wellness. The LSLF program provides a model for delivering this patient-centered comprehensive support. Further research should include more controlled trials to better evaluate the effectiveness of LSLF intervention.

Keywords

community health, obesity, physical activity, health promotion, health outcomes, perinatal care

Depression and obesity are critical public health issues, particularly during pregnancy. Perinatal depression has been linked to poor fetal growth and neonate health, and more frequent neonatal special care.¹⁻³ Postpartum depression has negative effects on parenting and child health.⁴⁻⁶ Women who are overweight (body mass index [BMI] = 26.1-29.0 kg/m²) and obese (BMI > 29.0 kg/m²) have increased risk of perinatal complications such as diabetes, hypertension, abnormal labor, cesarean delivery, congenital malformations, and offspring obesity.^{7,8}

Together, these findings highlight the importance of reducing perinatal depression and obesity/overweight, with special attention to women experiencing both risks. Unfortunately, less than 25% of pregnant and postpartum women with depression receive any mental health treatment.^{9,10} The gap between needs and services reflects a

missed opportunity for reaching vulnerable women. Women's close contact with the medical system during the perinatal period provides a window of opportunity for linking depressed or overweight patients to appropriate services. Services at this time may be more successful because patient motivation for change is often heightened during pregnancy, and there are fewer racial/ethnic and

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economic disparities in prenatal care than other areas of medical treatment.¹¹

There is growing evidence that brief intervention efforts based on the principles of motivational interviewing and goal-setting self-management increase treatment utilization among low-income populations.¹² In addition, case management services and individualized contact between provider and patient may boost treatment initiation.¹³ In 2008, The Living Smart, Living Fit (LSLF) program was initiated to better serve low-income pregnant and postpartum women with elevated BMI and/or depressive symptoms. Specifically, care coordinators trained in motivational interviewing met individually with women with identified risk factors to promote engagement in a portfolio of healthy eating, physical activity, and mental health services. We hypothesized that using motivational interviewing and offering a variety of services would improve perinatal depression, BMI, and birth outcomes.

Methods

Study Site and Participants

Community Health Center, Inc (CHCI), is one of the largest providers of medical, dental, and behavioral health to the uninsured and underinsured across Connecticut, serving more than 130,000 primary care patients annually at 13 sites. More than 60% of patients are racial/ethnic minorities and 92% are at or less than 200% of the federal poverty level. Although CHCI's pregnancy health indicators are above average for health centers,¹⁴ the risk of obesity and depression are disproportionately high among CHCI's patients during the perinatal period. In all, 33% of women experience perinatal depression and more than 70% of women of childbearing age are obese/overweight. Less than 40% of women with perinatal depression accepting a referral access behavioral health care.¹⁵ More than 900 women were screened for obesity and depression from August 2008 to July 2011. A total of 107 women were enrolled in the LSLF program in CHCI's 3 prenatal sites. Study outcomes of interest included changes in depression (based on initial and final PHQ-9 [Patient Health Questionnaire] scores), change in BMI, birth weight, and postpregnancy smoking among initial smokers.

Procedure

All patients who had a pregnancy intake visit were eligible for referral to the LSLF program. At intake, BMI was calculated and patients completed the PHQ-9, a measure of depressive symptoms widely used in primary care.¹⁶ Women with a PHQ-9 score ≥ 10 or documented mood

disorder or BMI >25 kg/m² were eligible for referral to LSLF. Intake staff scheduled eligible participants for an appointment with a clinical care coordinator (CCC).

At the initial LSLF visit, CCCs used motivational interviewing to help the patient establish self-management goals. Patients were encouraged to participate in any of the available LSLF activities and services. The CCCs maintained contact with the patient through in-person meetings or telephone calls throughout the pregnancy and until the postpartum visit or attrition occurred. Services were provided in English or Spanish. Outcome data was collected at the 6-week postpartum visit.

Data Collection, Management, and Analysis

Institutional review board approval for this study was obtained through CHCI's institutional review board (IRB ID 1016). Data were collected from electronic medical records and stored in secured spreadsheets maintained by research staff. Data were de-identified prior to analysis. Analyses were performed with SPSS 18 (Windows version 18.0, SPSS, Chicago, IL).

Results

The average participant age was 26.7 years (range = 16-43 years). In total, 48% of women were Hispanic/Latina and 18% were African American. Of the participants, 85% women made first LSLF contact during pregnancy (65% first trimester), while 15% were postpartum. At entry, 76% of women had a history of mood disorder (depression, bipolar disorder, and/or anxiety) and 93% and 38% of women had initial BMI greater than 25 and 30 kg/m², respectively (range 19-56 kg/m²). On average, women received 2.5 phone calls from LSLF staff (range = 0-13, SD = 2.4) and had 3.5 in-person contacts (range = 0-25, SD = 3.8). Ninety-two enrollees (86%) participated in some LSLF activity. For analytic purposes, types of activities were grouped into 3 categories (Table 1): pregnancy or family services, physical health, and mental health/stress. LSLF participants who did versus those who did not engage in these 3 activities were compared on health outcomes using repeated-measures analysis of variance (for change in PHQ-9 scores and BMI), analysis of covariance (for birth weight), and χ^2 analysis (for smoking; Table 2). Although this type of analysis may be affected by selection bias (eg, women used the services they needed most), we controlled for baseline scores to protect against this possibility. For each outcome, only a subset of women had follow-up data because of attrition or incomplete data collection. There were no significant differences in women with and without follow-up data on initial PHQ-9, BMI, and demographic characteristics.

Table 1. Participation and Attrition Rates^a by Intervention Type

Program Type	Participation	Have Final Outcome Data; n (%)	No Final Outcome Data; n (%)
	Total Sample (n = 107)	68 (64)	39 (36)
Physical health programs: Nutritional services and counseling, activities at Vinnie's Jump and Jive movement and dance studio, smoking cessation	Yes (n = 54)	36 (67)	18 (33)
	No (n = 53)	32 (60)	21 (40)
Mental health programs: Behavioral health care, the Stress Reduction Program, Blue Mamas group	Yes (n = 32)	19 (60)	13 (40)
	No (n = 75)	49 (65)	26 (35)
Family/pregnancy programs: Centering Pregnancy, breast-feeding or childbirth education, Infant Massage classes, Family Wellness Center activities, Nurturing Families Network	Yes (n = 45)	33 (73)	12 (27)
	No (n = 62)	35 (56)	27 (44)

^aAttrition rates did not vary by participation in any type of intervention.

Table 2. Outcomes per Participation in Each Category of Intervention Services

Interventions/Outcomes		Depression (Decline in PHQ-9 Points)	Final BMI	Average Birth Weight	Low Birth Weight (% of Sample)	Postpregnancy Smoking (Among Initial Smokers) (%)
Pregnancy/family services	Involved	3.8 (SD = 4.4), n = 24	33.7 (SD=7), n = 32	3463 (SD = 668), n = 33	0.0, n = 33	67, n = 6
	Not involved	<1.0 (SD = 5.7), n = 21	33.9 (SD = 9.0), n = 35	3351 (SD = 695), n = 35	10.6%, n = 35	63, n = 7
Physical health services	Involved	3.38 (SD = 5.0), n = 24	34.4 (SD = 6.8), n = 36	3432 (SD = 742), n = 36	11.1, n = 36	70, n = 10
	Not involved	1.33 (SD = 5.4), n = 21	33.2 (SD = 9.7), n = 31	3376 (SD = 612), n = 32	3.2, n = 32	50, n = 4
Mental health/stress reduction services	Involved	1.8 (SD = 6.3), n = 14	33.5 (SD = 6.8), n = 19	3694 (SD = 690), n = 19	9.4, n = 19	67, n = 6
	Not involved	2.5 (SD = 4.9), n = 31	33.9 (SD = 8.8), n = 49	3295 (SD = 648), n = 49	5.7, n = 29	63, n = 8
Any LSLF services	Involved	2.7 (SD = 5.4), n = 5	33.4 (SD = 7.2), n = 15	3443 (SD = 693), n = 53	7.7, n = 4	61, n = 7
	Not involved	+1.2 (SD = 2.7), n = 40	35.4 (SD = 11.2), n = 52	3278 (SD = 636), n = 52	6.7, n = 1	100, n = 1

Abbreviations: PHQ-9, Patient Health Questionnaire; BMI, body mass index; LSLF, Living Smart, Living Fit program.

Forty-five women had initial and final PHQ-9 data. For these women, average PHQ-9 scores went down significantly from 8.6 (SD = 4.7; 34% elevated) at baseline to 6.3 (SD = 6.2; 22% elevated) at follow-up, $F(1, 44) = 8.43$, $P = .006$. In repeated-measures analysis if variance, involvement in pregnancy-/family-related activities was significantly associated with a greater decrease in PHQ-9 scores, $F(1, 43) = 4.76$, $P = .04$. The 24 women who participated in pregnancy-/family-related activities showed a 3.8 point decline, whereas the 21 nonparticipants had less than a 1 point decline. At final assessment, 38% of nonparticipants versus 8% of participants had elevated PHQ-9 scores ($\chi^2 = 5.7$, $df = 1$, $P = .02$). Involvement in mental health/stress or health activities did not predict change in PHQ-9 scores.

Sixty-three women had initial and final BMI scores. The average BMI at baseline was 34.3 kg/m² (SD = 8.2) and at final assessment was 34.2 kg/m² (SD=8.16). None of the 3 types of interventions were associated with change in BMI.

Sixty-eight women had birth outcome data available. The average birth weight was 3406.3 g (SD = 680). Birth weight was significantly associated with participation in mental health services, $F(1, 66) = 5.01$, $P = .03$, but not pregnancy/family or physical health activities. The average weight of the babies of the 19 women who participated in mental health activities was 3694 g (SD = 690; 0% low birth weight) compared with 3294.7 g (SD = 648) for the babies of the 47 nonparticipating women (10% low birth weight). These results remained statistically significant

after controlling for initial PHQ-9 scores and mood disorder to control against initial selection bias.

No differences were evident in changes in smoking based on LSLF participation.

Follow-up analyses were also conducted to examine dose–response effects between amount of activities or phone contact and health outcomes. No associations were found.

Discussion

This pilot study evaluated the LSLF program, with a portfolio of services (pregnancy-/family-related, mental health, and physical health services) and motivational interviewing, and its ability to improve depression, BMI, and birth outcomes in an underserved population. Participation in pregnancy-/family-related activities was associated with depression improvement as manifest by decreased PHQ-9 scores. Participation in mental health services was associated with higher birthweight. No changes in BMI or smoking status were associated with LSLF involvement.

Assessment of the “effectiveness” of LSLF intervention is limited in several ways. First, only a subset of women (n = 45-67) had final PHQ-9, BMI, or birth outcome data available. Additionally, outcomes such as low birth weight were low base rate phenomena; consequently, there was low statistical power to detect potential group differences. There was also no true control group or benchmark data available to compare participants with to determine program effectiveness. Given these caveats, outcome data should be viewed as preliminary until more controlled trials can be conducted.

Despite these limitations, statistically significant effects were noted in several areas. Participation in pregnancy- and family-related activities was associated with a significant reduction in depressive symptoms, and participation in mental health activities was associated with significantly higher birth weight. In addition, system changes were achieved, including standardization in screening of depression and BMI, routine assessment, and coordination of care for 2 key health issues during the perinatal period and the development of an LSLF client brochure in English and Spanish that remains available for patients. Thus, the LSLF program shows promise as a sustainable model of supporting women with depression and obesity/overweight during and after pregnancy with care coordination and a portfolio of options for mental and physical wellness.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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