Testing an Intervention to Reduce Negative Thinking, Depressive Symptoms, and Chronic Stressors in Low-Income Single Mothers

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Purpose: *To test the effectiveness of a cognitive-behavioral group intervention in reducing depressive symptoms, negative thinking, and chronic stressors in low-income, single mothers at risk for depression.*

Design and Methods: *A randomized, controlled prevention trial was conducted with 136 low-income, single mothers with children between the ages of 2 and 6 years. Each participant was screened before enrollment and was determined to be at risk for depression. Participants were randomly assigned to either the control or experimental group. The experimental group was invited to participate in a 4- to 6-week cognitive-behavioral group intervention. Data on depressive symptoms, negative thinking, and chronic stressors were collected via self-report questionnaires from control and experimental groups at baseline, 1 month, and 6 months after the intervention to assess the effects of the intervention.*

Findings: *Compared with those in the control group, women who received the intervention had a greater decrease in depressive symptoms, negative thinking, and chronic stressors; these beneficial effects were maintained over a 6-month period.*

Conclusions: *The findings indicate the effectiveness of this cognitive-behavioral group intervention and show the beneficial effects of reducing negative thinking via the use of affirmations and thought-stopping techniques.*

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[Key words: depression, single mothers, negative thinking, chronic stressors]

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Depression, the most common mental illness in women, occurs twice as often in women as in men (Stewart, Ricci, Chee, Han, & Morganstein, 2003). Depression is a costly illness and it has broad social, personal, and economic consequences of diminished functional ability. Depressed people are often less able to perform as parents, and they perceive themselves to be in worse health compared to others (Hays, Wells, Sherbourne, Rogers, & Spitzer, 1995). Poverty and chronic stressors increase low-income, single mothers' risk for depression (Hall, Gurley, Sachs, & Kryscio, 1991). In studies of mothers of young children, the prevalence of a high level of depressive symptoms (not major depression) ranged from 35% (Orr & James, 1984) to 66% (Peden, Hall, Rayens, & Grant, 2004). Children experience the adverse consequences of depression when interacting with their mothers (Field, Healy, Goldstein, & Guthertz, 1990). The purpose of this randomized, controlled trial was to test the effectiveness of a cognitive-behavioral group intervention designed to reduce negative thinking, depressive symptoms, and chronic stressors in low-income, single mothers at risk for depression.

Background

Negative thoughts and chronic stressors are risk factors for depressive symptoms in low-income single mothers

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(Peden et al., 2004). Negative thinking has been identified as a predictor for later development of depression in women (Hollon, DeRubeis, & Seligman, 1992; Peden, Hall, Rayens, & Beebe, 2000a; Seligman, 1991). Negative thoughts imply criticism or devaluation of self (Teasdale & Rezin, 1978), and they dominate the perceptions of the depressed person (Peden, 1993; 1996). Referents of negative thoughts might be self, significant others, current lifestyle, and past experiences. Chronic everyday stressors also have adverse effects on mothers' mental health. These are defined as common problems faced daily that worry, bother, or upset the person, including financial concerns, role overload, employment problems, parenting worries, and interpersonal conflict. Everyday stressors of low-income mothers with young children have been strongly linked to depressive symptoms of single mothers (Hall, Williams, & Greenberg, 1985). Hall (1990) found that high levels of everyday stressors predicted the probability of a high level of depressive symptoms among 196 mothers of kindergarten children. Hall et al. (1991) also found that the higher a single mother's everyday stressors, the greater the probability of a persistent high level of depressive symptoms over a 1-year period.

Cognitive-behavioral interventions have been shown to prevent the onset of depression (Munoz, 1987, 1993; Peden, Hall, Rayens, & Beebe, 2000b, 2001) and relapse in people recovering from depression (Paykel, 1989). Although much empirical support exists for broad-based, global application of cognitive-behavioral interventions (Beck, 1976; Clarke & Lewinsohn, 1989; Hollon, Shelton, & Loosen, 1991; Hauenstein, 1997), little research has been focused solely on reducing depressive symptoms by decreasing negative thinking using a cognitive-behavioral group format. The only reported research in this area has been conducted by this research team (Peden et al., 2000b; Peden, Hall, Rayens, & Beebe, 2001; Peden et al., in press).

In an ongoing program of research, this team has developed a body of evidence supporting the cognitive-behavioral group intervention tested in this study as an effective means of decreasing negative thinking, thereby preventing or decreasing depressive symptoms. The intervention has been tested with women diagnosed with major depression (Peden, 1998), at-risk college women (Peden et al., 2000a, 2001), and low-income single mothers (Peden et al., in press). The intervention tested in this study is based on the premise that women who are at risk for depression have modifiable risk factors. The modifiable risk factor targeted is negative thinking. The intervention builds on the work of Beck, Gordon, and Meichenbaum. In his seminal work, Beck (1967) developed cognitive-behavioral strategies to identify cognitive distortions and to assist people to replace those thinking errors with more accurate and helpful views. Using Beck's model, Gordon was the first nurse researcher to design a cognitive-behavioral group intervention to treat depression in women. This program, Insight, has been widely used clinically and validated empirically (Gordon & Tobin, 1991; Maynard, 1993). Meichenbaum (1977) developed the STOP technique to provide a mechanism to assist people to change their thinking styles. These techniques are referred to as covert assertion (McKay, Davis, & Fanning, 1981) and include thought interruption and thought substitution. This research team has repeatedly tested Meichenbaum's techniques, providing empirical support for thought interruption (STOP) and thought substitution (use of affirmations; Peden, 1998; Peden et al., 2000a, 2001; Peden et al., in press).

Prevention research to this point has included testing of interventions that are broad based in approach to the treatment of depression, targeting numerous depressive symptoms. In this study, negative thinking, both prominent and troublesome (Peden, 1993, 1996), was targeted as a means of preventing depression in low-income single mothers. A cognitive-behavioral intervention specifically focused on reducing negative thoughts and increasing positive self-talk and affirmations was tested with low-income single mothers. The expected outcomes of the intervention were decreased negative thinking, depressive symptoms, and chronic stressors. The benefits of the intervention were expected to be maintained over a 6-month follow-up period.

Methods

Design and Sample

A randomized controlled prevention trial was conducted to test the effectiveness of an intervention designed to reduce negative thoughts, chronic stressors, and depressive symptoms in low-income, single mothers. To be eligible for participation in the study, the single mothers had to have at least one child aged 2 to 6 years living with them and be at or below 185% of the poverty level. Additional inclusion criteria included not currently receiving psychiatric care or counseling, not taking antidepressant medication, not suicidal, not currently pregnant, and not having a child less than 1 year of age. Of the 311 women screened and invited to participate, an initial sample of 205 women were recruited and completed the baseline survey.

For these 205 low-income single mothers, baseline data were collected on negative thoughts and depressive symptoms, as well as sociodemographic characteristics (Peden et al., in press). The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977) were administered to identify people with high levels of depressive symptoms. Those with a score of 10 or above on the BDI or a score of 16 or above on the CES-D were classified as having depressive symptoms. Of the 205 women who completed the baseline data collection, 136 were identified as at-risk for clinical depression and agreed to participate in the intervention phase of the study. As they were enrolled, these participants were randomly assigned to two groups with 74 randomized to the control group and 62 to the intervention group. Those in the intervention group were invited to participate in a 6-hour cognitive-behavioral

group intervention distributed over 4-6 weeks. Of the 136 low-income single mothers enrolled in the intervention portion of the study, 91 (67%) completed all three interviews (baseline, 1 month, and 6 months).

The mean age of the 136 women in the intervention study was 27.2 (*SD*=5.6). Slightly more than half were Caucasian (52%); the majority of the remaining mothers were African American. More than half had at least some postsecondary education (55%, *n*=75). Many of the mothers were employed (57%, *n*=78), and of the 78 women with jobs outside the home, 60% (*n*=47) had full-time employment, yet the majority of the sample (80%; *n*=109) had an annual household income of $15,000 or less. Most of the low-income single mothers had never been married (58%, *n*=79), and the remainder were either divorced or separated.

Measures

Depressive symptoms. The 20-item CES-D contains items relating to depressed mood and psychologic indicators of depression. This scale indicates "the presence of dysphoria and somatic complaints that are often accompanied by associated features of depression, but do not necessarily meet the criteria for the clinical syndrome of depression" (Berkman et al., 1986, p. 373). Respondents rate how often each symptom was experienced during the past week on a 4-point scale of rarely or none of the time (0) to most or all of the time (3). The ratings of the four positive items are reversed and added to those of the other 16 items forming a summary score ranging from 0-60. A score of 16 or above indicates a high level of depressive symptoms. This score corresponded to the 80th percentile of scores in community samples (Comstock & Helsing, 1976) and has been used extensively in other studies. Both the reliability and validity of the CES-D have been supported in numerous studies (e.g., Hall, Kotch, Browne, & Rayens, 1996; Peden et al., 2000b, 2001). Cronbach's alpha coefficient in this study ranged from .80 to .92.

The 21-item BDI identifies affective, behavioral, cognitive, motivational, and vegetative aspects of depression. Each item consists of four statements, scored from 0 to 3, with 0 indicating no symptoms and 3 indicating severe distress. Participants rate each item according to how they felt in the last week. Beck recommended a cutoff score of 10 or above as indicative of at least mild depression (Beck et al., 1961). The BDI has shown good concurrent validity compared with psychiatric ratings of severity of depression in both clinical populations and college students (Ogles, Lambert, & Sawyer, 1995). The BDI has shown good internal consistency and test-retest reliability (Beck, 1978). Cronbach's alpha coefficient for the different administrations in this sample ranged from .78 to .92.

Negative thoughts. The Crandell Cognitions Inventory (CCI; Crandell & Chambless, 1986) was used to measure negative thoughts. The 45-item CCI was developed using both depressed and nondepressed psychiatric patients. Only the 34 negative self-statements are scored. The negative self-statements are rated for frequency of occurrence from almost never (1) to almost always (5). Total scores range from 34–170, with higher scores indicating higher frequency of negative thinking. Crandell and Chambless (1986) reported a Cronbach's alpha of .95 in a sample of depressed, psychiatric, and normal participants. Construct validity was supported by correlations with other measures of negative thinking. The CCI also allowed distinguishing depressed and nondepressed psychiatric participants from normal participants (C.J. Crandell, personal communication, April 2, 1993). Cronbach's alpha coefficients for the different administrations in this sample ranged from .94 to .97.

Chronic stressors. The Everyday Stressors Index (ESI; Hall, 1983), a 20-item instrument to assess common problems faced daily by mothers with young children, was used to measure chronic daily stressors. The instrument was derived from literature review, expert consultation, and adaptation of some items from the Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981). The domains measured in this scale include financial concerns, role overload, employment problems, parenting worries, and interpersonal conflict. On a 4-point scale from not at all bothered (0) to bothered a great deal (3), mothers rate how each problem worries, upsets, or bothers them from day to day. A summary score of 0-60 is computed with higher scores indicating greater chronic stress. Internal consistency coefficients using Cronbach's alpha have ranged from .80 to .85 (Hall et al., 1985; Hall et al., 1991). Construct validity was supported by discrimination of everyday stressors from measures of maternal depressive and psychosomatic symptoms using factor analytic techniques (Hall, 1983; Hall, 1987). The Cronbach alpha coefficients for the ESI in this sample ranged from .80 to .85.

Procedure

This study was approved by the University of Kentucky Medical Institutional Review Board. Data on depressive symptoms, negative thinking, and chronic stressors were collected from the control and experimental groups via self-report questionnaires at baseline (before randomization), 1 month after the intervention, and at a 6-month follow-up. Study recruiters were located in Women, Infants, and Children (WIC) facilities, local health department clinics, and child health clinics. Information about the study was placed in housing offices, food stamp offices, and other social service agencies. Personal letters were sent to women participating in a self-sufficiency program for single parents. All women received $20 for participating in the each of the three interviews (baseline, 1 month, and 6 months after intervention).

Experimental Intervention

Those single mothers assigned to receive the cognitive-behavioral intervention participated in six 1-hour or four 90-minute group sessions that targeted identification of negative thinking and its effects on feelings and depressive behaviors. The intervention is based on the premise that women who are at risk for depression have modifiable risk factors. The modifiable risk factor targeted is

negative thinking. Cognitive-behavioral strategies are designed to teach people that through self-control they can alter their thoughts, feelings, and behaviors. Cognitive-behavioral strategies are focused on teaching skills to regulate thoughts and moods. An important aspect of skill teaching is practice of the skills between sessions. The primary skill taught is the STOP technique, a thought-interruption technique developed by Meichenbaum (1977). Through practice, specifically the use of audiotapes, people learn to interrupt negative thinking. Once the negative thinking is interrupted, a more positive thought is inserted. These positive thoughts are referred to as affirmations. Participants listen daily to affirmations audiotaped in their own voice, and they place written affirmations in their work and home environments. This use of other visual cues is another mechanism for incorporating positive thoughts into their thinking style.

The intervention was designed using specific content from Verona Gordon's *Insight* (1991) program, *The Depression Workbook* (Copeland, 1992), and Dr. Peden's own clinical practice with depressed women. Affirmations and direct actions were adapted from the Insight program, with permission. *The Depression Workbook* included information on thought stopping, affirmations, and distorted thinking styles. Depressed women benefit from group treatment (Gordon & Tobin, 1991; van Survellan & Dull, 1981) because it allows contact with peers with similar problems, reduces isolation, promotes change, and is cost-effective. To ensure fidelity in implementing the intervention, a script was written for each session. Upon assignment to the intervention group, each participant received a notebook containing handouts on the weekly topics, a schedule for each session, and homework assignments. Group size varied from four to eight participants. The intervention is educational and was offered by a master's-educated psychiatric nurse with experience in leading client groups. Each group leader was trained by the PI in intervention delivery. A more complete description of the weekly sessions is available (Peden et al., 2001).

Data Analysis

Sociodemographic characteristics of control vs. experimental participants at baseline of women who completed all three interviews and those who dropped out were examined using the *t* test or chi-square test of association, as appropriate. The bivariate relationships between the sociodemographic characteristics and each of the outcome variables were assessed using Pearson's product-moment correlation or the *t* test. For each series of comparisons, a Bonferroni correction to the .05 significance level was done to control the overall Type I error rate.

The longitudinal effect of the intervention on each of the outcome variables (CES-D, BDI, CCI, and ESI) was assessed with a repeated measures analysis of covariance using mixed model methodology (the procedure PROC MIXED in SAS [1996]) with fixed effects of time and treatment and random effect of subject. The PROC MIXED procedure is particularly appropriate for use in longitudinal studies in which dropouts are common (Littell et. al., 1996). Because no differences at baseline were found between those who completed the study and those who dropped out, and because the dropout rate did not differ between the control and intervention groups, the assumption that the incomplete data were missing at random is reasonable. For each outcome variable (CES-D, BDI, CCI, and ESI), a separate analysis of covariance model using the intention-to-treat convention was considered with the corresponding baseline value as a covariate. Post-hoc pairwise comparisons were made using Fisher's least significant difference procedure.

P values of .01 or less were deemed significant. For the dichotomous versions of the CES-D and BDI, the Cochran-Mantel-Haenszel χ^2 test (Cochran, 1954; Mantel & Haenszel, 1959) was used to determine whether the percentage of subjects with elevated scores (CES-D$\geq$16; BDI$\geq$10) differed between the two groups, controlling for the factor of time.

Results

No significant differences were found between control (n=74) and experimental (n=62) groups on maternal age, race, marital status, education, income, employment status, or child's age or sex. These two groups also were not significantly different on baseline CES-D scores, BDI scores, negative thoughts, or chronic stressors. Similarly, no differences were identified in any of these baseline sociodemographic characteristics or outcome measures between those who completed all three interviews (n=91) and those who had dropped out by the third interview (n=45). The dropout rate did not vary by treatment group; 63% of the treatment group and 70% of the control group completed all three interviews. Of those assigned to the intervention group, 27 (44%) attended at least half of the intervention sessions.

Center for Epidemiologic Studies–Depression Scale. The raw means and standard deviations for the CES-D at baseline, 1 month, and 6 months postintervention for control and experimental groups are shown in the **Table**. The repeated measures ANCOVA with baseline CES-D used as a covariate indicated a significant Group main effect, indicating that the control and experimental groups differed on mean CES-D scores postintervention, controlling for baseline CES-D scores. Posthoc analysis using Fisher's least significant difference procedure showed that the experimental group had a lower mean CES-D score, averaged across both postintervention time periods, than did the control group (t_{101}=2.8, p=.007). The main effect of Time and the Group x Time interaction were not significant. The significant Group effect, even after adjusting for baseline group differences, indicates that the intervention was effective in decreasing CES-D scores. Since the Time main effect compares the 1-month and 6-month CES-D scores, adjusted for baseline CES-D levels, lack of significance of this effect indicates no change in CES-D scores for the combined group of treatment and control participants from 1 to 6 months postintervention.

Table. Summary of Repeated Measures Analysis of Covariance (ANCOVA) Results (N = 136)

	Time						ANCOVA F tests		
	Baseline Mean (SD)		1 month Mean (SD)		6 months Mean (SD)				
Outcome variable	Treatment	Control	Treatment	Control	Treatment	Control	Group main effect	Time main effect	Interaction
Center for Epidemiologic Studies – Depression	25.2 (9.5)	24.3 (8.0)	16.7 (10.2)	21.9 (11.0)	15.0 (10.7)	18.2 (11.6)	7.6*	6.1	1.1
Beck Depression Inventory	20.4 (7.5)	19.5 (7.0)	13.0 (9.7)	16.2 (8.1)	11.8 (10.4)	14.9 (9.5)	7.9*	1.7	<0.1
Crandall Cognitions Inventory	53.0 (23.1)	54.2 (21.8)	35.8 (23.8)	46.1 (26.0)	31.7 (26.3)	38.9 (25.8)	7.0*	7.5*	1.2
Everyday Stressors Index	24.7 (9.3)	25.6 (10.0)	17.3 (9.0)	22.1 (10.6)	15.2 (7.9)	19.7 (10.0)	8.1*	7.0*	0.1

*p<.01

Controlling for time, the prevalence of high CES-D scores (CESD≥16) was compared for control and experimental participants to determine if the two groups differed. The Cochran-Mantel-Haenszel χ^2 test statistic was 12.9 (p=.0003), indicating a smaller percentage of women in the experimental group had a high level of depressive symptoms over the course of the study, compared with control women. As shown in the **Figure**, a sharp decline occurred in the prevalence of a high level of depressive symptoms among the experimental participants from the baseline interview (81%) to the 1-month postintervention follow-up (44%). The prevalence declined even further at the 6-month follow-up to 37%. Although the high CES-D scores declined for the control group from 86% at baseline to 72% at the 1-month follow-up, this decrease was clearly smaller than that experienced by the experimental group. At the 6-month follow-up, the prevalence of a high level of depressive symptoms in the control group decreased to 62%, still much higher than the prevalence among treatment participants at this follow-up. Thus, the results of this analysis provide further evidence of the effectiveness of the intervention in reducing depressive symptoms.

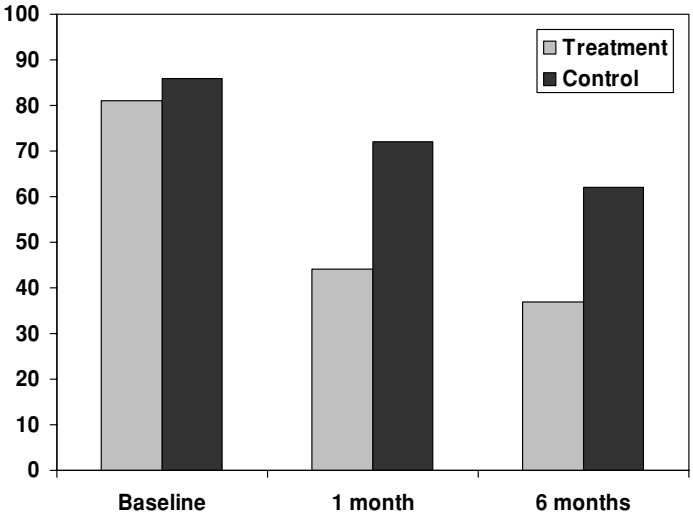

Figure: Prevalence of high CES-D scores over time by group.

Beck Depression Inventory. Shown in the **Table** are the raw means and standard deviations for the BDI at baseline, 1 month, and 6 months postintervention for control and experimental groups. The repeated measures ANCOVA with baseline BDI used as a covariate revealed a significant main effect of Group, indicating that the control and experimental groups differed on mean BDI scores postintervention, controlling for baseline BDI scores. Posthoc analysis using Fisher's least significant difference procedure showed that the experimental group had a lower mean BDI score, averaged across both time periods, compared with the control group (t_{101}=2.8, p=.006). The main effect of Time and the Group X Time interaction were not significant for the BDI. This result was not unexpected because the differences between 1 month and 6 months postintervention appear to be minimal for both groups. The significant Group effect, even after adjusting for baseline group differences, is evidence of the effect of the intervention in decreasing BDI scores. The fact that the Time effect was not significant indicates the stability in BDI scores for the combined group of women (i.e., both those in the treatment as well as the control group) between 1- and 6-months after the intervention, adjusting for baseline scores.

The prevalence of at least mild depression (BDI > 10) was compared between experimental and control participants to determine whether the groups differed. The Cochran-Mantel-Haenszel χ^2 test statistic was 4.5 (p=.03).

Negative thinking. Shown in the Table are the raw means and standard deviations for the CCI at baseline, 1 month, and 6 months postintervention for control and experimental groups. The repeated measures ANCOVA with baseline CCI used as a covariate showed a significant main effect for Group. Fisher's least significant difference procedure for the Group main effect indicated that the intervention group had significantly fewer negative thoughts during the postintervention period than did the controls (t_{101}=2.7, p=.01). The main effect of Time also was significant: the posthoc analysis indicated that the level of negative thoughts continued to decline between 1 and 6 months postintervention for the combined group of treatment and control participants,

adjusting for baseline levels (t_{89}=2.7, p=.007). The significance of the Time effect indicated that negative thinking in both groups continued to decline over the course of the follow-up period. The Group X Time interaction was not significant for CCI.

Chronic stressors. The raw means and standard deviations for chronic stressors at each time and for each group are shown in the **Table**. The repeated measures ANCOVA with the covariate of baseline ESI indicated significant Group and Time main effects. The posthoc analysis for Group indicated that intervention group participants had significantly lower chronic stressor scores during the postintervention period, compared with the control participants (t_{101}=2.8, p=.006). The significant Time main effect indicated that, for the combined group of control and treatment participants, the decrease in chronic stressors from 1 to 6 months postintervention was significant (t_{89}=2.6, p=.01), adjusting for baseline scores.

Discussion

The findings in this study support the recommendations of the National Institute of Mental Health Psychosocial Intervention Development Workgroup (Hollon et al., 2002) to design interventions to prevent the onset of clinical depression in at-risk populations. Single mothers with small children are at risk for depression. The intervention was effective in decreasing depressive symptoms, and this beneficial effect lasted 6 months after the intervention. Negative thinking and chronic stressors also decreased significantly for both treatment and control participants from 1 month to 6 months postintervention. The findings of this study document the effectiveness of this intervention in reducing negative thinking, thereby improving the mental health of single mothers. Prior research has shown that negative thinking mediates the effects of self-esteem and chronic stressors on depressive symptoms (Peden et al., 2004), underscoring the potential benefit of interventions to effectively reduce negative thoughts.

Conducting research with this high-risk group provided challenges. Although many of the single mothers had difficulty participating in the intervention, those who did participate reported significantly fewer depressive symptoms, negative thinking events, and chronic stressors than did the control group. As in previous research (Peden et al., 2000b), participation in the study, either as a control or experimental participant, was beneficial to the women's mental health. Isolation and low sense of belonging are commonly experienced by women with depression. In this study, all data-collection activities occurred in the mother's home with the same interviewer conducting all three interviews. The interest in the single mother and her children very likely benefited all participants. Other researchers have reported the positive benefits of research participation, whether as control or experimental participants (Carpenter, 1998). Although the possibility of a Hawthorne effect exists, the intervention group improved significantly. In this study, we used a no-treatment control group. In future studies, we will include an attention-control group to help eliminate the potential Hawthorne effect.

Another limitation of the study was attrition. Only 63% of the experimental group and 70% of the control group completed both follow-up interviews. Given the chaotic schedules of low-income, single mothers, this level of attrition was not surprising. The greater challenge faced by this research team was intervention-group participation. To facilitate attendance, the intervention was offered in two formats, four 90-minute sessions or six 60-minute sessions. Additional attendance strategies included reminder calls both the evening before and day of the intervention group session; providing meals for both mothers and children; providing childcare; and providing intervention materials at the point of study enrollment. Despite these strategies, attendance at the intervention group meetings was lower than expected. This phenomenon reflects the unpredictable, stressful lives experienced by these single mother families.

Conclusions

This research indicates the mental health benefits of altering negative thinking through an easy-to-administer and cost-effective nursing intervention. It also provides further support for the use of affirmations as a way to improve mood in at-risk people. Such an intervention might have little direct effect on changing the chronic stressors faced by this vulnerable population; however, nurses can provide strategies to improve the way single mothers perceive the chronic stressors they face. Additional clinical implications include depression screening as a routine practice for all mothers, with particular attention to women experiencing multiple stressors. Referral to mental health professionals for further evaluation and treatment can decrease the incidence of depression in this vulnerable population.

Depression is a costly problem. It not only interferes with the health of mothers but it also has the potential to negatively affect the mental health of their children. Early recognition and treatment of depressive symptoms can improve the mental health of low-income, single-mother families. Interventions focused on reducing negative thinking are one key to preventing clinical depression in low-income, single mothers.

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