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***EVALUATION OF A STRENGTHENING FAMILIES (FAMILIAS FUERTES)
INTERVENTION FOR PARENTS AND ADOLESCENTS IN HONDURAS***

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Abstract

Family strengthening interventions are particularly important in low-resource countries in Latin America where the effects of poverty increase the likelihood that adolescents will engage in risky behaviors. The purpose of this quasi-experimental study was to pilot a family strengthening program, Familias Fuertes, in a low-income neighborhood in Tegucigalpa, Honduras. The initial sample included 41 parents and their 10 to 14 year-old adolescents who were randomly assigned to the intervention or control group. Parents and adolescents in both groups completed study instruments prior to the beginning of the program, immediately on completing the 7-week program, as well as 4 and 12 months after completing the program. Findings suggest benefits of the intervention on adolescent-reported family closeness and parent reports of positive parenting practices and improved self esteem. There were no other differences between the two groups in adolescent reports of parenting or family relationship variables or in their reports of their use of drugs, alcohol, or tobacco, although qualitative interview data indicated that parents and adolescents perceived the program positively. Further research is needed with larger samples and with instruments that may be more sensitive to detect effects of the intervention.

Keywords: Adolescent, Parent, Family Strengthening, Honduras

EVALUATION OF A STRENGTHENING FAMILIES (FAMILIAS FUERTES) INTERVENTION FOR PARENTS AND ADOLESCENTS IN HONDURAS

Introduction

A recent World Health Organization report noted that one-fifth of the world's population comprises adolescents, and 85% of adolescents are in the developing world.¹ Risky health behaviors of adolescence can lead to life-long health problems. It has been estimated that two-thirds of premature deaths and one-third of adult health problems are associated with conditions or behaviors that begin in youth.¹ Parents play a critical role in promoting healthy development of their adolescent children. Stronger families also promote safer neighborhoods, more effective schools, and a more productive workforce.² The Pan American Health Organization (PAHO) identified community-based family strengthening interventions as a particularly important strategy to improve adolescent and youth health in low-resource countries where the effects of poverty increase the likelihood that adolescents will engage in risky behaviors.³ In many Latin American countries, adolescents represent a significant percentage of the total population, and thus programs to enhance adolescent health and reduce risky health behaviors are critical.⁴ The purpose of this study was to pilot a family strengthening intervention in a low income neighborhood in Tegucigalpa, the capital of Honduras.

Honduras, a Central American country with a population of 7 million, has one of the highest rates of poverty, morbidity and mortality in the Americas.⁵ The per capita gross national income in 2008 was \$3,600, with 20.7% of the population living on less than \$1 (U.S.) per day.⁶ The recorded adult literacy rate is 80%, and the average number of years of education is 6.2 years.⁵ A total of 38% of the population is less than 15 years of age, and thus, programs to promote healthy futures for these youth are critical to ensure optimal development of the nation.⁷ Epidemiological data indicate that Honduran youth are at high risk for physical, psychosocial, and developmental health problems. Lack of access to education or job opportunities contributes to the high rate of teen pregnancy and early marriage in the region, where 24-41% of adolescents marry prior to age 18 years, and 46-63% of youth have had sexual relations prior to age 20.⁵ Honduras has the highest rate of births to teens between 15-19 years of age in Central America (with a fertility rate of 114 - 162 births for every 1000 girls between the age of 15-19 years in urban and rural areas, respectively).³ Honduras also has the third highest incidence of HIV/AIDS in the region, (with Haiti^a and Guyana reporting the highest rates).³

The Strengthening Families Program: For Parents and Youth 10-14 (SFP 10-14) is an evidence-based family skills-building training program that has been found to be effective in delaying the onset substance use, lowering levels of aggression, increasing the resistance to peer pressure in adolescents. The program is also effective in increasing parents'/caregivers' effectiveness in setting appropriate limits and showing affection and support for their children.⁸ In a review of longitudinal studies evaluating substance abuse prevention programs published in the International Cochrane

Collaboration Reviews, Foxcroft and colleagues concluded that the SFP 10-14 was twice as effective as any other program in the world.⁹ The SFP 10-14 program was evaluated in a randomized controlled trial that involved random assignment of families with children age 10-14 from 33 Iowa public schools. These studies included rigorous outcome evaluations involving the use of multiple methods and collection of data 6, 18, 24, 30, 48, and 72 months after the pretest. A total of 161 families participated in 21 intervention groups at 11 different schools, with group sizes ranging from 3-15 families. Ninety four percent of the families participated in 5 or more of the 7 sessions. Findings indicated that parents in the intervention group demonstrated significantly improved parenting behaviors (communicating specific rules and consequences for using substances, controlling anger when communicating with the child, and increased positive involvement and communication with the child). Youth who participated in the program had lower levels of substance use, problem conduct, school problems, affiliation with antisocial peers, and better peer resistance. Some of the group differences actually increased in favor of the intervention group youth over the 6 year follow-up.¹⁰⁻¹³

The original SFP 10-14 program was based on three theoretical models: a biopsychosocial, vulnerability model, a resiliency model, and a family process model linking economic stress and adolescent adjustment. Social Learning Theory principles guide the sessions and how they are delivered. The focus is promoting authoritative parenting ('Love and Limits'), through teaching, modeling, practicing, and rewarding parenting skills. The emphasis is promoting consistent discipline, parental monitoring, and positive communication patterns.^{11,14} The program consists of seven sessions beginning with a 2-hour session for parents and for youth separately, followed by a 1-hour session for youth and parents meeting together. The interventions in the sessions include viewing videos, role-playing, discussions, learning games, and family projects.

In 2002, the PAHO conducted a review of projects focused on parents of adolescents and decided to adapt the SFP 10-14 program in order to replicate an evidence-based intervention in Latin America.¹⁵ The SFP 10-14 program was translated to Spanish and adapted based on recommendations of experts so that it would be culturally relevant for Latin American families. The adapted Spanish version of the program is called "Familias Fuertes (FF)," and the facilitator's manual, curriculum materials, and videotaped vignettes used in the parent and family sessions are available from the PAHO.¹⁶ The conceptual model for the adapted program is based on an ecological model that focuses on the individual and family. At the individual level, the framework incorporates the theory of goal-setting to help adolescents identify dreams and goals and develop a plan of action to achieve these goals. At the family level, the program focuses on a model of Effective Parenting developed by PAHO which views effective parenting as a balance between demands to

provide emotional love and warmth with the need to provide structure, discipline, monitoring, and promote appropriate autonomy.¹⁵

The FF program has been pilot tested and evaluated in El Salvador with 40 intervention and 36 control group parents, and 46 intervention and 40 control group adolescents. Data were collected from parents and adolescents at baseline, at the end of the 7-week program and 1 year after the program ended. Adolescent age ranged from 10-14 years, with a mean age of 12.8 years.¹⁷ There was no discussion in the report from the El Salvador study about the reliability or validity of the measures in the study. Comparing the median of subscales across the three measurement periods for the intervention and control groups, project staff found positive changes in favor of the intervention group on the following variables: relations of support, proximity and shared time, frequency of shared activities with caregivers, frequency that parents had established rules and reminded adolescents about the rules without criticizing them, drug use on the part of the adolescent or family members, pregnancy, and sexually transmitted infections in the adolescent.¹⁵

The 2008 PAHO Regional Strategy for Improving Youth and Adolescent Health identified a need for further, rigorous evaluation of the Spanish version of the program in diverse settings in Spanish-speaking countries.³ The purpose of this study was to pilot the FF program with a sample of 41 adolescents and their caregivers in a low-income neighborhood in Tegucigalpa, Honduras. The study was conducted as an international research collaboration between nursing faculty members at the Universidad Nacional Autonoma of Honduras (UNAH) and the University of Alabama at Birmingham (UAB). UAB faculty assisted with obtaining funding and facilitating the study design, planning for the facilitator training, analysis of the data, and the preparation of the final project reports. UNAH faculty recruited participants, implemented the intervention, and collected all data for the study in Honduras. Although the main objectives of this pilot project were assessing the feasibility of the intervention and estimating effect size for future research, we also tested the following four study hypotheses:

1. Parents who participate in the program will report more positive parenting practices, more positive perceptions of their family relationships, and higher self esteem compared to control group parents;
2. Adolescents who participate in the program will report more time spent with family, more family closeness, more positive family relationships, higher self esteem, and lower levels of family conflict compared to control group adolescents;
3. Adolescents who participate in the program will report higher levels of parent monitoring, more family rules, and more parental concern about their use of tobacco, drugs or alcohol compared to control group adolescents;

4. Adolescents who participate in the program will report lower rates of use of drugs, tobacco and alcohol compared to control group adolescents.

In addition to testing the above hypotheses, researchers maintained logs to document the process of implementing the program and to identify challenges and implications for future program implementation and evaluation.

Methods

Design

A quasi-experimental design was used, with 21 parent-adolescent pairs assigned randomly to the control and 20 assigned randomly to the intervention group. The random assignment was done by a simple drawing of slips of paper for each family that designated whether the family was assigned to the control or intervention group.

Protection of Human Subjects and Sample

The study was approved by the Institutional Review Boards of the UNAH and UAB. Parents and adolescents were recruited from a public school in a low-income neighborhood of Tegucigalpa, Honduras. Local authorities suggested the selection of the particular neighborhood as one with a high level of social problems. Sample inclusion criteria for adolescents were the following: the adolescent was 10-14 years of age, had lived in the study community for at least 1 year, attended the target school regularly, and signed an assent form for study participation. Sample inclusion criteria for parents were that the parent be between 23 and 65 years of age, be the primary caregiver (biological or non-biological) of a child who attended the target school, had lived in the target community for at least 1 year, and signed the consent form. Recruitment flyers were posted at the school which was selected as the primary recruitment site. Letters were sent home with students announcing informational sessions to explain the study and to answer questions about the program. Three informational sessions were held and a total of 41 parents signed consents to participate in the study. Adolescents gave their assent to participate. Both parents of an adolescent were encouraged to participate in the program; however, only 31% of the adolescents were living with both parents and thus it was often difficult to involve fathers in the program. A total of 38 mothers, 3 fathers, and 41 adolescents signed consents and completed baseline measures, but only 15 families in the control group and 17 families in the intervention group completed the study. Reasons for participants dropping out of the study are not known.

Intervention Group

Adolescents and parents in the FF intervention group participated in seven weekly sessions, each lasting approximately 3 hours. UNAH nursing faculty who had been trained as FF facilitators served as facilitators for the sessions. During the first 2 hours of each weekly session, adolescents met with two facilitators and parents met with a third facilitator. During the third hour, adolescents and parents met together with the three facilitators for family sessions. Figure 1 lists the topics that were included in the adolescent, parent, and family sessions.

Control Group

Adolescents and parents in the control group received informational brochures about healthy diets and other nutritional information. The participants in the control group completed all study measurement instruments at four different times as did the participants in the intervention group.

Figure 1. Familias Fuertes Intervention Topics

Topics for Parent Sessions (First hour parents and youth meet separately)	Topics for Youth Sessions (First hour parents and youth meet separately)	Topics for Family Sessions (Second hour parents and youth together)
1. Love and Limits	Having Goals and Dreams	Supporting Children's Goals and Dreams
2. Establishing House Rules	Appreciating Your Parents	Promoting Family Communication
3. Promoting Good Behavior	Dealing with Stress	Appreciating Family Members
4. Using Sanctions	Obeying the Rules	Using Family Meetings+ (enhance existing content)

5. Establishing Linkages	Dealing with Peer Pressure	Understanding Family Values
6. Protecting Youth from Risky Behaviors	Group Pressure and Good Friends	Families and Dealing with Peer Pressure+(enhance existing content)
7. Connections with the Community	Helping Others	Review Session and Celebration

Procedures

During the summer before the pilot study began, all project faculty met in Honduras to participate in FF facilitator training. A certified FF trainer with experience in implementing the FF program in El Salvador came to Honduras to lead the 3-day FF facilitator training program.

Parents and adolescents in both the intervention and control groups completed study instruments prior to the beginning of the program (Time 1 or T1), immediately after completing the 7-week program (T2), 4 months after completing the program (T3), and 12 months after completing the program (T4).

Parents and adolescents each received small gifts (such as a basket of school supplies, a book bag, food, cleaning and bath supplies) after completing the study instruments. In addition, group facilitators maintained logs describing each session and noting any particular barriers that were encountered during program implementation. One of the researchers, who was not a facilitator, observed the FF sessions with adolescents and parents, as an additional strategy for evaluating the process of program implementation.

Instruments

Measures of parents' perceptions of their parenting behaviors and adolescent perceptions of time spent with family, family closeness, positive family relationships, family conflict, parent monitoring, family rules, parental concern about their use of tobacco, drugs or alcohol, and use of drugs, tobacco and alcohol were adapted from measures used in the previous

evaluations of the FF programs conducted in Peru and El Salvador.¹⁷ These measures were adapted from scales originally developed by the United States Center for Substance Abuse Prevention (CSAP) core measures in the “Student Survey of Risk and Protective Factors,” and from questionnaires developed by Hermida and Villa.¹⁸ There was limited information about the reliability of these scales, although all of them have face validity and they are included in materials for implementing and evaluating the FF program available from the PAHO.¹⁹

A 20-item scale was used to assess parents’ perceptions of their parenting behaviors, adapted from the instrument used to evaluate the English version of the Strengthening Family Program (SFP10-14).²⁰ The Rosenberg Self-Esteem Scale (RSES) was used to measure both parent and adolescent self esteem.²¹ This scale has been widely used as a measure of self esteem for both youth and adults.²² Schmit and Allik translated the RSES into 28 languages and administered to 16,998 participants across 53 nations.²³ The scale factor structure was largely invariant across nations. Although Honduras was not specifically included as one of the 53 nations, the findings from this study suggested that the RSES can be useful for measuring global self-esteem across dozens of languages and cultures.

The Family APGAR scale was used to measure parent and adolescent perceptions of the overall quality of the family relationship.²⁴ The Family APGAR scale is a five-item scale that was originally designed to assess adults’ levels of satisfaction with support received from family members. The scale measures perceived support in five domains: adaptation, partnership, growth, affection, and resolve. This scale has been used widely with reports of high levels of internal consistency²⁵ and criterion validity has been reported by correlations with a measure of family cohesion.²⁶ Several reviews of instruments to identify family functioning evaluate the Family APGAR as a good screening tool in research and in clinical practice.^{27,28} Bellón Saameño and colleagues reported that one factor was identified in a factor analysis, and there was an internal consistency of .84 in a Spanish version of the Family Apgar.²⁹ The Spanish version of the Family APGAR has been used in other research studies with Spanish speaking participants³⁰ and was used in this study.

Internal consistency reliability coefficients were calculated for each scale at each measurement time point. Table 1 provides information about the number of items in each of these scales, the range of scores for each scale, and the internal consistency reliability coefficients obtained at Time 1.

Table 1. Number of Items, Range of Scores, and Reliabilities of Scales at Time 1 (T1)

Scale	Hypothesis	Number of Items	Range of Scores	Reliability at T1
(A) – adolescent report (P) – parent report				
Parenting (P)	1	20	1-4 (higher scores reflect more positive parenting behaviors)	0.799
Family APGAR Reported by Parent (P)	1	5	0-2 (higher scores reflect greater levels of satisfaction with family)	0.814
Parent Self Esteem (P)	1	10	1-4 (higher scores reflect higher levels of self esteem)	0.767
Family Closeness (A)	2	11	1-4 (high scores reflect more closeness)	0.724
Spend Time with Family (A)	2	10	1-4 (high scores reflect more time with family)	0.815
Family Conflict (A)	2	4	1-4 (higher scores reflect more family conflict)	0.443
Family Worry (A)	2	2	1-4 (higher scores reflect greater degree of worry about family)	0.817
Family Relationship (A)	2	4	1-4 (higher scores reflect more positive family relationships)	0.503
Family APGAR Reported by Adolescent (A)	2	5	0-2 (higher scores reflect greater levels of satisfaction with family)	0.837

Adolescent Self Esteem (A)	2	10	1-4 (higher scores reflect higher levels of self esteem)	0.724
Family Rules (A)	3	11	1-4 (higher scores reflect more appropriate family rules)	0.814
Parent Monitoring (A)	3	8	1-4 (higher scores mean more parental monitoring)	0.754
Family Bothered by Risky Behaviors (A)	3	12	1-4 (higher scores reflect that family is more bothered by the behavior)	0.956
Smoking (A)	3	4	1-4 (higher scores reflect that family is more bothered by the behavior)	0.835
Use of Alcohol (A)	3	4	1-4 (higher scores reflect that family is more bothered by the behavior)	0.848
Use of Drugs (A)	3	4	1-4 (higher scores reflect that family is more bothered by the behavior)	0.880
Parents Talk About Risky Behaviors (A)	3	4	1-4 (higher scores indicate that parents talk with adolescents more)	0.980
Adolescents Use Substances (A)	4	11	1-6 (higher scores reflect more use of substances)	0.992
Use of Tobacco (A)	4	1	(higher scores reflect more use of substances)	NA
Use of Alcohol (A)	4	4	1-6 (higher scores reflect more use of substances)	0.949
Use of Drugs (A)	4	6	1-6 (higher scores reflect more use of substances)	0.999

Statistical Analyses

Demographic characteristics of participants were tabulated and tested for differences between the intervention and control groups. Data collected from the study instruments were tabulated at each time point and descriptive statistics were calculated. Longitudinal models fitted with linear mixed models were used to test the four study hypotheses comparing the adolescents and caregivers over the four measurement times. A longitudinal model was fitted for each scale. Each model included parameters for a 'time' effect, a 'group' effect, and a 'group by time' interaction. The time effect was used to determine whether the group means changed significantly over time, but in the same direction; the group effect was used to determine if there was constant separation between the group means over time; and the group by time interaction was used to assesses whether separation between the group means developed over time, and was the parameter of primary interest. A simple autoregressive AR(1) structure was fitted to account for the dependency among the repeated measures on the same participants. The longitudinal models were also used to estimate effect sizes and required sample sizes for planning of future applications of the intervention in similar populations.

Significance was set at the traditional 0.05 level. However, since the main objective of the study was effect estimation rather than hypothesis testing, the significance level for the multiple tests was not corrected. Because of the small sample size, suggestive results were considered with p-values <0.15.

Findings

Table 2 provides information about the demographic characteristics of parents and adolescents in both groups. Although the parent-adolescent pairs were randomly assigned to the intervention and control groups, there was a suggestion of a difference in mean income between the two groups, with intervention families having higher income levels ($p=0.09$).

Table 2. Demographic Characteristics of Participants

Variable	Intervention Group	Control Group	p-value*
Parent Age, mean (SD)	40.5 (13.23)	42.19(14.08)	0.69

Monthly Income, mean (SD)			
Lempiras	4052(2391)	2916(1618)	0.09
Dollars	\$214(\$236)	\$154.1 (\$85.5)	
Number of Children Under Parent's Care, mean (SD)	2.89(1.37)	3.1(1.33)	0.64
Adolescent Age, mean (SD)	12.05(1.5)	12(1.3)	0.91
Adolescent Education in years, mean (SD)	6.25(1.74)	6(1.73)	0.65
Parent Education, n (%)			
Less than 6 years	5 (25%)	8 (38.1%)	
6 years	6 (30%)	7 (33.3%)	
7-11 years	6 (30%)	1 (4.8%)	0.31
12 years	2 (10%)	3(14.2%)	
Some college	1 (5%)	1(4.8%)	
College graduate	0	1(4.8%)	
Relationship to Child in Study, n (%)			
Parent	16(80%)	14(66.7%)	
Grandparent	2(10%)	5(23.7%)	0.84
Aunt/Uncle	1(5%)	1(4.8%)	
Other	1(5%)	1(4.8%)	

Who Child Lives With, n (%)

2 Parents	5 (25%)	8 (38.1%)	
Father	2 (10%)	2 (9.5%)	0.48
Mother	11 (55%)	6 (28.6%)	
Other	2 (10%)	5(23.8%)	

*Two-sample t-test or Fisher's exact test, as appropriate

All 20 families in the intervention group attended the first of the seven sessions. Four of the remaining sessions were attended by 16 families and two of sessions were attended by 15 families. Further analysis indicated that 12 of the families attended all 7 sessions, 4 families attended 6 sessions, and 4 families attended only 2 sessions. We conducted separate analyses including and excluding these four families, and the conclusions were the same for both analyses. We therefore decided to retain all 20 families in the analysis presented here.

Table 3 presents descriptive statistics for the study instruments at each time point, as well as the results from the longitudinal models used to test the research hypotheses. There were significant differences at T1 (baseline) between the intervention and control groups on two study variables: adolescent self esteem and adolescent reports of family rules (see Table 3), indicating that at baseline the adolescents in the intervention group had higher self esteem and reported more appropriate family rules compared to adolescents in the control group. There was a significant time effect for nine variables: family closeness; family rules; family bothered by adolescent risky behaviors, drug use, smoking, and alcohol use; parent talk about risky behaviors; and adolescent and parent self esteem. These findings suggest that both intervention and control group means changed over time but following similar trajectories (see Table 3). There was a significant effect for group for one variable (adolescent self esteem). On the average, adolescent self esteem was higher for adolescents in the intervention group from T1 to T4.

The only variables suggesting significant group-time interactions (and thus indicating development of differences in group means over time between the intervention and control groups) were the scales completed by parents measuring parenting practices ($F(1,102)=2.61, p = .10$), and self esteem ($F(1,102)=2.39, p=.13$). The trajectories over time for these two mean scales favored the intervention group. These findings suggest that the Familias Fuertes intervention may have a positive

influence on promoting positive parenting behaviors, positive perceptions among parents about their family relationships, and higher parental self esteem, thus partially supporting the first study hypothesis. However, there were no suggestive group differences (as indicated by the p-value of group-time interactions) for any of the other scales, and thus the second, third, and fourth study hypotheses were not supported.

Table 3. Comparison of Intervention and Control Groups across Study Time Points

Hypothesis	Variable	Mean (SD)				Longitudinal Model Parameters		
		T1	T2	T3	T4	Parameter F(1,ddf)		
						Group	Time	Time*Group
	Parenting Practices Reported by							
1	Parent							
	I ^a	2.89(.49)	3.19(.51)	3.29(.51)	3.29(.53)	1.03(39)	3.02(102)	2.61(102)
	C ^b	3.13(.45)	2.88(.65)	2.91(.59)	3.14(.52)	0.32	0.09	0.11
	Family APGAR Reported by							
1	Parent							
	I ^a	1.54(.47)	1.56(.45)	1.64(.43)	1.59(.45)	2.09(39)	0.65(102)	0.10(102)
	C ^b	1.29(.58)	1.32(.61)	1.26(.50)	1.41(.48)	0.16	0.42	0.75
1	Parent Self Esteem							
	I ^a	3.31(.44)	3.38(.47)	3.66(.31)	3.80(1.27)	0.20(39)	4.93(102)	2.36(102)
	C ^b	3.01(.52)	3.09(.51)	3.10(.45)	3.11(.60)	0.66	<0.03	0.13
2	Family Closeness							

	I ^a	1.97(.62)	1.88(.53)	1.89(.55)	3.18(.48)	0.68(39)	43.4(102)	.54(102)
	C ^b	1.96(.37)	2.11(.61)	2.21(.72)	2.87(.59)	0.42	<0.0001	0.47
2	Spend Time with Family							
	I ^a	2.97(.55)	3.03(.58)	3.14(.38)	3.24(.28)	0.08(39)	3.42(102)	0.75(102)
	C ^b	2.97(.63)	2.98(.59)	3.03(.60)	3.06(.45)	0.77	0.07	0.39
2	Family Conflict							
	I ^a	1.55(.62)	1.91(.59)	1.78(.52)	1.43(.52)	0.07(39)	0.04(102)	0.17(102)
	C ^b	1.75(.48)	1.76(.53)	1.99(.74)	1.75(.51)	0.8	0.84	0.68
2	Family Worry							
	I ^a	2.28(1.27)	2.59(1.07)	2.56(1.25)	2.30(1.25)	0.52(39)	0.06(101)	0.03(101)
	C ^b	1.93(1.06)	2.25(1.07)	1.95(.90)	1.94(1.14)	0.47	0.8	0.86
2	Family Relationship							
	I ^a	3.57(.35)	3.57(.32)	3.53(.36)	3.50(.41)	0.44(39)	0.13(102)	0.21(102)
	C ^b	3.53(.45)	3.45(.42)	3.40(.49)	3.57(.35)	0.51	0.72	0.64
	Family APGAR Reported by							
2	Adolescent							
	I ^a	1.56(.51)	1.60(.48)	1.76(.24)	1.85(.37)	0.09(39)	2.35(102)	1.25(102)
	C ^b	1.44(.58)	1.38(.60)	1.32(.61)	1.49(.46)	0.76	0.13	0.27
2	Adolescent Self Esteem							
	I ^a	3.30(.46) c	3.38(.33)	3.47(.38)	3.40(.48)	6.64(39)	4.15(102)	0.94(102)

	C ^b	2.84(.50) ^c	3.18(.51)	3.05(.52)	3.15(.45)	<0.01	<0.04	0.33
3	Family Rules							
	I ^a	2.97(.71) ^c	3.28(.52)	3.19(.61)	3.52(.94)	3.40(39)	10.81(102)	0.18(102)
	C ^b	2.51(.55) ^c	2.46(.29)	2.79(.52)	2.86(.60)	0.07	<0.001	0.67
3	Parent Monitoring							
	I ^a	3.39(.69)	3.56(.49)	3.59(.52)	3.59(.52)	0.21(39)	0.40(106)	1.11(106)
	C ^b	3.21(.53)	3.27(.65)	3.17(.61)	3.17(.61)	0.65	0.53	0.3
	Family Bothered by Risky							
3	Behaviors							
	I ^a	3.27(.59)	3.39(.46)	3.45(.54)	3.52(.55)	2.31(39)	6.90(102)	1.20(102)
	C ^b	3.01(.96)	3.12(.94)	3.12(.92)	3.64(.45)	0.14	<0.001	0.28
3	Family Bothered by Smoking							
	I ^a	3.26(.54)	3.31(.48)	3.48(.57)	3.61(.48)	1.19(39)	7.33(102)	0.34(102)
	C ^b	3.06(.96)	3.10(.93)	3.10(.94)	3.65(.46)	0.28	<0.008	0.56
3	Family Bothered by Alcohol Use							
	I ^a	3.28(.64)	3.40(.51)	3.50(.57)	3.44(.67)	2.75(39)	5.33(102)	1.39(102)
	C ^b	2.96(.99)	3.10(.95)	3.11(.92)	3.57(.47)	0.11	<0.02	0.24
3	Family Bothered by Drug Use							
	I ^a	3.29(.64)	3.45(.48)	3.37(.54)	3.51(.56)	2.75(39)	6.80(102)	1.89(102)
	C ^b	3.00(.96)	3.16(1.01)	3.15(.95)	3.71(.47)	0.11	<0.01	0.17
3	Parents Talk About Risky Behaviors							

	I ^a	3.43(1.04)	3.58(.86)	3.75(.77)	3.70(.72)	3.27(39)	5.22(101)	0.92(101)
	C ^b	2.75(1.39)	3.46(.96)	3.09(1.12)	3.57(.81)	0.08	<0.02	0.34
4	Adolescents Use Substances							
	I ^a	1.03(.07)	1.01(.03)	1.01(.02)	1.01(.02)	0.43(39)	0.03(106)	0.13(106)
	C ^b	1.26(1.05)	1.06(.18)	1.31(.85)	1.31(.85)	0.52	0.86	0.72
4	Adolescents Use Tobacco							
	I ^a	1.0(0)	1.0(0)	1.0(0)	1.0(0)	1.4(39)	0.0(102)	0.0(102)
	C ^b	1.3(1.13)	1.21(.92)	1.63(1.26)	1.13(.34)	0.24	0.94	0.94
4	Adolescents Use Alcohol							
	I ^a	1.08(.20)	1.03(.09)	1.02(.06)	1.00(.00)	1.21(39)	0.70(102)	0.05(102)
	C ^b	1.30(1.04)	1.13(.32)	1.41(.89)	1.06(.14)	0.28	0.41	0.82
4	Adolescents Use Drugs							
	I ^a	1.00(.00)	1.00(.00)	1.00(.00)	1.00(.00)	1.25(39)	0.38(102)	0.38(102)
	C ^b	1.23(1.05)	1.00(.00)	1.20(.89)	1.00(.00)	0.27	0.54	0.54

I^a = Intervention Group;

C^b = Control Group;

^c Indicates significant differences between Intervention and Control Groups at T1 (baseline)

Effect Size Estimation

Because one of the main objectives of the study was to estimate effect sizes, further analyses were conducted in order to calculate the time-averaged mean differences across the four measurement periods, and to calculate the approximate sample size per group needed to detect the time-averaged differences between the groups across four measurement periods, with a power of 80% and an alpha of .05, assuming similar conditions as in the present study. These calculations assumed the covariance structures that were obtained in the current study. Table 4 illustrates the results of these analyses. These findings can be used in planning future research to identify measures most likely to be sensitive to change from the FF intervention, and to identify estimated sample sizes needed to detect these changes.

Table 4. Sample Size Calculations for Study Variables

Hypothesis	Variable	Observed time- averaged difference	Residual Variance	Autoregressive correlation parameter, AR(1)	Required sample size per group*
1	Parenting Practices Reported by Parent	0.15	0.29	0.33	80
1	Family APGAR Reported by Parent	0.26	0.25	0.49	30
1	Parent Self Esteem	0.46	0.36	0.12	26
2	Family Closeness	-0.06	0.39	0.08	466
2	Spend Time with Family	0.09	0.27	0.68	383
2	Family Conflict	-0.14	0.34	0.28	102
2	Family Worry	0.41	1.29	0.54	64
2	Family Relationship	0.05	0.16	0.47	411
2	Family APGAR Reported by Adolescent	0.28	0.25	0.4	28
2	Adolescent Self Esteem	0.33	0.23	0.43	17
3	Family Rules	0.58	0.38	0.38	10
3	Parent Monitoring	0.32	0.34	0.53	28
3	Family Bothered by Risky	0.18	0.53	0.44	113

	Behaviors				
	Family Bothered by	0.18	0.53	0.39	108
3	Smoking				
	Family Bothered by Alcohol	0.22	0.58	0.45	87
3	Use				
	Family Bothered by Drug	0.15	0.57	0.43	187
3	Use				
	Parents Talk About Risky	0.39	1.04	0.39	47
3	Behaviors				
	Adolescents Use	-0.22	0.37	0.54	66
4	Substances				
4	Adolescents Use Tobacco	-0.3	0.52	0.09	33
4	Adolescents Use Alcohol	-0.19	0.3	0.09	36
4	Adolescents Use Drugs	-0.1	0.27	-0.001	106

* Approximate sample size per group needed to detect the observed time-averaged difference between groups with 80% power, at $\alpha=0.05$, and with 4 repeated measurements.

Examination of the logs that were maintained by the FF facilitators indicated that the facilitators implemented all key components of each of the seven adolescent, parent, and family sessions. Parents and adolescents were enthusiastic about participating in the program, and often wanted the program to continue rather than end at the appointed hour. During the final session when asked about recommendations for changes or modifications in the program, the most common response was the recommendation that the program be continued for longer than 7 weeks, applying this

program to other populations, allowing more time for each session, including more games in the sessions, adding additional topics, and offering the program to young people who have problems with drugs.

Discussion

Although the data from the facilitators' logs indicated that both parents and adolescents responded positively and enthusiastically to the intervention, the quantitative findings provided only partial support for the first study hypothesis. The findings did not support the second, third, and fourth hypotheses. There could be several explanations for these findings. The first is that since this was a pilot project, the sample size was too small to detect differences between the intervention and control groups. The use of a small convenience sample recruited from a single school in a low-income neighborhood in Tegucigalpa was a major limitation to the study.

A second explanation for the failure to support the second, third, and fourth hypotheses is that the measures may not have been sensitive enough to detect group differences as a result of the intervention. Although the Family APGAR and self esteem measures were established instruments with extensive documentation of their reliability and validity, these measures have not been used to detect differences as a result of the FF intervention. The scales completed by adolescents to assess their perceptions of family relationships and their use of drugs, alcohol, and tobacco were adapted from measures used in the previous evaluation of the FF program that had been conducted in Peru and El Salvador. Although these scales had face validity and had been adapted from measures used by the Center for Substance Abuse Prevention and from studies conducted in Spain,¹⁸ there was limited information on the reliability and validity of the adapted scales.

There were group differences identified in the scale completed by parents to describe their parenting practices. This scale was adapted from the pre- and post-test of parenting behaviors that was developed by Virginia Molgard and used in the evaluation of the English version of the SFP 10-14 program. This scale may be a more sensitive measure of change in the parenting behaviors that are targeted by the FF program than the measures of adolescent perceptions of parenting and family measures that were used in this study.

There were significant increases over time in the scores on nine of the study variables (family closeness; family rules; family bothered by adolescent risky behaviors, drug use, smoking, and alcohol use; parent talk about risky behaviors; and adolescent and parent self esteem). One explanation for this finding might be a Hawthorne effect or a measurement

effect that influenced reporting by parents and adolescents in both the intervention and control groups. Adolescent self esteem was consistently higher in the intervention compared to the control group from T1 to T4. It is difficult to explain why the randomization failed to balance the groups in terms of adolescent self esteem. However, since adolescents in the intervention group reported significantly higher level of self esteem at baseline compared to adolescents in the control group, it may be that there was little room for improvement as a result of the intervention.

It is difficult to compare results on the parent measures from this study and from the previous study conducted in El Salvador because different measures were used in the two studies. However, the same measures of adolescent reports of parenting and family relationships were used in both studies, so these results can be compared. In the El Salvador study, there were significant improvements in adolescent reports of parental closeness, spending time with families, and appropriate family rules from baseline to the end of the 7-week program among adolescents in the intervention, but not the control group. One reason for the difference in findings between the two studies might be differences in the sample characteristics. The mean age of the adolescents in the El Salvador study was 12.8 years (slightly older than the mean age of adolescents in the present study). A total of 63% of intervention and 60% of control group adolescents in the El Salvador study lived with both parents, compared to 25% and 38.1% in the present study.¹⁷ Further research is needed with different samples to determine whether these differences identified in the El Salvador study can be replicated. Although the SFP 10-14 program was adapted by PAHO to ensure that it was culturally relevant for Latin American families, the findings from this study suggest that there is a need for further research with different samples, to ensure that the program is culturally relevant and effective in Latin America.

Despite the limitations related to sample size and measurement, there were a number of strengths to this study. There were extensive measures taken to ensure the integrity of the administration of the intervention, including maintenance of logs by the program facilitators to ensure that key components of each session were addressed. The collection of post-intervention data at three time points, up to 1 year after the end of the intervention represents an additional strength.

Another strength of this study was the calculation of the approximate sample size per group needed to detect group differences to guide future studies with larger sample sizes. Obviously, a limitation of these calculations, as with any other retrospective power and sample size calculations, is that it is assumed that similar conditions as in the present study would apply. Any changes in the procedures or the intervention would possibly change the effect sizes and required sample sizes. However, some scales such as Family Closeness, Spend Time With Family, and Family Relationship,

appeared to be insensitive to the intervention and it is likely that in future occasions participant burden can be decreased by not applying these instruments.

The findings from this study provide important guidance in planning future evaluations of the Familias Fuertes intervention; outcome data allow more accurate power analyses to ensure an adequate sample size to detect differences in the various subscales that were used. The finding that some of the scales had extremely low power should guide researchers in selection of alternative instruments that may be more reliable and valid. The enthusiastic response of the families who participated in this intervention suggests that the program may be an effective strategy to enhance parent/adolescent relationships and thereby reduce the risk of problems such as teen pregnancy, sexually transmitted diseases, and substance abuse. Further research is needed to evaluate the program with larger samples, and with more valid and reliable instruments, before the intervention can be recommended for widespread implementation in Latin America.

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