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Preventing Substance Use among Early Asian-American Adolescent Girls: Initial Evaluation of a Web-Based, Mother-Daughter Program

Lin Fang, Ph.D,

The University of Toronto, Factor-Inwentash Faculty of Social Work, 246 Bloor Street W., Toronto, ON M5S 1A1, Canada

Steven P. Schinke, Ph.D, and

Columbia University School of Social Work, 1255 Amsterdam Avenue, New York, NY 10027

Kristin C. A. Cole, M.S.

Columbia University School of Social Work, 1255 Amsterdam Avenue, New York, NY 10027

Abstract

Purpose—This study examined the efficacy and generalizability of a family-oriented, web-based substance use prevention program to young Asian-American adolescent girls.

Methods—Between September and December 2007, 108 Asian-American girls aged 10-14 years and their mothers were recruited through online advertisements and from community service agencies. Mother-daughter dyads were randomly assigned to an intervention arm or to a test-only control arm. Following pretest measurement, intervention-arm dyads completed a 9-session web-based substance use prevention program. Guided by family interaction theory, the program aimed to improve girls' psychological states, strengthen substance use prevention skills, increase mother-daughter interactions, enhance maternal monitoring, and prevent girls' substance use. Study outcomes were assessed using generalized estimating equations.

Results—At posttest, relative to control-arm girls, intervention-arm girls showed less depressed mood; reported improved self-efficacy and refusal skills; had higher levels of mother-daughter closeness, mother-daughter communication, and maternal monitoring; and reported more family rules against substance use. Intervention-arm girls also reported fewer instances of alcohol, marijuana, and illicit prescription drug use, and expressed lower intentions to use substances in the future.

Conclusions—A family-oriented, web-based substance use prevention program was efficacious in preventing substance use behavior among early Asian-American adolescent girls.

Keywords

Asian Americans; adolescent; female; family; prevention; substance use; computer; web-based

Corresponding author: Lin Fang, 246 Bloor Street W., Toronto, ON M5S 1A1, Canada; tel. 416.946.5084; fax. 416.978.7072; lin.fang@utoronto.ca.

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Introduction

Notwithstanding their popular image as members of a model minority group, Asian-American adolescent girls face increasing risks for substance use [1]. Little research has invested in developing and testing prevention programs for Asian-American adolescent girls. Meta-analytic data showing that Asians are nearly excluded from the youth treatment outcome literature highlight the need to include adequate number of Asian Americans in clinical trials [2]. Addressing this research gap, we tested the generalizability of a family-based, gender-specific program with a sample of Asian-American adolescent girls and their mothers, and evaluated the program's outcomes on girls' substance use, psychological states, substance use prevention skills, parent-child interactions, and parental monitoring and rules against substance use.

Methods

Study participants were recruited through advertisements on craigslist.org and in mailings to Asian community service agencies in 19 states with significant Asian populations between September and December 2007. To be eligible, girls needed to be Asian, be aged between 11 and 14 years, have private access to a computer, and have mothers' active participation. Among 206 mother-daughter dyads screened, 98 were excluded (37 ineligible, 36 failed to consent/assent, 25 unreachable by mail) and 108 were recruited and randomized. The study protocol was approved by Columbia University's Institutional Review Board.

Procedure

Mother-daughter dyads were randomly assigned to intervention ($n = 56$) and control arms ($n = 52$). Girls and mothers had separate and unique log-in names and passwords, and each completed a pretest and posttest survey online. Following pretest measurement, intervention-arm dyads received, via email, a username and password to interact with a 9-session web-based substance use prevention program at home and at times convenient to them. Delivered by voice-over narration, animated graphics, and games, session content involved skill demonstrations and interactive exercises that required the joint participation of mothers and daughters. Mother-daughter dyads were asked to complete one session per week. Each session lasted approximately 45 minutes. The average length of time between baseline and post-intervention survey completion was 6.25 months ($SD = 2.25$; Range = 5.5).

Control-arm dyads received no intervention. Intervention participants could not access post-intervention measures unless they completed all program sessions. Posttest data collection occurred approximately 1 year after pretest. Each participant received incentives of gift certificates (valued at \$20 and \$25 respectively at the two measurement occasions) for completing study measures.

Intervention

The substance use prevention program (Table 1) was guided by family interaction theory [3]. Positing that parent-child dynamics during pre- and early-adolescent years play a significant role to adolescent substance use, family interaction theory suggests that strong parent-child communication, appropriate parental monitoring, high levels of parental involvement, and high levels of parent-child communication can buffer against peer and psychological risks and decrease adolescent substance use. Aiming to preventing girls' substance use through enhancing mother-daughter interactions, the program helped mothers establish clear rules about consequences for substance use, manage conflict, monitor their daughters' behavior and activities, improve their children's self-esteem, and gain competency in empathizing with their daughters and assisting them in coping with stress. At the same time, the program assisted girls

to manage stress and interpersonal conflict, build refusal skills, enhance self-efficacy, increase their social supports and prosocial activities, and maintain close relationships with their mothers.

Measures

Demographic data were obtained from girls and mothers. At pretest and posttest, girls reported their use of alcohol, cigarettes, marijuana, and prescription drugs for non-medical purpose in the past 30 days, and their intentions in engaging in substance use in the future. Girls also completed measures concerning depression ($\alpha = 0.71-0.89$) [4], self-efficacy ($\alpha = 0.95$) [5], refusal skills ($\alpha = 0.71-0.89$) [6], mother-daughter closeness ($\alpha = 0.91$) [7], mother-daughter communication ($\alpha = 0.80-0.84$) [8], maternal monitoring ($\alpha = 0.88$) [9], and family rules against substance use ($\alpha = 0.77-0.83$) [10]. All survey instruments were administered in English.

Results

Two mother-daughter dyads attrited from each arm, and 104 dyads (54 intervention and 50 control) successfully completed both pretest and posttest measures. At pretest, 41.3% ($n = 43$) of girls had used alcohol, 6.7% ($n = 7$) cigarettes, 3.8% ($n = 4$) marijuana, and 21.1% ($n = 22$) illicit prescription drugs in the past 12 months. No demographic differences were found between intervention and control arms at pretest (Table 2). Generalized estimating equations (GEE) tested between-arm differences for repeated measures outcome variables. Relative to control-arm girls, at posttest, intervention-arm girls reported less depressed mood ($p = .045$), greater self-efficacy ($p = .002$), better refusal skills ($p = .014$), higher levels of mother-daughter closeness ($p = .0001$), improved mother-daughter communication ($p = .03$), greater maternal monitoring ($p = .0003$), and more family rules against substance use ($p = .0004$). Intervention-arm girls also reported fewer instances of using alcohol ($p = .016$), marijuana ($p = .009$), and prescription drugs for non-medical purposes ($p = .017$), and expressed lower intentions to use substances in the future ($p = .004$).

Discussion

This is the first randomized controlled trial that examines the efficacy of a family-oriented substance use prevention program for Asian-American adolescent girls. Facilitated by online recruitment, the web-based program reached a substantial number of Asian-American participants in a relatively short period. Girls were largely second-generation Asian Americans from socioeconomically advantaged backgrounds. Participants involved in the intervention improved on measures of their psychological states, substance use prevention skills, and maternal relationships. These girls also reported more parental monitoring and rules against substance use. Most important, intervention-arm girls reported less substances use than their control-arm counterparts.

Study findings should be interpreted with caution. The program was delivered in English, and was inaccessible to non-English-speaking participants. Findings are most salient for second-generation, acculturated Asian-American girls. That participating families were required to have a computer to access the computerized program and were mostly recruited online further limited the generalizability of study findings. Lastly, the program content was not designed expressly for Asian Americans and lacked cultural specificity. Given that substance use is a culturally and contextually dependent behavior, culturally relevant programs that enhance the content relevance for Asian-American youth warrant further development and testing.

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Table 1

Session themes and sample activities of the web-based, mother-daughter substance use prevention program

Session Theme	Sample Activity
1. Mother-daughter relationship	<ul style="list-style-type: none"> The "active listening" exercise assisted to establish foundations for sharing, camaraderie, and trust between mothers and daughters
2. Conflict management	<ul style="list-style-type: none"> A role play illustrated rude and polite behaviors, followed by mothers and daughters taking turns to discuss their experiences of such behaviors, and how these experiences made them feel.
3. Substance use opportunities	<ul style="list-style-type: none"> Animated vignettes illustrated how engaging in or avoiding substance use opportunities respectively hurt or benefited adolescent girls
4. Body image	<ul style="list-style-type: none"> Activities emphasized the importance of prioritizing a healthy body, rather than a conventionally attractive body, and demonstrated that using substances to deal with body image issues was unhealthy and counterproductive.
5. Mood management	<ul style="list-style-type: none"> The "reframing exercises" taught girls and mothers to identify and manipulate the connection between behavior and mood by <i>reframing</i> events and their responses to these events, and showed participants that using substances to cope with low mood was dangerous.
6. Stress management	<ul style="list-style-type: none"> Animated characters illustrated for girls and their mothers signals of stress and healthy ways to defuse it and asked girls to list their various sources of stress.
7. Problem solving	<ul style="list-style-type: none"> Animated vignettes and interactive exercises demonstrated the steps of <i>Stop</i>, <i>Options</i>, <i>Decide</i>, <i>Act</i>, and <i>Self-praise</i> and engaged girls to practice these steps with their mothers' assistance.
8. Social influences	<ul style="list-style-type: none"> Graphics and visuals demonstrated to girls and their mothers the actual prevalence of substance use among adolescent girls and boys and corrected misperceptions.
9. Self-efficacy	<ul style="list-style-type: none"> An interactive game taught girls and their mothers assertive skills and the value of encouragement. Girls and their mothers can only advance in the game if they use positive reinforcement or praise.

Baseline and posttest data for 104 dyads of Asian-American adolescent girls and their mothers in a randomized controlled trial of a web-based substance use prevention program between September and December 2007

Table 2

	Baseline		Posttest		Intervention by time interaction effect	
	Control (n = 50)	Intervention (n = 54)	Control (n = 50)	Intervention (n = 54)	Wald χ^2	P
Demographic Variables						
Girl's age, y, mean (SD)	13.25 (0.94)	12.99 (0.96)				.17 ^d
Mother's age, y, mean (SD)	41.06 (7.10)	39.42 (6.48)				.22 ^d
Foreign-born girls, %	14.0	20.4				.45 ^e
Foreign-born mothers, %	64.0	55.6				.53 ^e
Single parent, %	18.0	13.0				.48 ^e
Mothers' highest education, %						.50 ^e
High school	32.0	22.2				
College	40.0	24.6				
Graduate school	28.0	35.2				
Outcome Variables ^a						
Depression (SE) ^b	1.62 (0.57)	1.41 (0.88)	1.68 (0.71)	1.26 (0.73)	3.97	.045
Self-efficacy (SE)	3.46 (0.71)	3.54 (0.69)	3.24 (0.92)	3.78 (0.50)	9.73	.002
Refusal skills (SE)	3.52 (0.79)	3.54 (0.67)	3.34 (0.75)	3.70 (0.57)	6.02	.014
Mother-daughter closeness (SE)	2.88 (1.15)	3.02 (1.04)	2.70 (1.17)	3.41 (0.88)	15.51	.0001
Mother-daughter communication (SE)	3.27 (2.40)	3.50 (2.04)	2.85 (1.80)	3.61 (2.03)	4.62	.03
Maternal monitoring (SE)	4.39 (0.87)	4.39 (0.72)	4.22 (0.84)	4.67 (0.58)	13.00	.0003
Family rules (SE)	1.97 (1.62)	1.92 (1.62)	1.83 (1.62)	2.62 (1.32)	12.48	.0004
30-Day Substance Use (SE) ^c						
Alcohol	0.26 (0.78)	0.06 (0.23)	0.74 (1.92)	0.07 (0.33)	5.85	.016
Cigarettes	0.06 (0.31)	0.13 (0.58)	1.84 (10.23)	0.02 (0.14)	3.54	.06
Marijuana	0.004 (0.02)	0.001 (0.01)	0.01 (0.03)	0 (0.00)	6.84	.009
Prescription drugs	0.03 (0.13)	0.06 (0.25)	0.14 (0.61)	0.01 (0.03)	5.73	.017
Intention to use in the future (SE)	3.04 (2.80)	2.70 (2.14)	3.70 (3.39)	2.11 (2.05)	8.10	.004

Note. Wald χ^2 and *P* values were derived using the generalized estimating equation (GEE) models. Adjusting for within-subject model correlations, GEE models included outcomes as the dependent variables, and group assignment, time and interaction of the two variables as independent variables. Frequency of substance use in the past 30 days was analyzed through log link by specifying the Poisson distribution in the GEE. Linear GEE models were used to analyze all other outcome variables. We assessed whether including the demographic variables (i.e. girl's age, mother's age, girls' and mothers' foreign-born status, mother's education, and household composition) would change the coefficient of the interaction term by more than 10%. No confounding was found so these variables were not included.

^a Except as noted, scores are from 5-point scales; higher scores are better.

^b Scores are from 5-point scales; lower scores are better.

^c Occasions of use in the past 30 days.

^d Using the *t* test.

^e Using the χ^2 test.