Effectiveness of Community-based Substance Use Prevention Program Among Adolescents - Using Social Cognitive Theory

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Abstract

Background

This study aims to assess a tailored community-based intervention protocol for preventing substance use in Iranian adolescents based on social cognitive theory.

Methods

An ecological approach, Mobilizing for Action through Planning and Partnership(MAPP), was used to develop an intervention for preventing substance use among 180 adolescences (14-18 years old) participating in the study in Iran, through six main steps. Outcomes were analyzed 6, 18, and 24 months later by the SPSS.23. RM-ANOVA, ANCOVA, and Pearson correlation tests were used for data analysis.

Results

Almost more than 40% of the adolescents from Qhahjavarestan county participated in this study in 4 stages measurement. Substance use behavior explainers, including positive outcome expectancies ($p<0.001$, $F=25$), negative outcomes expectancies ($p<0.001$, $F=31.2$), and self-efficacy ($p<0.001$, $F=12.3$), were significantly promoted in the intervention group at three stages (6, 18, and 24 months after intervention). The program demonstrated insignificant reductions in cigarette, alcohol, and drug use at the initial users, but the incidence of new cases of cigarette using ($p<0.001$, $F=9.93$) and alcohol drinking ($p<0.07$, $F=2.9$) in the intervention group was reduced at 6 and 18 months after the intervention.

Conclusion

Our results support the effectiveness of a community-based educational program based on social cognitive theory to reduce the incidence of new cases of drug users among adolescents. More effective educational interventions with a greater focus on self-efficacy and social support may be warranted.

Introduction

Substance use and abuse continue to be important public health problems that contribute greatly to morbidity and mortality rates globally[1-3]. Although drug abuse and smoking show a reasonably stable or reducing trend in many developed countries, they are rapidly increasing in developing countries[4,5]. Thus, in the next few years, the major burden of drug abuse and smoking will be imposed on these countries, which are less equipped to cope with these challenges[6].

Over recent decades, Iran has also suffered from substance abuse consequencing in social, psychological, familial, and economic calamity[7,8]. According to a meta-analysis study in Iran, overall estimates for adolescents' cigarette smoking and chewing tobacco/pan/nas in the general population have been 16.8% and 10.0%, respectively[9]. In other studies, the prevalence of tobacco usage (cigarettes, hookah, and pipe) among high school students have been reported as 18-24% in their lifetime[10-12].

Substance use among young adults is often the result of multiple contributing factors. Young adults are influenced not only by their specific personality traits or genetics but also by their relationships with others, the institutions, as well as communities to which they belong, and the broader society in which those institutions are embedded[13-16]. Findings show that the most effective programs target salient risk and protective factors at the individual, family, and/or community levels, and are guided by relevant psychosocial theories regarding the etiology of substance use and abuse [17-21].

Social Cognitive Theory is applied in the field of substance use, claiming that people presume positive expectancies and attitudes towards substances through the process of observing or imitating positive statements or attitudes of their models. It essentially purports triadic reciprocity between behavior, personal factors, and environment [18]. Another research has also shown that community-based programs based on these factors can be effective in preventing adolescent substance use[20].

Mobilizing for Action through Planning and Partnerships (MAPP) is one of such community-based strategic planning processes for improving community health (Figure.1). It applies strategic thinking to prioritize and address health issues, and it is suggested as a useful and effective tool further to enhance the development and application of these theories to prevent substance use in the community[22,23].

Due to the absence of comprehensive theoretical approaches in community-based interventions in Iran, this study aimed to assess a sustainable tailored health promotion program from the perspective of social cognitive theory in preventing substance use among adolescences. The outcomes have been criticized for adolescent's cognitive factors, including positive and negative outcome expectancies, self-efficacy, perceived social support, and concerning cigarette, alcohol, and other drug use.

Materials And Methods

A multidisciplinary team of researchers started working on this project based on a systematic stepwise approach combining the SCT and MAPP protocol in the Substance Use Prevention Program in Adolescents (SUPPIA).

To identify the high-risk counties in Isfahan province, according to the results of a cross-sectional study of the research team[12,24,25] as well as holding a focus group with the representatives of the United Nations Office of Drugs and Crime (UNODC) in Isfahan, Qahhvarestan and Gavart counties were selected, and assigned to intervention and control groups randomly. The two counties had similar cultural, educational, occupational, and economic situations. (Table.3). the intervention based on the MAPP model(Figure.1) included the following six phases:

In the first phase, the steering committee appointed key stakeholders from the health volunteers, local clerics, city council, and head of the municipality, in this city. In the second phase, "prevention of substance use in adolescences in Qahhgavarestan" was chosen as a *vision* according to the steering committee and stakeholders' views participating in several focus group meetings. In the third phase, the four assessments were done to provide the bulk of data that informed the generation of strategies and goals (the methods of the 4 assessments are in publish elsewhere). In the fourth phase, *to identify and develop our strategic issues*, data of four assessments were used to help paint a clear picture of the needs on hand. In the fourth phase, the group set goals for each strategy based on the vision, and assessment. In the fifth phase, *to implement* the program according to the goals and results of assessment extracted from the previous phases, the strategies were scheduled (Table1-2).

In the last step, for monitoring and evaluating the program, at baseline and three follow-ups (6, 18, and 24 mounts later), a self-completed questionnaire by students was collected. The EUDAP questionnaire was used to investigate intrapersonal, interpersonal, and environmental factors influencing behavior. The questionnaires assessed the elements of socio-demographic, adolescent's substance use, knowledge, resistance self-efficacy, outcome expectancies, perceived social support, coping skills, substance use in the family, and social environment[26,27]. The questionnaires were localized in Iran by Fathian and colleagues and were confirmed to have adequate internal consistency for Iranian adolescents (Cronbach's alpha = 0.75–0.85)[12,28].

Ethical consideration: Before completing the questionnaire, the study was approved by the committee of faculty members and the ethics committee (No:73/M/4/12), Social Deputy of Police(No:91397882), and Drug Coordinating Council(No:358048). For ethical reasons, a cover letter was attached to each questionnaire, emphasizing that participants' responses were anonymous and would remain confidential. Participation was voluntary and participants had the opportunity to review the study questionnaire before indicating whether they wanted to participate. All adolescents gave written informed consent from their parents to participate in the study .

Statistical analysis: Questionnaires were completed in 4 stages (before the intervention and 6, 18, and 24 months after the intervention).

Statistical analysis: Kolmogorov-Smirnov test was used for data normality. Also, independent and paired t-test were used for comparison between and within the intervention and comparison groups. ANCOVA with pre-test scores was used to compare between the two groups at post-test and follow-up. Analysis of variance with repeated measures was used to examine the trend of between- and within-group changes.

Results

Approximately 57% of the adolescents in the Qahjavarestan County enrolled in the intervention group. Of the 98% who participated in the baseline assessment; 96% of those participating in the baseline assessment also participated at wave 2; 95% of those participating in the baseline assessment also participated at wave 3. Due to the locality and availability of the intervention group, we did not have much loss at 3 waves of measurement in intervention group. In the control group (Gavart county), 70 questionnaires were completed by 14-18-year-old adolescents selected by simple random sampling in public places, such as parks, libraries, cafes, and shops. A stationery pack was given as a gift to those who completed the questionnaires. Table 3 presents the selected socio-demographic characteristics of the 140 adolescents who participated in our study (Table.3).

The results indicated that the effect of time, group, and time-group on promoting perceived self-efficacy, positive outcome expectancies, and negative outcome expectancies in the three waves of measurement, had a significant difference between intervention and control groups (Table.4).

Table 5 displays the means and standard error for students' cigarette, alcohol, and other drug use by condition and wave. It should be noted that the difference between the two groups was mainly due to an increase in the rate of substance use in the control group, indicating a decrease in the incidence and preventive effect of the intervention program in the intervention group (Table.5).

Discussion

This paper describes a 2-year-follow-up community-based intervention using the MAPP protocol in six main steps: mobilizing and partnership of most stockholders and organizations, preparing the vision based on the stakeholders and string committee's opinion, and assessing a wide-ranging needs assessment in 4 steps; extracting intervention methods and strategies based on SCT in three levels of individual, family, and environment; evaluating the program outcomes in 6, 18, and 24 months later. The outcomes have been criticized for adolescent's cognitive factors, including positive and negative outcome expectancies, self-efficacy, perceived social support, and concerning cigarette, alcohol, and other drug use.

Substance use behavior explainers, including positive outcomes expectancies, negative outcomes expectancies, and self-efficacy, were significantly promoted in the intervention group compared to the control group over time ($p<0.001$). However, perceived social support did not increase significantly in the intervention group. The effect of time for cigarette smoking in the intervention group was significant in four stages of measurement ($P<0.001$, $F=9.93$); however, it was not significant for alcohol and other drugs. The effect of group for smoking, alcohol, and other drug use was significant in four stages ($P<0.01$), indicating an increase in using all three types of substances in the control group. This finding illustrates the role of prevention in the present study in reducing the incidence of new cases in the intervention group compared with the control. Further, according to the results, the present intervention did not

show a significant decrease in the number of former alcohol and other drug users; however, the number of prior cigarette users decreased, with a minimal effect size according to Cohen's criterion ($ES=0.15$).

In Chou study to evaluate the effects of a community-based prevention program on decreasing drug use in high-risk adolescents, the results showed a significant reduction in cigarette use at the initial follow-up (6 months) and the alcohol use at the first 2 follow-ups (up to 1.5 years); he concluded that primary prevention program could reach and influence high-risk adolescents[29]. The difference between the Chou study and ours in reducing smoking and alcohol use further could be due to the number of substance users. In his intervention group, almost all of the adolescents in the Chu group had at least one-time alcohol or cigarette use in their life; however, in our study, most of the adolescents had never used drugs or cigarettes in their life. The results, though, did not show a good effect in decreasing substance use in the intervention group that could be due to the short follow-up time. Since this is a prevention study and the number of substance abusers in the group is initially very low, a long-term follow-up of 5 years or more is recommended to evaluate the effects of the intervention in reducing substance use in adolescents.

Limitation: This study had several methodological limitations. For example, a possible threat to the validity of the findings was the reliance on self-reported drug use. However, extensive research conducted on the validity of self-reported smoking dispels this concern[30]³⁰. Fathers' absence in parent training sessions, despite meetings on weekends and registration based on their willingness, was another problem with the plan. Informing parents about the importance of properly communicating with their children in preventing high-risk behaviors and paying more attention to peer groups can play an influential role in resolving this problem in future studies.

Conclusion

The community-based prevention intervention described in this article provides the detailed protocol design of a prevention effort to reduce adolescents' substance use in individual, family, and community levels using social cognitive theory, offering new insights into substance use prevention. The feasibility test of this design in these communities has demonstrated the practical and potential effectiveness of such a comprehensive and mutually supporting strategy set, which should next be tested for efficacy in other societies using the strategies described above. The reduction of new cases of drug, cigarette, and alcohol use in the intervention group over time indicates the preventive effect of the current intervention on substance use in adolescents. However, to reduce the substance use rate in initial users, it is necessary to consider other approaches and strategies in such interventions.

Abbreviations

SUPPIA: substance use prevention program in adolescents

MAPP: mobilizing for action through partnership and planning

SCT: social cognitive theory

S-E: self-efficacy

UNODC: United Nations Office of Drugs and Crime

Declarations

Ethics approval and consent to participate:

Before completing the questionnaire, the study was approved by the committee of faculty members and the ethics committee of Isfahan university of medical sciences (No:73/M/4/12), Social Deputy of Police(No:91397882), and Drug Coordinating Council(No:358048). For ethical reasons, a cover letter was attached to each questionnaire, emphasizing that participants' responses were anonymous and would remain confidential. Participation was voluntary and participants had the opportunity to review the study questionnaire before indicating whether they wanted to participate. All adolescents gave written informed consent from their parents to participate in the study .

Consent for publication: Not applicable.

Availability of data and material: data will be share if the journal ask for sharing.

Competing interests: All the authors declare that they have no competing interests.

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Contributions: Z.F and A.E conceived, designed and organized the study. Z.F ,A.E, F.GH and F.M drafted the manuscript; and Z.F critiqued the manuscript for important intellectual content. All authors read and approved the final version of the manuscript.

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Tables

Table 1. Description of methods and strategies based on the social cognitive theory *in adolescences in 8 sessions*

constructs	Strategies	Methods
Session one: promoting knowledge	Providing written and verbal information about the drugs	<ol style="list-style-type: none"> 1. Educating on the type, category, and appearance of all kinds of drugs by trained staff of the social assistance department of police 2. Visiting the drug exhibition 3. Educating about the short-term and long-term effects of all kinds of drugs 4. Playing educational videos about drugs and their use consequences 5. Distributing books and pamphlets on all types of drugs and their use consequences
Session two and three: Promoting Outcome expectancies	<ol style="list-style-type: none"> 1.Expectancy: effort → performance (E→P) 2.Instrumentality: performance→ outcome(P→O) 3.Valence: outcome→ reward- Punishment 	<ol style="list-style-type: none"> 1. Discussing that one's effort (E) will result in attainment of desired performance (P) goals by perceived control, increasing self-efficacy, and achievable goals using the experiences of people with a history of drugs 2.1 Discussing that a person will receive a reward if the performance expectation is met. This reward is a future achievement and social popularity. 2.2. Discussing community valuation of addicts, besides health value and non-addiction in the future of adolescents 2.3. Discussing the expected outcomes of adolescents with drug use and explaining the real consequences of drug use by the formerly addicted people 3.3 Discussing the value an adolescent places on the future achievement and social popularity, as well as health benefits 3.4.Playing videos of people with a history of addiction and the consequences of drug use for them
Session four and five: Self-regulation	<ol style="list-style-type: none"> 1.Goal setting <ol style="list-style-type: none"> 1.1.Forethought phase 1.2Performance phase 1.3.Self-reflection phase 2. Self-efficacy <ol style="list-style-type: none"> 2.1Mastery experiences 2.2Vicarious experiences 2.3Verbal persuasion 2.4Emotional and physiological states 	<p>Four strategies are used for goal setting training:</p> <p>Direct Attention: Direct attention to behaviors that will assist in accomplishing the goal and avoidance of the behaviors that will not.</p> <p>Energizing: Inspiration to put in a certain amount of effort based upon the difficulty of achieving one's goal</p> <p>Task Persistence: The amount of time spent on the behavior to achieve a goal</p> <p>Effective Strategies: To achieve a goal, the individual seeks out different ways</p> <p>To promote resistance self-efficacy behavior</p> <ul style="list-style-type: none"> • Expression of the experiences of the former drug user • Video broadcasting expressions of drug use experience by famous people <p>- Encouragement of people who participate in discussions and role-playing in abstinence in a high-risk situation</p> <p>- Teaching relaxation techniques and reducing stress after doing new behaviors</p>
Session six and seven: Life skill	<ol style="list-style-type: none"> Assertiveness skill Problem-solving skill Decision-making skill 	<ol style="list-style-type: none"> 1. Training and practicing decision-making, assertiveness, and problem-solving skills by psychological experts through discussion and role-playing techniques 2. Preparing a wallpaper and brochure as a group work on the impact of life skills in reducing substance use in adolescents 3. Video recording of teaching educational material to family members by adolescents
Session eight: Percived social support	<ol style="list-style-type: none"> Emotional support Informational support Appraisal support Instrument support 	<p>Emotional support: Practical training of communication skills for their parents</p> <p>Informational support: Providing information to teenagers, friends, parents, and the general community about drugs and ways to prevent drug use</p> <p>Appraisal support: Encouraging adolescents and parents participating in the program (student stationery pack and barometer to parents)</p>

Table 2. Description of methods and strategies used in the SUPPIA (*parents and environment*)

	Determinant	Strategies
Parents	Session one: Promoting parents knowledge	1.Educating the type, category, and appearance of all kinds of drugs by trained staff of the social assistance department of police 2.Educating about the short-term and long-term effects of all kinds of drugs 4. Playing educational videos about drugs and the consequences of drug use 5. Distributing books and pamphlets on all types of drugs and the consequences of drug use among parents
	Session 2-4: Promoting parents life skills	1. Training and practicing decision-making, assertiveness, and problem-solving skills by psychological experts through discussion and role-playing techniques 2. Preparing a wallpaper as a group work on the impact of life skills in reducing substance use in their adolescents
Environment	Promoting Social motivation	Holding a media campaign by: 1. Installing posters on the consequences of drug use in all public places 2. Sending daily text messages about the consequences of drug use to raise public awareness and support the drug use prevention program 3. Home training and brochure distribution by local health volunteers 4. Playing subtitles on drug abuse prevention from the provincial television network 5. Conducting a public conference to raise public awareness and social motivation 6. Establishing a drug exhibition to raise public awareness and social motivation

Table3: socio-demographic characteristics of the adolescents who participated in the present study.

Variables		Int (N/Mean)	Ctr(N/Mean)	P-Value
Age	Age	15.59±1.6	15.30±1.9	0.3
Sex	Female	33	30	0.73
	Male	38	40	
Education level	Grade1	36	19	0.83
	Grade2	10	7	
	Grade3	8	5	
	Grade4	7	6	
Dad education	Literacy	5	11	0.08
	Primary. Edu	45	32	
	Diploma	12	20	
	BS-MS	3	7	
Mom education	Literacy	9	13	0.06
	Primary. Edu	43	33	
	Diploma	14	20	
	BS-MS	0	3	
Income	Very good	5	2	0.6
	Good	30	33	
	Bad	23	22	
	Very bad	5	7	

Table 4: Mean, standard error, confidence interval, intra and inter-group comparisons of Positive and negative Outcome expectancies, Refusal Efficacy, and social support between intervention and control groups in four waves of measurement

Variables	Groups	Time 1 (Pretest)	Time 2	Time 3	Time 4	RM-ANOVA		
		Mean(SE)	Mean(SE)	Mean(SE)	Mean(SE)	Time	Group	Time.Group
Positive Outcome expectancies	Int N=50	10.63(4.8)	7.1(3.01)	6.92(2.74)	6.57(2.38)	p<0.001 F(1.8,92.2)=25	p<0.001 F(1,101)=18	p<0.001 F(3,99)=11
	Ctrl N=53	10.62(4.48)	9.94(4.63)	10.65(4.52)	11.12(4.38)	P=0.01 F(1.5,22.8)=1.6		
	ANCOVA	t=-0.09 p=0.26	p<0.001 F(1,111)=41.9	p<0.001 F(1,120)=8.7	p<0.001 F(1,114)=22.7			
Negative Outcome expectancies	Int N=51	11.61(3.10)	14.98(1.95)	14.80(1.76)	14.36(1.88)	p<0.001 F(2,101)=31.2	P=0.14 0.0F(1,110)=2.19	p<0.001 F(1.8,201)=26.6
	Ctrl N=58	12.93(4.02)	13.18(3.76)	13.18(3.76)	13.18(3.76)	P=.19 F(1,59)=1.76		
		t=0.18 p=0.85	p<0.001 F(1,112)=43	P=0.53 F(1,122)=0.4	P=0.82 F(1,123)=0.05			
Refusal Self-efficacy	Int N=49	12.46(3.16)	14.65(1.8)	14.28(2.06)	15.14(1.54)	p<0.001 F(3,46)=12.32	p<0.001 F(1,110)=48.8	p<0.001 F(2.8,314)=9.36
	Ctrl N=63	12.15(4.08)	10.61(3.64)	11.44(3.66)	11.38(4.04)	P=0.12 F(3,60)=2.02		
		t=0.91 p=.36	p<0.001 F(120,1)=59.6	p<0.001 F(124,1)=9.8	p<0.001 F(1,120)=22.5			
Social support	Int N=51	19.91(6.26)	20.60(4.02)	21.17(3.17)	20.66(3.07)	P=.24 F(df)=1.41(2)	P=.27 F(1,107)=1.22	P=0.02 F(3,303)=3.34
	Ctrl N=58	20.93(5.93)	19.76(4.76)	19.13(5.73)	19.29(5.47)	P=.09 F(df)=2.15(3)		
		t=0.18 p=0.85	P=.07 F(1,119)=3.4	P=.09 F(1,125)=2.82	P=0.12 F(1,125)=71(1)			

Table 5: Mean, standard error, confidence interval, intra and inter-group comparisons for outcomes of intervention including cigarette, alcohol, and other drug use between intervention and control groups in four waves of measurement

Variables	Groups	Time 1 (Pretest)	Time 2	Time 3	Time 4	RM-ANOVA		
		Mean(SE)	Mean(SE)	Mean(SE)	Mean(SE)	Time	Group	Time.Group
Cigarette	Int N=56	5.37(0.42)	4.98(0.3)	4.82(0.25)	4.76(0.15)	p<0.001 F(1.23,68)=9.93	P=0.007 F(1,113)=7.6	P=0.04 F(2.6,249)=2.8
	Ctrl N=62	5.9(0.41)	6.50(0.84)	6.7(0.49)	6.93(0.49)	P=0.11 F(2.57,149)=2.07		
	ANCOVA	P=0.88 t=135	P=0.002 F(1,126)=9.58	P=0.03 F(1,123)=4.7	P=0.16 F(1,116)=1.95			
Alcohol	Int N=60	4.36(0.17)	4.48(0.61)	4.47(0.53)	4.45(0.58)	P=0.07 F(1.5,82)=2.9	p<0.001 F(1,114)=17.6	P=0.01 F(2.5-287)=4.03
	Ctrl N=65	5.2(0.24)	6.08(0.6)	6.3(0.5)	6.4(0.54)	P=0.01 F(2.5,148)=0.06)		
		t=0.57 p=0.57	p<0.001 F(1,126)=15.2	P=0.01 F(1,125)=6.06	P=0.01 F(1,119)=5.9			
Other drugs	Int N=56	4. (0.24)	4.25(0.5)	4.1(0.55)	4.1(0.0.48)	P=0.32 F(1,55)=1	p<0.001 F(1,119)=30.8	P=0.1 F(2.67,317)=2.06
	Ctrl N=66	5.2(0.24)	5.4(0.48)	6.5(0.51)	6.1(0.44)	P=0.07 F(2.7,170)=2.4		
		t=-2.6 p=0.01	P=0.04 F(1,139)=9.72	P=0.002 F(1,125)=9.7	P=0.003 F(1,121)=8.8			

Figures

Figure 1

Mobilizing for Action through Planning and Partnerships (MAPP) model