

Exploring attitudes and knowledge about drug abuse among 100 adolescents of four provinces in Iran and developing a participatory interactive training module for drug abuse prevention among 20 drugs exposed adolescents of Alborz and Golestan Provinces, Iran: An Intervention study.

Ava Rahmanian

Advisor: Dr. Kirk Allison

Abstract

Background: In view of the drug abuse issue in Iran, especially its prevalence among adolescents, awareness plays an essential role in prevention of its spread. Based on educational syllabi taught in schools there is not proper teaching material about this critical issue. On the other hand the necessity to have information about the societal awareness level is clear for starting any educational intervention. Therefore, the current study explored awareness about drug abuse among adolescents and then developed and piloted a participatory interactive training module for drug abuse prevention.

Methods: This study was conducted in 2019 in two steps. The first step was implemented in 4 cities: Tehran, Mashhad, Karaj, Gonbad-Qabous, and for a group of Afghan immigrants living in the countryside of Gonbad-Qabous. A validated questionnaire was adopted to determine knowledge, attitude, and practice of adolescents regarding addictive drugs. ^[17] This was accomplished by volunteer participation of 100 teenagers who were invited to the study by cluster sampling. The second step was conducted in Karaj and countryside of Gonbad-Qabous as intervention study.

Results: The study identified 100 adolescents' knowledge status and attitude toward drug abuse according to age and gender in 4 Provinces of Iran. 62% of participants had not studied about substances' effects before the treatment. 36% and 62% had intermediate and poor knowledge status about substance abuse respectively, and 77% in total had positive or very positive attitude toward drugs. Statistical results after treatment in two different locations with vulnerable populations clearly showed for Knowledge a 27.63 mean difference improvement on a scale of 100

after training compared to the before training and for Attitude a 37.46 mean difference decrease in positive attitude toward harmful drug use (p-value of <.000 for both).

Conclusions: According to the obtained results, knowledge is inversely related to positive tendency toward drugs among adolescents of 4 provinces of Iran and, based on the educational intervention (treatment) that has been performed, improved knowledge status is capable of decreasing positive attitude toward drugs dramatically. Regarding the importance of adolescent years in forming the future behaviors, it is essential to pay more time and attention to providing educational interventions.

Introduction

Illegal drugs and substances have had destructive impact on mental and general health of generations and adversely affect sustainable development.

Many actions have been taken globally to change society's knowledge and attitude toward drugs. These interventions are aimed to prevent illicit drug abuse. Adolescents' age groups are at greater risk of drug abuse because of less information about the problem. [16]

Reduction of substance abuse, as a public health challenge, depends on two important levels: 1) Policies which influence the levels and patterns of substance use, 2) Holding interventions at the health care system level that work on restoration of health in affected individuals. [7] Today one of the most critical issues for countries is drug abuse in adolescents because it is a complex of psychological, social, and physiological issues. [17] Based on a report by the head manager of the Presidency Drug Control Headquarter, the number of drug abusers reached 247 million out of 7.3 billion persons (3.4%) by 2014. [4][5] According to the latest epidemiologic research in 2015 in the Islamic Republic of Iran 5.4% of the country's population are drug abusers. The prevalence rate of drug abuse among high school students is 2.1%. On the other hand 55% of divorces, 65% of domestic violence, 25% of murders and 10% of financial crimes in Iran are related to drugs.

According to the World Drug Report 2018, 5.6 per cent of the global population aged 15-64 years, used drugs at least once during 2016; this means about 275 million people. 31 million of them needed treatment because they suffer from drug use disorders. And 13.8 million of young people aged 15-16 years used cannabis initial estimations suggest. [8][9] The World Health Organization

reported 450,000 deaths as a result of drug use in 2015. 167,750 of those deaths were directly associated with drug use such as overdose death but the rest mainly died because of HIV or hepatitis C infections through unsafe injecting practices.[8] The most harm – about 76 per cent of deaths – refers to opioids (mostly overdoses). 10.6 million worldwide inject drugs. Of these more than half live with hepatitis C, and one in eight lives with HIV endure the greatest health risk. [8] As the UNODC reported in the World Drug Report 2018, the range of substances and combinations available to users has never been wider because on the one hand drugs such as heroin and cocaine have been available for a long time, and on the other hand new psychoactive substances and use of non-medical prescription drugs increased recently. [8] 11 per cent of illicit drug users worldwide (one in nine) or 0.62 per cent (range: 0.34 to 0.91 percent) aged 15–64 years, suffer from drug abuse disorders. Those 11 percent need treatment for their dependency. A drug disorder is a state in which the person may experience drug dependence and/or require treatment. From 2015 to 2016 the number of drug users increase by about 1 million. This mainly reflects a global increase in the number of users of opiates and cocaine as well. [9] During the year of 2016, 192 million people used cannabis at least once. [10] Numbers of cannabis users have increased by roughly 16 per cent in the past decade globally. Today the drug problem becomes more complex because on the one hand the growing pathway of poly drug use and poly drug trafficking and on the other the growing stream of pharmaceutical preparations of unclear origin destined for non-medical use make this an issue with two parts, of health and society. [10]

In 2010 a study started to explore substance abuse among Iranian high school students. [11] The study showed 39.9 per cent of drug abusers were using opium (all forms), 46.3 per cent of those using heroin (all forms). In Iran, different forms of opium are used through smoking, eating / drinking or, rarely injecting. [12] The study compared the results with the last research in 2004 and it has been shown that gradually the use of substances has a trend from less dangerous opiates toward more dangerous hard opiates. The study mentioned that this is the first time in the history of drug use in Iran that heroin use is more prevalent than opium use.

Knowledge about the age of onset of substance abuse is particularly important. Various researches showed drug abuse often begins in adolescence. A study on high school students of Shiraz revealed 30.2% of students had experienced cigarette, alcohol, and narcotics and stimulants at least once in their lifetime.[19] In another study of high schools of Tehran, 6.9% of students experienced drug abuse and 16.9% experienced cigarette smoking. Alcohol, opium, and marijuana were the most

prevalent drugs. [18] The declining age range of addicts and drug abusers is a global concern. The drug abuse issue creates various problems such as destruction of social and economic resources, threat to social security, and various forms of maladaptive behaviors. [20]

In 2017 the "System of Social Care for Students" (known as "NAMAD" in Iran) started. It is a school based plan for developing awareness about social harm between high school students. [5][6] The plan has been started as a pilot in six states of Iran under supervision of the Ministry of Education, the Police, the Judiciary, the Social Welfare Organization and the Barekat Foundation. Although the head manager of Presidency Drug Control Headquarters said the NAMAD caused decreased crystal methamphetamine usage between adolescents, methodology and results of the pilot studies have not yet been officially published. [5][6][15] The NAMAD study did not measure knowledge and tendency toward drugs and only contains educational trainings. Unfortunately the training syllabi are not available yet for all students of Iran although it is very necessary. In another study in 2010, Alzahra University of Iran, supported by UNODC, designed the package "Life Skills Training Focusing on Drug Use Prevention in Families". The package was published in 2011 as a subunit of the "Decreasing demand of illicit substances and control of HIV" plan. The package has 8 modules including drug trend prevention methods, spiritual development, resiliency skills, parenting skills, relationship development, stress control, violence control, and domestic violence prevention. [2] The study targeted families not youth themselves and did not focus on neural pathways of addiction. Also it is prepared for those families who already have an addicted person or persons who are exposed to drug abuse. It is not for all adolescents with any family background. Finally since there are a few studies that cover drug abuse prevention among adolescents by measuring and developing awareness and knowledge, this study is investigating the adolescents' knowledge and attitudes toward drugs, and also pilots the difference in their attitude after passing an educational training.

Methods

Study design

The pre-intervention study was conducted out of two aims; first to determine the knowledge status and attitude toward drugs among adolescents and to investigate the relation between these two variables through filling questionnaires. The pre-questionnaire had four sections: in the first section

general demographic information is gathered. Questions of the second section are designed to measure participants' knowledge about illegal drugs, short-term and long-term complications of abusing narcotics and stimulants, and information about different illegal drugs accessible in the society. The third section's questions assessed attitudes and causes of the positive tendency toward drug abuse. Finally in the fourth section, participants answered questions about the practice of the participants about drug abuse, the type, form, and the cause of drug abuse, the age of drug abuse onset, and the location of abuse. The project's aim was to explore the relationship between knowledge status and the degree of tendency toward drugs and the project hypothesis was that these two variables vary in opposite directions.

The second step was conducted as an interventional study. Adolescents from two vulnerable populations participated in educational training classes. At the end the post-questionnaire was filled out. The post-questionnaire had the same "knowledge" and "attitude" parts as the pre-questionnaire.

Setting, location, dates

The project was conducted in 2019 from March to July. The pre-questionnaire was filled out in March in 4 Cities: Tehran, Mashhad, Karaj, Gonbad-Qabous and in the countryside of Gonbad-Qabous where a group of Afghan immigrants live there. This was accomplished by volunteer participation of 100 teenagers who were invited to the study. Data was gathered from February to April. During March training classes were held at an NGO located in countryside of Gonbad-Qabous (Intervention location A), and in the three months of May, June, and July training classes were held at an NGO orphanage located in Karaj (Intervention location B)

Participants eligibility

Participants of the first arm joined the study as volunteers and came from different backgrounds including artists, child laborers, orphans, regular students, and immigrants. All were in adolescent ages between 12 to 20 years old.

Outcome, exposure, other variables

All Participants of the second arm, who lived in the location A, were immigrants from Afghanistan and had experienced social harms and poverty, and those who lived in the location B, were orphans

and had experienced social harms such as drug abuse, sexual abuse, mental problems, and dropping out from school.

Data instrument and measurements

The pre-/post-questionnaire was adopted from an action-research project and had passed validation and reliability tests. [17]

Addressing sources of bias

The 100 participants were invited by cluster sampling. Confidentiality was assured; however it is possible that some with drug problems avoided participation. The pre/post intervention was conducted with orphans and refugees. There was not a significant difference between the pre-scores of 10 orphans who did and 6 other orphans who did not participate in the intervention.

Study size

In the first arm 100 and in the second arm of these 10 adolescents who were orphans and 10 adolescents who were refugees participated. The orphan adolescents who were invited to the training were highly exposed to drug abuse.

Handling of variables in the questionnaire

In the first section general demographic information was gathered and the data of this section were calculated as a percentage in the final analysis. To determine outcome of the scales of each question of the other sections, the questions were scored as explained below.

For the knowledge section, the score was calculated from 0 (as complete lack of knowledge) to 100 (as complete knowledge). In the end the percentage of knowledge status for each respondent was determined by calculation of the percentage of right answers across all knowledge questions. The results are categorized as poor for under 54%, intermediate for 55-79% and sufficient for above 80%. Break points were chosen based on the questionnaire content. There were 57 questions for knowledge status and less than 30 correct answers considered as poor and more than 45 correct answers considered as sufficient and intermediate for between.

The questions of the attitude section were categorized into three parts: 1) possible causes of drug use, 2) physical and psychological changes as a result of drug abuse, and 3) addiction potency of

drugs. In the first part with 21 questions, the importance of each factor was scored with a 5-point scale (1 as least important and 5 as most important). The mean of these scores was calculated for each factor. In the second and third part with 9 questions, induced physical and psychological changes and potency of drugs were determined by asking participants to comment as “agree,” “neutral” or “disagree” for the second part and “agree” or “disagree” for the third part. Then scoring was done as 0 = lowest positive attitude score to 100 = highest positive attitude score. Results of the attitude section were categorized as very positive for 71%-100%, positive for 41%-70%, negative for 21%-40% and very negative for 0%-20%. Break points were chosen based on questions' content. Questions have clear aim and directions. Since questions of the first part show a general vision about the important causes of addiction, the results of the first part are separated from the rest of the questions and reported separately. Results of the second and third parts are used as Attitude status in the present study because they are designed to ask specifically the individual's attitude that can result in a tendency toward drugs. Complete agreement for more than 6 times is considered as very positive and less than 2 times considered as very negative and two other breakpoints set in between. The scores of questions with the opposite direction are reversed in the aggregate analysis.

Statistical methods

After gathering the data, descriptive statistics analysis has been conducted using simple frequency and percentage for categorical variables including minimum/maximum and median and mean. Categorical variables were compared using Fisher Exact Test, and t-tests were calculated for comparing responses by sex for continuous variables and paired t-tests for before and after-training scores. Additionally linear regressions were run on Knowledge and Attitude with predictors toward determining the relation between knowledge and attitude. Analyses were conducted with the SPSS software (version 22.0) and Vassarstats.net for multidimensional Fisher Exact Tests. Advisor ran checks on Stata/SE 12.1.

Loss to follow-up, matching, sampling

100 adolescents answered the pre-questionnaire. 10 of these who are refugees in location A and 10 of these who are orphan children cared for through an NGO in location B participated in the training classes and all 20 answered the post-questionnaire. Pre and post questionnaires have the

same parts and were connected to respondent by codes. All adolescents joined answering the pre-questionnaire by personal invitation.

Ethical considerations

Questionnaires were filled anonymously to reassure students about confidentiality. The supporting group of refugees in location A and the founder of the NGO of location B approved the questionnaire and supported the project. Also adolescents of Tehran were participants in one of the projects of an educational institute; the supervisor of the project approved the questionnaire. Other Adolescents did not join the project via special institute or school; the project was presented to them in person at a book gathering and they volunteer to join the project by their own interest.

Results

The total number of participants was 100, consisting of 35 participants from Gonbad-Qabus (35%), 34 participants from Tehran (34%), 16 participants from Karaj (16%), 10 participants from Afghan immigrants (10%), and 6 participants from Mashhad (6%). 10 participants who participated in the training were from Karaj and the other 10 near Gonbad-Qabus. There were more males (n= 59) than females (n= 41) among the participants. All participants were between ages 12 to 20 with the median of 14 for both males and females. Range of family sizes were 3-8 with the median of 5. Among the 100 participants 16 were orphans and lived in an NGO located in Karaj city.

With respect to educational level of parents, Bachelor's and higher degree was the most common response among mothers (n= 41, 49%) followed by High School or Associate Diploma (n= 27, 32%) and among fathers High School and Associate Diploma (n= 33, 39%) were most common followed by Bachelor's and higher degree (n=32, 38%). With respect to occupations of parents, housewife was the most common response among mothers (n= 50, 59%) followed by employee (n= 23, 27%) and among fathers self-employed (n= 56, 66%) was most common followed by employee (n=26, 31%). Orphaned respondents did not answer concerning family profile. (Table 1)

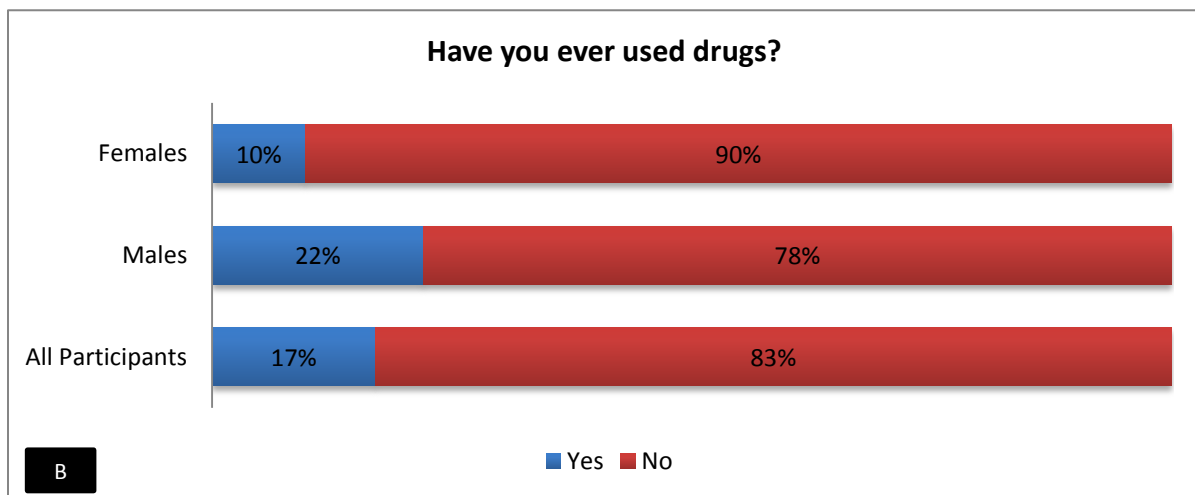
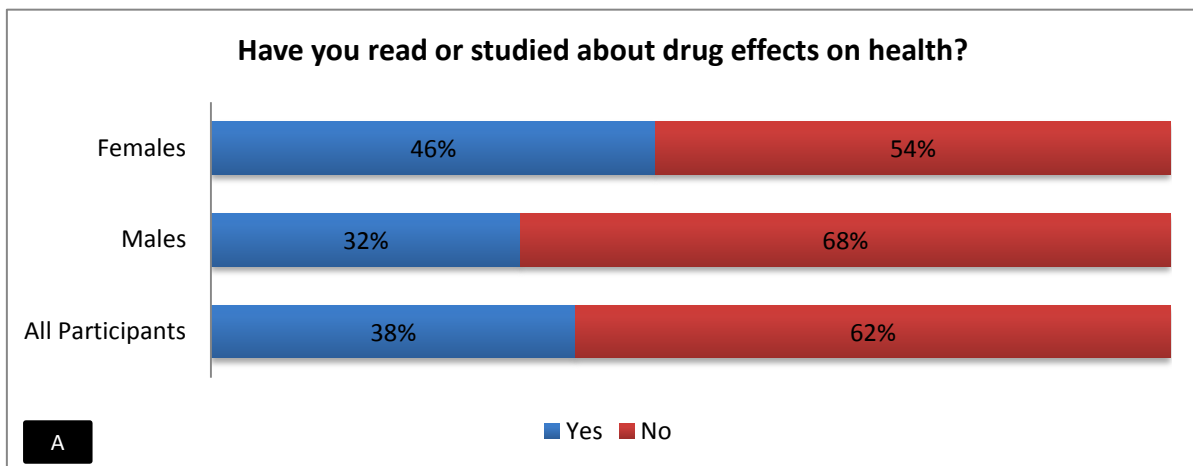
Table 1. General Characteristics of surveyed participants (n=100*)

Characteristics	Total n(%) / median(min-max) mean (SD) (n=100)	Male n(%) / median(min-max) mean (SD) (n=59)	Female n(%) / median(min-max) mean (SD) (n=41)
Age	14 (12-20) 14.9 (SD 2.18)	14 (12-20) 14.1 (SD 2.04)	15 (12-20) 15.2 (SD 2.35)
Family size*	5 (3-8)	5 (3-8)	5 (3-8)
Mother's educational status*			
Illiterate	1 (1.2%)	0 (0.0%)	1 (2.4%)
Elementary or middle school	15 (17.8%)	9 (20.9%)	6 (14.6%)
High school or Associate diploma	27 (32.2%)	14 (32.6%)	13 (31.7%)
Bachelor's degree and higher	41 (48.8%)	20 (46.5%)	21 (51.3%)
Father's educational status*			
Illiterate	4 (4.7%)	3 (7%)	1 (2.4%)
Elementary or middle school	15 (17.8%)	8 (18.7%)	7 (17.1%)
High school or Associate diploma	33 (39.4%)	17 (39.5%)	15 (36.6%)
Bachelor's degree and higher	32 (38.1%)	15 (34.8%)	18 (43.9%)
Mother's occupational status*			
Employee	23 (27.3%)	10 (23.3%)	13 (31.7%)
Housewife	50 (59.5%)	27 (62.8%)	23 (56.1%)
Self-employed	11 (13%)	6 (13.9%)	5 (12.2%)
Retired	0 (0.0%)	0 (0.0%)	0 (0.0%)
Father's occupational status*			
Employee	26 (31.1%)	15 (34.9%)	11 (26.9%)
Househusband	0 (0.0%)	0 (0.0%)	0 (0.0%)
Self-employed	56 (66.6%)	27 (62.7%)	29 (70.7%)
Retired	2 (2.3%)	1 (2.4%)	1 (2.4%)

*16 participants were orphans and did not fill out the family information section.

In the questionnaire to the question 'have you read or studied about drug effects on health?' 38% of all participants (19 of males, and 19 of females) responded "yes". The mentioned resource of their study was open search on the web and contents in social media. Also to the question of have you ever used drugs 17% of all participants (13 males, and 4 females) responded "yes". (Figure 1)

Figure 1. (A) The percentage of participants who studied about drug abuse and its effects on health. (B) Drug abuse experience divided by gender.



Fisher exact test was run for both study and drug experience on gender. As the p-value for none of them is greater than 0.05 (.21 and .17 respectively) there is not sufficient evidence to conclude although that there is a significant association between gender and seeking knowledge background and gender and drug experience either, although knowledge seeking and experience of using drugs appear inversely proportioned across the two questions. (Table 2)

Table 2a. Two-tailed p-value=.21

Have you studied about drug effects?			
	Yes	No	Total
Female	19(46%)	22(54%)	41(41%)
Male	19(32%)	40(68%)	59(59%)
Total	38(38%)	62(62%)	100(100%)

Table 2b. Two-tailed p-value=.17

Have you ever used drugs?			
	Yes	No	Total
Female	4(10%)	37(90%)	41(41%)
Male	13(22%)	46(78%)	59(59%)
Total	17(17%)	83(83%)	100(100%)

While the proportions in Tables 2a and 2b indicate greater study and less use among females compared to males, and conversely less study and more use among males, the differences did not reach significance at the .05 level.

In the questionnaire (Appendix 1), knowledge status of participants about short and long term effects of drugs, forms of drugs and addictive potential of drugs was measured as shown in Table 2. Just 2% of participants demonstrated sufficient knowledge (80%+ correct) about the subject while 62% of participants had poor knowledge about the subject (<54%). 'Positive attitude toward drugs' means the participants had a tendency to use drugs and (or) believed that the advantages of drugs are more than their disadvantages. The results showed 77% of participants had a sum of positive or very positive attitudes toward drugs. It was explored whether the tendency toward drugs is more common among boys than girls. (Table 3)

Table 3. Participant's Knowledge status and attitude toward drug.

	Total n (%)	Male n (%)	Female n (%)
Knowledge status			
Sufficient	2 (2%)	2 (3.3%)	0 (0.0%)
Intermediate	36 (36%)	23 (39%)	13 (31.7%)
Poor	62 (62%)	34 (57.7%)	28 (68.3%)
Attitude toward drugs			
Very positive	33 (33%)	22 (37.2%)	11 (26.8%)
Positive	44 (44%)	23 (39%)	21 (51.3%)
Negative	12 (12%)	8 (13.5%)	4 (9.7%)
Very negative	11 (11%)	6 (10.3%)	5 (12.2%)

A t-test was run for knowledge and attitude split by gender for raw scores. It showed that male participants know more about drugs and their effects. The results revealed there was a significant difference for knowledge status between males and females with Males averaging 53.47 and

Females 47.97 ($p=.035$) with equal variances assumed or ($p=.026$) equal variances not assumed. Levene's Test for Equality of Variances returned a p-value of .028 rejecting the hypothesis of equal variances, indicating the t-test $p=.026$ as appropriate with the 5.5 point mean difference being significant. By contrast when subjects were assigned by score range to 3 evaluative categories for knowledge the variation was masked such that a Fisher exact test on the categories was not significant ($p<.41$).

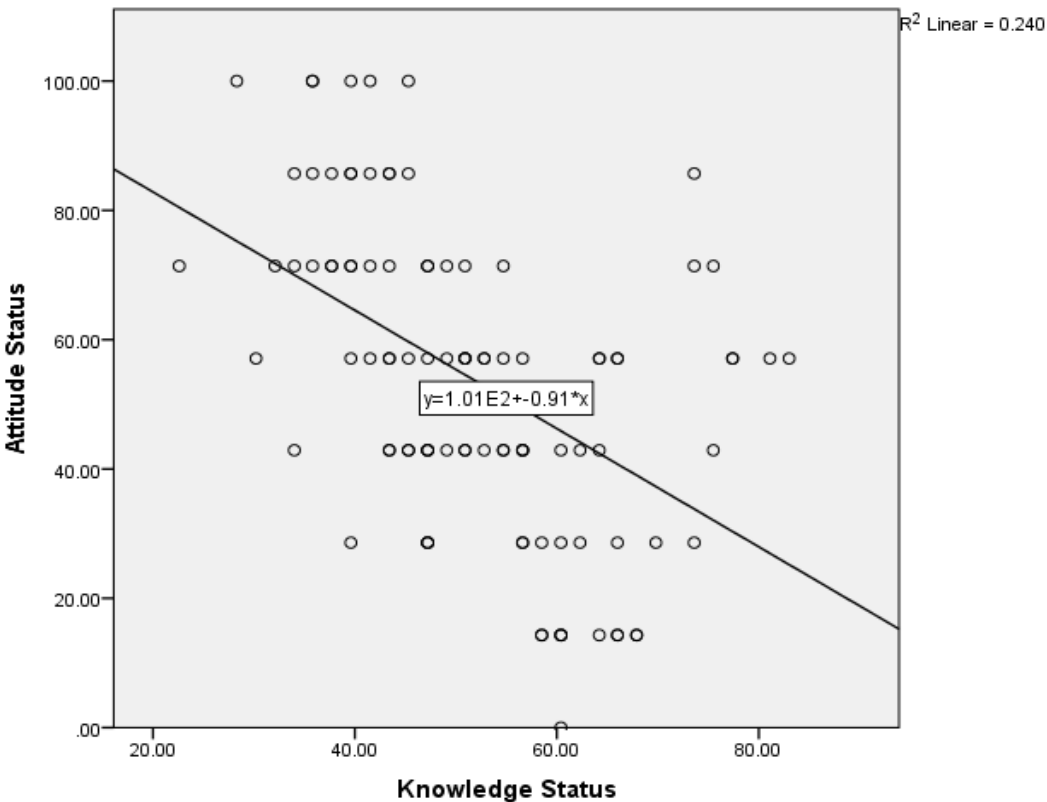
For Attitude there is much more variation within the gender groups' scores resulting in the lower p-value even though the averages are about 5 points apart (Male 55.44 and Female 50.76) with a p-value of .359 for equal variance and .365 not assuming equal variance. Levene's Test for Equality of Variances returned a p-value of .652, not rejecting the hypothesis of equal variances, indicating the t-test $p=.359$ as appropriate - so the attitude of participants and their tendency toward drugs is not significantly related to gender. Not surprisingly, when subjects were assigned by score range to the 4 evaluative categories for attitude the variation was also reduced such that a Fisher exact test was likewise not significant ($p<.58$).

Another t-test was run for knowledge and attitude split by province, to explore whether there is any meaningful relationship between knowledge and attitude of capital citizens (Tehran participants) and other-province participants. The results reveal that raw mean knowledge status for Tehran was actually about 4 points lower (49.17 vs. 53.17) but with significance of $p=.144$ for equal variance or $p=.137$ not assuming equal variance (Levene's Test for Equality of Variances not rejecting ($p=.997$) indicating the first p-value). By contrast positive attitude status toward drugs for Tehran with the raw mean of 55.41 is about 2.5 points higher than other provinces with the mean of 52.88 which had significance of $p=.622$ for equal variance or $p=.644$ not assuming equal variance. Levene's Test for Equality of Variances did not reject equal variances ($p=.229$) indicating likewise the first very non-significant p-value. In sum there was not a significant difference between capital and provinces although knowledge status for Tehran was somewhat lower and positive attitude somewhat higher.

The project's aim was to explore the relationship between knowledge status and the degree of tendency toward drugs and the project hypothesis was these two variables vary in opposite directions. The value of the Pearson Correlation Coefficient of these two critical outcome variables of this study was calculated and showed the value of -0.489. This indicates as a hypothesis the project explored, there is an inverse relation between knowledge and tendency to have a positive

attitude toward drugs. Based on the results of correlation, the relationship between the knowledge and attitude variables is not necessarily a cause and effect relationship, but logically where knowledge status increases one may predict the positive tendency toward drugs will decrease. Figure 2 plots the 100 participant data points defined by attitude and knowledge scores.

Figure 2. Attitude Status x Knowledge Status Data Points and Slope-Intercept Line
As knowledge status increases, positive attitude decreases. Less Knowledge on X axis translates to a more positive Attitude on Y and higher Knowledge corresponds to a less positive attitude.



Participants' attitude toward the role of various factors in tendency toward illegal drug abuse were measured with 21 statements with a 5-point Likert scale ranging from Very Unimportant (1) to Very Important (5) in (Table 6).

There are five items in Table 6 which more than 50 respondents believe have the most pivotal role of influence (“very important”) in the tendency toward drugs use. Three of these refer to family and friends and two others refer to curiosity and joy seeking:

- Teenagers curiosity has role in tendency toward illegal drug use (54)
- Joy-seeking has role in tendency toward illegal drug use (57)
- Presence of an addicted person in the family has role in tendency toward illegal drug use (55)
- Friends offer has role in tendency toward illegal drug use (61)
- Presence of an addicted person in residential/educational place has role in tendency toward illegal drug use (56)

Table 6. Participants attitude toward the role of various factors in tendency toward illegal drug abuse

Factors	Very unimportant			Unimportant			Neutral			Important			Very important		
	T	m	f	T	m	f	T	m	f	T	m	f	T	m	f
Teenagers curiosity has role in tendency toward illegal drug use	3	2	1	8	5	3	20	9	11	15	11	4	54	33	21
Joy-seeking has role in tendency toward illegal drug use	2	2	0	6	3	3	18	9	9	17	11	6	57	17	40
Somatic diseases has role in tendency toward illegal drug use	25	13	12	33	23	10	25	16	9	10	6	4	6	3	3
Psychiatric disorder has role in tendency toward illegal drug use	20	10	10	21	13	8	30	19	11	16	10	6	13	7	6
Lack of knowledge about complications of drugs has role in tendency toward illegal drug use	20	10	10	17	11	6	23	12	11	21	13	8	19	14	5
Positive attitude toward drug abuse has role in tendency toward illegal drug use	30	18	12	35	22	13	14	10	4	14	7	7	7	3	4
Low self-confidence has role in tendency toward illegal drug use	15	8	7	26	12	14	24	16	8	24	13	11	12	8	4
Elimination of shyness has role in tendency toward illegal drug use	23	12	11	26	14	12	34	21	13	8	7	1	8	6	2
Parents divorce has role in tendency toward illegal drug use	19	12	7	20	14	6	35	20	10	15	8	7	11	6	5
Lack of amusement facilities has role in tendency toward illegal drug use	12	5	7	15	8	7	19	11	8	38	21	17	16	14	2
Disability in resolving routine problems has role in tendency toward illegal drug use	44	23	21	25	16	9	13	11	2	14	8	6	4	2	2
Crowded family has role in tendency toward illegal drug use	44	22	22	14	10	4	24	19	5	12	6	6	9	6	3
Having strict parents has role in tendency toward illegal drug use	33	19	14	26	18	8	17	10	7	10	5	5	14	8	6
Presence of an addicted person in the family has role in tendency toward illegal drug use	4	2	2	6	4	2	15	10	5	20	13	7	55	30	25
Friends offer has role in tendency toward illegal drug use	5	2	3	4	2	2	12	5	7	18	12	6	61	39	22
Family disputes has role in tendency toward illegal drug use	13	7	6	21	12	9	33	17	16	20	16	4	14	9	5
Access to drugs has role in tendency toward illegal drug use	12	6	6	11	4	7	19	7	12	37	12	15	20	12	8
Lack of access to consultation centers has role in tendency toward illegal drug use	36	23	13	37	23	14	17	9	8	4	3	1	6	2	4
Low cost of drugs has role in tendency toward illegal drug use	27	14	13	16	10	6	25	16	9	16	9	7	16	11	5
Having free time has role in tendency toward illegal drug use	53	32	21	27	16	14	8	6	2	3	2	1	3	2	1
Presence of an addicted person in residential/educational place has role in tendency toward illegal drug use	10	6	4	13	4	9	6	3	3	15	10	5	56	37	19

Linear Regression on Knowledge Status and Attitude towards Drugs

In addition, linear regression models were run to explore relationships between Knowledge or Attitude and other variables: gender, family size, parents' educational level and province. 16 orphanage observations are excluded given lack of data on parental educational level and family size ambiguity. Linear regression assumptions were confirmed by advisor (Stata diagnostics for normality and homogenous variance of residuals (difference between predicted and data values), predictor collinearity, predictor linearity, and possible omitted variables). Knowledge Status as a predictor for Attitude varied from linearity for the most extreme scores while other model dimensions clearly satisfied all assumptions including normality of residuals. (The natural log of the Knowledge variable did not significantly improve the plot.)

Knowledge model predictors were Gender (male = 1), Age, Family Size, Father educational status, Mother educational status, Province (Tehran vs. other provinces) and Attitude Status. The adjusted R-square was .436 and the entire model significant at the .000 level. Besides Attitude Status ($p < .000$), which is inversely related to Knowledge, other predictors did not reach significance in relation to Knowledge (Table 4a) at the .05 level. The next most significant variable for Knowledge was (Tehran) Province ($p = .130$) with a positive coefficient.

Table 4a. Coefficients for Knowledge model (unclustered by province).

N=84	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	T	
(Constant)	63.156	10.047		6.286	.000
Male Gender	2.372	1.953	.103	1.215	.228
Age	.320	.447	.061	.715	.477
Family Size	1.231	1.002	.119	1.229	.223
Father's Educational Status	-1.441	1.429	-.108	-1.009	.316
Mother's Educational Status	-1.275	1.605	-.088	-.795	.429
Tehran Province	3.708	2.424	.157	1.530	.130
Attitude Status	-.320	.041	-.662	-7.764	.000

It occurred to the advisor, with apology, rather late, to also run a regression using the Stata cluster command on provinces for standard errors. Coefficients remain the same, but clustering exploits the possibility of greater correlation in variance within provinces (or schools) than between provinces (or schools) to generate robust standard errors. There are 4 clusters (provinces) without

the orphan cluster (no family data). Table 4b shows the impact of taking clusters into account (advisor's model) for standard errors. There are no standardized coefficients as variances in clusters differ before combining.

Table 4b. Coefficients for Knowledge model (clustered by province).

N=84	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	63.156	13.52		4.67	.019
Male Gender	2.372	1.953	NA	2.17	.118
Age	.320	.447	NA	.63	.575
Family Size	1.231	1.002	NA	1.03	.378
Father's Educational Status	-1.441	1.429	NA	-1.71	.185
Mother's Educational Status	-1.275	1.605	NA	-1.85	.161
Tehran Province	3.708	2.424	NA	6.42	.008
Attitude Status	-.320	.041	NA	-10.10	.002

Tehran Province is now clearly significant ($p=.008$) indicating 3.7 more knowledge points on average for Tehran respondents holding other model variables constant. This contrasts the lower mean in the raw Knowledge score t-test. Attitude Status remains very significant. Several other variables have lower p-values without reaching significance.

For the Attitude linear regression model (Table 5a below) predictors were Gender (male = 1), Age, Family Size, Father educational status, Mother educational status, Province (Tehran vs. other provinces) and Knowledge Status. The adjusted R-square (which discounts the R-square according to number of predictors) was .430 and the entire model significant at the .000 level, or about 43% of the variance in the data is accounted for by the model taking into account the number of predictors - which is very respectable (Table 5a).

Table 5a. Coefficients for Attitude model (unclustered by province).

N=84	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	T	
(Constant)	91.013	23.504		3.872	.000
Male Gender	3.017	4.079	.063	.739	.462
Age	.921	.926	.086	.995	.323
Family Size	3.561	2.060	.167	1.729	.088
Father's Educational Status	-1.762	2.979	-.064	-.592	.556
Mother's Educational Status	.616	3.345	.021	.184	.854
Tehran Province	8.787	5.009	.181	1.754	.083
Knowledge Status	-1.381	.178	-.669	-7.764	.000

The single clearly and hugely significant variable was Knowledge Status. Its unstandardized coefficient is -1.381 and p-value <.000 for a very large negative t-value of -7.764. This indicates that knowledge and (positive) attitude toward drugs are inversely related in a very significant way - an additional knowledge point predicted about 1.4 points lower attitude score on average. This is also seen in Figure 2 above when knowledge is higher positive attitude toward drugs is lower. Tehran province predicted higher positive attitude toward drug use of almost 9 points on average (8.787) (p=.083) below the .10 significance level. Each additional family member predicted 3.561 more points in positive attitude towards drugs (p=.083).

Table 5b shows the impact of taking clusters into account (advisor's model) for standard errors. The cluster approach exploits the possibility of greater correlation in variance within provinces (schools) than between provinces (schools).

Table 5b. Coefficients for Attitude model (clustered by province).

N=84	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	T	
(Constant)	91.013	26.573		3.42	.042
Male Gender	3.017	3.090	NA	0.98	.462
Age	.921	1.486	NA	0.62	.323
Family Size	3.561	0.595	NA	5.99	.009
Father's Educational Status	-1.762	1.769	NA	-1.00	.393
Mother's Educational Status	.616	1.204	NA	0.51	.644
Tehran Province	8.787	2.265	NA	3.88	.030
Knowledge Status	-1.381	0.108	NA	-12.76	.001

Taking clusters into account for standard errors, Family Size is now clearly significant at $p=.009$ compared to $p=.088$ above, and also Tehran Province at $p=.030$ compared to $p=.083$. Knowledge Status remained highly significant ($p=.001$).

Intervention Studies

After questionnaire analysis consistent with the hypothesis of an inverse relationship between knowledge status and positive attitude towards drug use, an educational intervention was piloted for 20 participants as a practical action in two different locations.

Seven topics were taught in seven sessions, each for one and a half hours. The intervention was an active learning including storytelling and games. The modules started with Basics of nervous system physiology and neurotransmitters, followed by sessions on Dopamine, Cocaine and Methamphetamine, Opium and Heroin, Nicotine, Cannabis, and Alcohol.

Intervention Study-location A (Afghan Immigrants in countryside of Gonbad-Qabous)

The participants were 10 adolescents (6 males and 4 females) who are immigrants from Afghanistan and live in the countryside of Gonbad-Qabous.

According to the post-questionnaire results in comparison with pre-questionnaire results for these 10 participants, the frequency of people with sufficient knowledge dramatically increased and the frequency of people with positive attitude toward drugs decreased significantly as expected. (Table 7)

Table 7. Descriptive statistics for post questionnaire results, among 10 refugee participants before and after training in location A (p-values on totals before and after)

Characteristics	(p-values)	Before trainings			After trainings		
		median(min-max) mean (SD) (n=10)			median(min-max) mean (SD) (n=10)		
		Total	Male	Female	Total	Male	Female
Age		15 (14 – 19) 15.7 (1.57)	15 (14 – 19) 15.3 (1.86)	16.5 (15 – 17) 16.3 (0.96)	15 (14 – 19) 15.7 (1.57)	15 (14 – 19) 15.3 (1.86)	16.5 (15 – 17) 16.3 (0.96)
Have you ever used drugs?	(p=1)						
Yes		2	2	0	2	2	0
No		8	4	4	8	4	4
Do you use drugs currently?	(p=1)						
Yes		1	1	0	1	1	0
No		9	5	4	9	5	4
Knowledge status	(p<.000)						
Sufficient		0	0	0	7	3	4
Intermediate		6	4	2	3	3	0
Poor		4	2	2	0	0	0
Attitude toward drugs	(p<.01)						
Very positive		2	1	1	0	0	0
Positive		5	3	2	1	1	0
Negative		2	2	0	2	1	1
Very negative		1	0	1	7	4	3

* p-values using Fisher Exact Test (2 x 2) and Freeman-Halton extension (3 x 2, 4 x 2) are 2-sided

Based on post training questionnaire results, 7 out of 10 participants gained sufficient knowledge about drug use's addictive potential, effects, and forms, compared to none before and 3 participants had intermediate knowledge compared to 6 before. All 4 who had poor knowledge improved. The improvement after the intervention was very highly significant ($p<.000$). 9 participants out of 10 had negative and very negative attitude toward drugs after the intervention compared to 3 before and 'very negative' increased from 1 to 7 (10% to 70%). Before the intervention 2 were very positive and 5 positive in attitude toward drug use. After the intervention 0 were very positive and only 1 positive. The intervention impact was significant ($p<.01$) concerning attitude; for both experiencing drug abuse and current use there was no difference between before and after treatment. The chi-square statistic is 0 given no change; the p-value for both variables is 1 and the results are not significant at $p<.05$. Based on Fisher Exact Test gender and experiencing drugs and currently use of drug did not show meaningful relation with $p=.4$ and $p=1$ respectively.

Eight other Fisher Exact Tests compared within and between male and female participants in both knowledge and attitude status before and after treatment. The results showed being male or female did not affect treatment outcome. (Table 8)

Table 8. Comparisons between knowledge and attitude statuses before and after the treatment split by gender.

Fisher Exact Tests	p-value
Female knowledge before and after the treatment	0.02
Male knowledge before and after the treatment	0.09
Female versus male knowledge before the treatment	>0.9
Female versus male knowledge after the treatment	0.2
Female attitude before and after the treatment	0.25
Male attitude before and after the treatment	0.1
Female versus male attitude before the treatment	0.6
Female versus male attitude after the treatment	0.9

As the t-test Paired Sample Statistics on the raw scores clearly show there is an increase in Knowledge with the intervention from 58.6 up to 87.9 or +29.3 points ($p=.000$) and a decrease in positive Attitude toward drugs from 45.7 down to 17.1 (decrease of -28.6 points, $p=.000$). The significance level, correlation and t for Knowledge Status were $p=.000$, .485 and 9.562 respectively. And the significance level, correlation and t for Attitude were $p=.000$, .882 and -9.508 respectively. Because significance levels are less than $p<.000$ the before and after scores have extremely meaningful differences rejecting the null hypothesis and concluding that the educational intervention treatment are highly significantly associated with increasing knowledge and significantly decreasing positive attitude toward harmful drug use.

Intervention Study - location B (an NGO located in Karaj city)

The participants were 10 out of 16 adolescent males who are cared for in the location B orphanage. Based on the t-test results for pre-knowledge status and pre-attitude status of 16 orphans split by those who participate in training and those who did not, participants and non-participants in the

intervention did not differ significantly in pre-intervention knowledge or attitude indicating there was not significant selection bias in who had the intervention among them (Knowledge $p=.883$, Attitude $p=.364$).

According to the post-training questionnaire results in comparison with pre-questionnaire results for these 10 participants, the number of people with sufficient knowledge dramatically increased and number of people with positive attitude toward drugs decreased as expected. (Table 9)

Table 9. Descriptive statistics for post questionnaire results, among 10 male orphanage participants before and after training in location B and Fisher Exact Test comparing Before/After results

Characteristics	(p-values)	Before trainings median(min-max) mean (SD) (n=10)	After trainings median(min-max) mean (SD) (n=10)
Age		15 (13 – 18) 15.5 (1.96)	15 (13 – 18) 15.5 (1.96)
Have you ever used drugs?	($p=1$)		
Yes		4	4
No		6	6
Do you use drugs currently?	($p<.58$)		
Yes		3	1
No		7	9
Knowledge status	($p<.02$)		
Sufficient		2	8
Intermediate		4	2
Poor		4	0
Attitude toward drugs	($p<.000$)		
Very positive		6	0
Positive		4	2
Negative		0	7
Very negative		0	1

* p-values using Fisher Exact Test (2 x 2) and Freeman-Halton extension (3 x 2, 4 x 2) are 2-sided

Based on post questionnaire results, 8 out of 10 participants had sufficient knowledge about drug use's addictive potential, effects, and forms after the intervention compared to only 2 before, and 2 participants had intermediate knowledge compared to 4 before. All 4 who had poor knowledge improved. The improvement after the intervention was significant ($p<.02$). 8 participants out of 10

had negative and very negative attitude toward drugs after the intervention compared to none before. Before the intervention 6 were very positive and 4 positive. After the intervention 0 were very positive and only 2 positive. The intervention impact was very highly significant ($p<.000$) concerning attitude.

As the t-test Paired Sample Statistics on the raw scores clearly show there is an increase in Knowledge with the intervention (from 57.7 up to 83.8) of +26.8 points ($p=.002$) and a decrease in positive Attitude toward drugs from 74.3 down to 27.9 (decrease of -46.4 points, $p<.000$). The significance level, correlation and t for Knowledge status are $p=.002$, .026 and -4.379 respectively. And the t-test significance level, correlation and t for Attitude were $p<.000$, -.649 and 5.975 respectively. Because significance levels are less than $p<.05$ the before and after scores have meaningful differences rejecting the null hypothesis, concluding that the educational intervention treatment is significantly associated with increasing knowledge and significantly decreasing positive attitude toward harmful drug use.

Combination of two intervention groups

As the t-test Paired Sample Statistics on the combined groups of participants with the intervention (20 participants from location A and B) scores show for Knowledge it is a 27.63 mean difference improvement in the after training compared to the before training with very highly significant p-value ($p<.000$) from 51.21 before up to 85.84 after the training for knowledge improving. On the other hand, for Attitude it is a 37.46 point mean difference decrease in positive attitude toward harmful drug use, likewise very highly significant ($p<.000$) from 59.99 before down to 22.53 after trainings (Table 10). The significance level, correlation and t for knowledge status calculated as $p=.000$, .224 and 8.439 respectively. And the significance level, correlation and t for attitude calculated as $p=.000$, .473 and -8.256 respectively. There were not enough Females for the comparison between sexes.

Table 10. Descriptive statistics for post questionnaire results, among all 20 participants before and after training in both locations A and B and Fisher Exact Test comparing Before/After results

Characteristics	(p-values)	Before trainings median(min-max) mean (SD) (n=20)			After trainings median(min-max) mean (SD) (n=20)		
		Total	Location A	Location B	Total	Location A	Location B
Age		15 (13 – 19) 15.7 (1.57)	15.5 (14 – 18) 15.5 (1.96)	15 (13 – 18) 15.6 (1.73)	15 (13 – 19) 15.7 (1.57)	15.5 (14 – 18) 15.5 (1.96)	15 (13 – 18) 15.6 (1.73)
Have you ever used drugs?	(p=1)						
Yes		6	2	4	6	2	4
No		14	8	6	14	8	6
Do you use drugs currently?	(p=.66)						
Yes		4	1	3	2	1	1
No		16	9	7	18	9	9
Knowledge status	(p<.000)						
Sufficient		2	0	2	15	7	8
Intermediate		10	6	4	5	3	2
Poor		8	4	4	0	0	0
Attitude toward drugs	(p<.000)						
Very positive		8	2	6	0	0	0
Positive		9	5	4	3	1	2
Negative		2	2	0	9	2	7
Very negative		1	1	0	8	7	1

* p-values using Fisher Exact Test (2 x 2) and Freeman-Halton extension (3 x 2, 4 x 2) are 2-sided

Discussion

Various studies have emphasized the importance of primary prevention. They noted that developing knowledge about a health issues can control and decrease health problems. Drug abuse is a biological disease and also a behavioral problem. In the first step of solving a behavioral problem, knowledge and attitude toward that particular behavior should be assessed and then corrected. [16][17] Behaviors are often created in early years of life. Iran has more than 15 million adolescent and young people. [21] There are few studies that measure these two important variables - knowledge and attitude - followed by a plan for an educational intervention for developing knowledge for youth toward drugs, nervous

system and overall health. Based on the literature review accomplished before the study, previously performed interventions did not meet the objectives of this study. For example in a study in 2010 which aimed to determine drug abuse among Iranian high school students, statistics of drug abusers and type of drug had been determined, but attitudes were not measured and no educational intervention followed the study. [11]

The present study determined both knowledge and attitude scores toward harmful drug use and tested and confirmed a hypothesis that the two were inversely related. It also developed a 7 topic intervention piloted with two socially vulnerable groups in Iran, refugees and orphans. The results were highly encouraging for general implementation with significant gains in knowledge while decreasing positive attitude toward harmful drugs. It also determined in regression equations that Tehran province was more positive in attitude toward harmful drugs compared to selected provinces outside of Tehran as were larger family sizes. The greatest (inverse) predictors were Knowledge or Attitude for the other.

Therefore, by designing a new educational intervention based on storytelling and games, not only did the knowledge toward neuroscience and drug abuse increase, and positive attitude toward dangerous drug use decrease, but also adolescents reported the tendency to read more about their body increased as well. The educational intervention piloted with the two vulnerable groups made a significant difference in both Knowledge status and Attitude toward drugs and confirms the hypothesis of the essential role of knowledge in decreasing positive attitude toward drugs.

Limitations

The project involved 100 adolescents across several provinces. Specific age differences were not explored. A larger N in subgroups would provide more statistical power. The intervention was only for the most vulnerable groups. Effects for other groups may vary. The post-intervention test was without a control group, meaning effects of a non-intervention factor on the whole group would not be subtracted. Finally the present study noticed that girls had statistically lower raw scores in knowledge about negative drug effects before the intervention, and this essential matter has the potential to be the subject of future studies.

Conclusion

In conclusion, the need for educational interventions or educational training modules was revealed. It can be helpful in adolescent ages for increasing knowledge and decreasing a positive attitude toward drug abuse. It is believed that such findings will also make a significant contribution between Ministry of Education and the Drug Control Headquarters to control a national epidemic in harmful drug use tendency among adolescents. An effective intervention for this age group was effectively piloted with vulnerable populations.

Sources

1. World Health Organization. Substance abuse. Terminology and classification. Available at: http://www.who.int/substance_abuse/terminology/definition1/en/
2. A Package on Strengthening Parents; Life Skills training focusing on drug use prevention in families, 2011, United Nations Office on Drugs and Crime, Presidency Drug Control Headquarters, Alzahra University
3. Safe life Guidelines for Adolescents, 2012, Shahram Rafeeifar, Mehravash Publication
4. Worldometers, Population. Available at: <http://www.worldometers.info/world-population/world-population-by-year/>
5. The prevalence rate of drug use in the country, 2016, Somayeh Hasanshahi, Behnam Ahmadi, The Islamic Republic News Agency (7440/3029/5054), available at: <http://www.irna.ir/fa/News/82596082>
6. The NAMAD plan; the biggest social national plan. 2017, Iran Magazine (217566). Available at: <http://ion.ir/News/217566.html>
7. World Health Organization. Substance abuse. Health Topic. Available at: http://www.who.int/topics/substance_abuse/en/
8. Executive summary; Conclusions and Policy Implications, World Drug Report 2018, United Nations Office on Drugs and Crime, Available at: <https://www.unodc.org/wdr2018/en/exsum.html>
9. World Drug Report 2018, United Nations Office on Drugs and Crime, Booklet 2
10. World Drug Report 2018: opioid crisis, prescription drug abuse expands; cocaine and opium hit record highs, United Nations Office on Drugs and Crime, Available at: https://www.unodc.org/unodc/en/frontpage/2018/June/world-drug-report-2018_-opioid-crisis_-prescription-drug-abuse-expands-cocaine-and-opium-hit-record-highs.html
11. Substance Abuse among Iranian High School Students (2010), Saeed Momtazi, Richard A Rawson
12. Momtazi S. Opium injection: a new method for an old drug. Paper presented at the International Society of Addiction Medicine (ISAM) annual meeting; 2008; Cape Town, South Africa.
13. Jafari S, Movaghar AR, Baharlou S, et al. Trends of substance use in southern Iran: a qualitative study. *Internet J Epidemiol*. 2008
14. Mojtahedzadeh V, Razani N, Malekinejad M, et al. Injection drug use in rural Iran: integrating HIV prevention into Iran's rural primary health care system. *AIDS Behav*. 2008;12:S7–S12.
15. The System of Social Care for Students, 2017, Mahin Malmir, The Islamic Republic News Agency (2819/1535), available at: <http://www.irna.ir/alborz/fa/News/82705015>
16. Sarami AA, Naderi H. Comparison between participants and non-participants in terms of knowledge and attitude towards drug abuse. *Humanity Soc Sci J*. 2009;4:76–82.
17. Nahid Geramian, Leila Gharaat, Shohreh Akhavan Taheri, Fatemeh Mohebpour, Mahmonir Nahvizadeh, Ziba Farajzadegan, Kamal Heidari. Development of a Questionnaire to Assess Drug Abuse among High School Students of Isfahan Province, Iran: An Action Research. *Int J Prev Med*. 2014 Dec;5(Suppl 2):S146-53.

18. Farhadinasab A, Allahverdipour H, Bashirian S, Mahjoub H. Lifetime pattern of substance abuse, parental support, religiosity, and locus of control in adolescent and young male users. *Iran J Public Health*. 2008;37:88–95.
19. Ahmadi J, Hasani M. Prevalence of substance use among Iranian high school students. *Addict Behav*. 2003;28:375–9. [PubMed]
20. Rezaei AM, Delavar A, Najafi M. Development and validation of the questionnaire to assess the attitude of 3rd grade middle school and high school students toward drugs. *Drug Abuse Stud Q*. 2012;6:37–54
21. Allahverdipour H, Heidarnia A, Kazemnegad A, Shafii F, Azad Fallah P, Mirzaei E. Status of drug abuse among students and merging self-control factor with EPPM model. *Yazd Univ Med Sci J*. 2005;13:24–5.

Appendices

Appendix 1. Questionnaire

General Information			
Province		City	
Age		Family Size	
Gender	☐ Female	☐ Male	☐ Prefer not to say
Father's Educational level			
☐ Middle school	☐ Elementary school	☐ Reading and writing	☐ Illiterate
☐ Master's degree and higher	☐ Bachelor's degree	☐ Associate diploma	☐ High school diploma
Mother's Educational level			
☐ Middle school	☐ Elementary school	☐ Reading and writing	☐ Illiterate
☐ Master's degree and higher	☐ Bachelor's degree	☐ Associate diploma	☐ High school diploma
Father's occupation			
☐ Retired	☐ Unemployed	☐ Self-employed	☐ Clerk
☐ Other, please write it down.....			
Mother's occupation			
☐ Retired	☐ Unemployed	☐ Self-employed	☐ Clerk
☐ Other, please write it down.....			

General knowledge	
Have you read or study about drug use?	Yes ☐ No ☐
Each of the questions can have more than one possible answer, so mark as many answers as you consider correct	
Which of the following drugs causes addiction?	
☐ Cocaine	☐ Heroin
☐ Opium	☐ Naas
☐ Psychological medication	☐ Morphine
☐ Analgesics (like ibuprofen pills)	☐ LSD
	☐ Antibiotics pills
	☐ Crystal
	☐ Shireh (Opium extract)
	☐ Ecstasy
	☐ Sleeping pills
	☐ Hashish
	☐ Crack
Do you know any other drugs?	☐ Yes ☐ No Name them,.....
Which of the following signs or symptoms are complications of addictive drugs (e.g., opium, heroin, morphine...)?	
☐ Myosis	☐ Dry mouth
☐ Constipation	☐ Mydriasis

☐ Diarrhea ☐ Brain damage ☐ Renal damage and failure ☐ Seeing unreal images that others can't see ☐ Hearing unreal sounds that others can't hear ☐ Others, Please write it down																								
Which one of the following complications is caused by stimulants (e.g., ecstasy, crystal)? ☐ Myosis ☐ Dry mouth ☐ Constipation ☐ Mydriasis ☐ Diarrhea ☐ Brain damage ☐ Renal damage and failure ☐ Seeing unreal images that others can't see ☐ Hearing unreal sounds that others can't hear ☐ Others, Please write it down																								
Which of the following is the short-term complication of drug abuse? ☐ Anxiety and depression ☐ Euphoria and happiness ☐ Personality disorder ☐ Pessimism ☐ Sleep disorder ☐ Raised self-confidence ☐ Dependence to drugs ☐ Aggressiveness ☐ Improved memory and learning ability ☐ Forgetfulness ☐ Others, Please write it down																								
Which of the following are the long-term complications of drug use? ☐ Anxiety and depression ☐ Euphoria and happiness ☐ Personality disorder ☐ Pessimism ☐ Sleep disorder ☐ Raised self-confidence ☐ Dependence to drugs ☐ Aggressiveness ☐ Improved memory and learning ability ☐ Forgetfulness ☐ Others, Please write it down																								
What form of drugs is available? ☐ Patch ☐ Tablet ☐ Chewing gum ☐ Cigarette ☐ Injection ☐ Transparent crystal ☐ Drinking liquid ☐ Powder ☐ Inhalable vapor of some liquids ☐ Others, Please write it down																								
Teenagers' attitude toward drug abuse																								
What is your idea about the role of each of the following factors in tendency toward illegal drug use? Based on the importance of each factor, please score from 1 to 5. 1 (least important) to 5 (most important) <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Teenagers curiosity</td> <td style="width: 10%; text-align: center;">☐1</td> <td style="width: 10%; text-align: center;">☐2</td> <td style="width: 10%; text-align: center;">☐3</td> <td style="width: 10%; text-align: center;">☐4</td> <td style="width: 10%; text-align: center;">☐5</td> </tr> <tr> <td>Joy-seeking</td> <td style="text-align: center;">☐1</td> <td style="text-align: center;">☐2</td> <td style="text-align: center;">☐3</td> <td style="text-align: center;">☐4</td> <td style="text-align: center;">☐5</td> </tr> <tr> <td>Somatic diseases</td> <td style="text-align: center;">☐1</td> <td style="text-align: center;">☐2</td> <td style="text-align: center;">☐3</td> <td style="text-align: center;">☐4</td> <td style="text-align: center;">☐5</td> </tr> <tr> <td>Psychiatric disorder</td> <td style="text-align: center;">☐1</td> <td style="text-align: center;">☐2</td> <td style="text-align: center;">☐3</td> <td style="text-align: center;">☐4</td> <td style="text-align: center;">☐5</td> </tr> </table>	Teenagers curiosity	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	Joy-seeking	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	Somatic diseases	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	Psychiatric disorder	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Teenagers curiosity	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5																			
Joy-seeking	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5																			
Somatic diseases	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5																			
Psychiatric disorder	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5																			

Lack of knowledge about complications of drugs	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Positive attitude toward drug abuse	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Low self-confidence	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
To eliminate shyness	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Parents' divorce	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Lack of amusement facilities	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Disability in resolving routine problems	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Crowded family	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Having strict parents	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Presence of an addicted person in the family	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Friends offer	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Family disputes	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Access to drugs	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Lack of access to consultation centers	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Low cost of drugs	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Having free time	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Presence of an addicted person in residential/educational place	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
Please write it down any other factors					

In my opinion, drug use causes;			
Transient euphoria	Agree ☐	No comment ☐	☐ Disagree
Improved memory and learning ability	Agree ☐	No comment ☐	☐ Disagree
Depression	Agree ☐	No comment ☐	☐ Disagree
Improvement in some somatic diseases	Agree ☐	No comment ☐	☐ Disagree
Increase in self confidence	Agree ☐	No comment ☐	☐ Disagree
Better acceptability by friends	Agree ☐	No comment ☐	☐ Disagree

What is your idea about addictive potential of drugs?	
Using some drugs like hashish are not addictive.	Agree ☐ ☐ Disagree
Even with using drugs for 1 time there is a possibility of becoming addicted.	Agree ☐ ☐ Disagree
Occasional use is OK.	Agree ☐ ☐ Disagree

Have you ever used drugs?		Yes ☐	No ☐
If you answered "yes", please answer the following questions			
☐ I used once for curiosity	☐ I use drugs following family disputes		
☐ I use drugs to improve my memory before exams	☐ I use drugs to achieve feeling happiness and joy		
☐ I use drugs so I can give public lectures	☐ I use drugs to win sport competitions		
☐ If an acute condition occurs, I use drugs to improve my general condition			
If you use drugs for any other reason, please mention it.			

What is the name of the drug you used for the first time?			
☐ Opium	☐ Crystal	☐ Shireh (opium extract)	☐ Heroin
☐ Hashish	☐ Morphine	☐ Naas	☐ Cocaine
☐ Ecstasy	☐ Crack	☐ LSD	Others
At what age you used drugs for the first time?			
How often do you use/used drugs?			
☐ Once a day	☐ More than once a day		
☐ Once a week	☐ Several times a week		
Others (Please write it down).....			
How much drug do you use/used every time?.....			
What drug do you use currently? (you can answer more than one item)			
☐ Opium	☐ Crystal	☐ Shireh (opium extract)	☐ Heroin
☐ Hashish	☐ Morphine	☐ Naas	☐ Cocaine
☐ Ecstasy	☐ Crack	☐ LSD	Others
☐ Currently I do not use drugs			
How do you use/used the drug?			
☐ Sniff (via nose)	☐ Smoke (like cigarette)	☐ Oral	☐ Injection
Others.....			
In what occasions do you use drugs?			
☐ Before exams	☐ Before doing sports	☐ On the street	☐ At parties
☐ At home	Others		
Why did you start using drugs?			
☐ Teenagers curiosity	☐ Joy-seeking	☐ Somatic diseases	☐ Psychological disorder
☐ To eliminate shyness	☐ Parents' divorce	☐ Low self-confidence	☐ Crowded family
☐ Having strict parents	☐ Low cost of drugs	☐ Having free time	☐ Friends' offer
☐ Family disputes	☐ Access to drugs	☐ Lack of knowledge about complications of drugs	
☐ Lack of amusement facilities		☐ Positive attitude toward drug abuse	
☐ Disability in resolving routine problems		☐ Lack of access to consultation centers	
☐ Presence of an addicted person in residential/educational place			
☐ Presence of an addicted person in the family			
Other.....			

Appendix 2. Variable description table

Variables	Definitions	Codes				
ID						
province		Tehran	Gonbad	Mashhad	Karaj	Afghan
		1	2	3	4	5
gender		Male	Female	Not to say		
		1	2	3		
age						
fam_size	Family Size					
F_edu	Father's education status	Illiterate	Elementary or middle school	High school or Associate diploma	Bachelor's degree and higher	
		1	2	3	4	
M_edu	Mother's education status	Illiterate	Elementary or middle school	High school or Associate diploma	Bachelor's degree and higher	
		1	2	3	4	
F_occu	Father's occupational status	Employee	Housewife/ husband	Self-employed	Retired	
		1	2	3	4	
M_occu	Mother's occupational status	Employee	Housewife/ husband	Self-employed	Retired	
		1	2	3	4	
study	Have you read or study about drug use?	Yes=1	No=0			
Coc_add	Does Cocaine cause addiction?	Yes=1	No=0			
Her_add	Does Heroine cause addiction?	Yes=1	No=0			
LSD_add	Does LSD cause addiction?	Yes=1	No=0			
Ecs_add	Does Ecstasy cause addiction?	Yes=1	No=0			
Opi_add	Does Opium cause addiction?	Yes=1	No=0			
Naa_add	Does Nass cause addiction?	Yes=1	No=0			
Antibio_add	Does Antibiotics pills cause addiction?	Yes=1	No=0			
slp_ad	Does Sleeping pills cause addiction?	Yes=1	No=0			
Psyco_add	Does Psychological medication cause addiction?	Yes=1	No=0			
Mor_add	Does Morphine cause addiction?	Yes=1	No=0			
Cry_add	Does Crystal cause addiction?	Yes=1	No=0			
Hash_add	Does Hashish cause addiction?	Yes=1	No=0			
Ana_add	Does Analgesics cause addiction?	Yes=1	No=0			
Shir_add	Does Shireh cause addiction?	Yes=1	No=0			
Cra_add	Does Crack cause addiction?	Yes=1	No=0			
Wea_sig	Is muscle weakness a sign of using drugs?	Yes=1	No=0			
Dry_sig	Is dry mouth a sign of using drugs?	Yes=1	No=0			
Con_sig	Is constipation a sign of using drugs?	Yes=1	No=0			

Myd_sig	Is mydriasis a sign of using drugs?	Yes=1	No=0
Dia_sig	Is diarrhea a sign of using drugs?	Yes=1	No=0
Bdam_sig	Is brain damage a sign of using drugs?	Yes=1	No=0
Rdam_sig	Is renal damage and failure a sign of using drugs?	Yes=1	No=0
See_sig	Is seeing unreal image that others can't see a sign of using drugs?	Yes=1	No=0
Hear_sig	Is hearing unreal sounds that others can't hear a sign of using drugs?	Yes=1	No=0
Noidea_sig	I don't know about drug abuse signs	Yes=1	No=0
dep_short	Is depression a short-term complication of drug abuse?	Yes=1	No=0
euph_short	Is euphoria and happiness a short-term complication of drug abuse?	Yes=1	No=0
pers_short	Is personal disorder a short-term complication of drug abuse?	Yes=1	No=0
pess_short	Is pessimism a short-term complication of drug abuse?	Yes=1	No=0
sle_short	Is sleep disorder a short-term complication of drug abuse?	Yes=1	No=0
conf_short	Is raised self-confidence a short-term complication of drug abuse?	Yes=1	No=0
depen_short	Is dependence to drugs a short-term complication of drug abuse?	Yes=1	No=0
agg_short	Is aggressiveness a short-term complication of drug abuse?	Yes=1	No=0
mem_short	Is improved memory and learning ability a short-term complication of drug abuse?	Yes=1	No=0
forget_short	Is forgetfulness a short-term complication of drug abuse?	Yes=1	No=0
Noidea_short	I don't know about short-term complication of drug abuse	Yes=1	No=0
dep_long	Is depression a long-term complication of drug abuse?	Yes=1	No=0
euph_long	Is euphoria and happiness a long-term complication of drug abuse?	Yes=1	No=0
pers_long	Is personal disorder a long-term complication of drug abuse?	Yes=1	No=0
pess_long	Is pessimism a long-term complication of drug abuse?	Yes=1	No=0
sle_long	Is sleep disorder a long-term complication of drug abuse?	Yes=1	No=0
conf_long	Is raised self-confidence a long-term complication of drug abuse?	Yes=1	No=0
depen_long	Is dependence to drugs a long-term complication of drug abuse?	Yes=1	No=0
agg_long	Is aggressiveness a long-term complication of drug abuse?	Yes=1	No=0
mem_long	Is improved memory and learning ability a long-term complication of drug abuse?	Yes=1	No=0
forget_long	Is forgetfulness a long-term complication of drug abuse?	Yes=1	No=0

Noidea_long	I don't know about long-term complication of drug abuse	Yes=1	No=0			
form_cig	Is cigarette one of the forms of drug?	Yes=1	No=0			
Form_gum	Is chewing gum one of the forms of drug?	Yes=1	No=0			
form_tab	Is tablet one of the forms of drug?	Yes=1	No=0			
form_pat	Is patch one of the forms of drug?	Yes=1	No=0			
form_pow	Is powder one of the forms of drug?	Yes=1	No=0			
form_dri	Is drinking liquid one of the forms of drug?	Yes=1	No=0			
form_cry	Is crystal one of the forms of drug?	Yes=1	No=0			
form_inj	Is injection one of the forms of drug?	Yes=1	No=0			
form_vap	Is Inhalable vapor of some liquids one of the forms of drug?	Yes=1	No=0			
Noidea_form	I don't know about the forms of drug	Yes=1	No=0			
att_cur	Teenagers curiosity has role in tendency toward illegal drug use	Less Important	2	3	4	More Important
		1				5
att_joy	Joy-seeking has role in tendency toward illegal drug use	1	2	3	4	5
att_som	Somatic diseases has role in tendency toward illegal drug use	1	2	3	4	5
att_psyc	Psychiatric disorder has role in tendency toward illegal drug use	1	2	3	4	5
att_know	Lack of knowledge about complications of drugs has role in tendency toward illegal drug use	1	2	3	4	5
att_pos	Positive attitude toward drug abuse has role in tendency toward illegal drug use	1	2	3	4	5
att_conf	Low self-confidence has role in tendency toward illegal drug use	1	2	3	4	5
att_shy	Elimination of shyness has role in tendency toward illegal drug use	1	2	3	4	5
att_divor	Parents' divorce has role in tendency toward illegal drug use	1	2	3	4	5
att_amus	Lack of amusement facilities has role in tendency toward illegal drug use	1	2	3	4	5
att_resolv	Disability in resolving routine problems has role in tendency toward illegal drug use	1	2	3	4	5
att_fam	Crowded family has role in tendency toward illegal drug use	1	2	3	4	5
att_stric	Having strict parents has role in tendency toward illegal drug use	1	2	3	4	5
att_addfam	Presence of an addicted person in the family has role in tendency toward illegal drug use	1	2	3	4	5
att_frien	Friends offer has role in tendency toward illegal drug use	1	2	3	4	5
att_famdis	Family disputes has role in tendency toward illegal drug use	1	2	3	4	5

att_acc	Access to drugs has role in tendency toward illegal drug use	1	2	3	4	5
att_cons	Lack of access to consultation centers has role in tendency toward illegal drug use	1	2	3	4	5
att_low	Low cost of drugs has role in tendency toward illegal drug use	1	2	3	4	5
att_free	Having free time has role in tendency toward illegal drug use	1	2	3	4	5
att_addedu	Presence of an addicted person in residential/educational place has role in tendency toward illegal drug use	1	2	3	4	5
att_cause_euph	Drug use causes Transient euphoria	Agree=1	Disagree=2		No Comment=0	
att_cause_mem	Drug use causes improved memory and learning ability	Agree=1	Disagree=2		No Comment=0	
att_cause_dep	Drug use causes Depression	Agree=1	Disagree=2		No Comment=0	
att_cause_impr	Drug use causes Improvement in some somatic diseases	Agree=1	Disagree=2		No Comment=0	
att_cause_conf	Drug use causes Increase in self confidence	Agree=1	Disagree=2		No Comment=0	
att_cause_friend	Drug use causes Better acceptability by friends	Agree=1	Disagree=2		No Comment=0	
att_hash	Using some drugs like hashish are not addictive.	Agree=1	Disagree=0			
att_1time	Even with using drugs for 1 time there is a possibility of becoming addicted.	Agree=1	Disagree=0			
att_occa	Occasional use is OK.	Agree=1	Disagree=0			
exp	Have you ever used drugs?	Yes=1	No=0			
frist_age	At what age you used drugs for the first time?					
first_drug	What is the name of the drug you used for the first time?	Hashish=1	Opium=2	Cocaine=3		
why_cur	I used once for curiosity	Yes=1	No=0			
why_cond	If an acute condition occurs, I use drugs to improve my general condition	Yes=1	No=0			
why_fam	I use drugs following family disputes	Yes=1	No=0			
why_joy	I use drugs to achieve feeling happiness and joy	Yes=1	No=0			
cur_opi	I use Opium currently	Yes=1	No=0			
cur_hash	I use Hashish currently	Yes=1	No=0			
cur_naas	I use Nass currently	Yes=1	No=0			
cur_cig	I use Cigarette currently	Yes=1	No=0			
cur_no	I don't use currently	Yes=1	No=0			