

## The Effect of an Educational Intervention Based on the PRECEDE-PROCEED Model on Knowledge, Behaviors and Attitudes of Adolescent Students Regarding Drug Abuse and Addiction

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### Abstract

**Background:** Drug abuse and addiction is one of the major public health problems affecting adolescents. Promoting knowledge, attitudes and preventive behaviors of drug abuse and addiction among adolescents can play crucial role in reducing this health problem.

**The aim of this study** was to evaluate the effect of an educational intervention based on the PRECEDE- PROCEED model on knowledge, behaviors and attitudes of adolescent students regarding drug abuse and addiction.

**Study design:** Quasi experimental study design was used in this study.

**Setting:** this study was conducted in Five Year System Technical High School for Developed Textile Industries in Tanta City. 10 classes from all five grades were selected randomly.

**Subjects:** the total study sample was 256 students (boys and girls).

**Collection of data:** PRECEDE-PROCEED Model components were used for planning, implementation and evaluation of the program. An appropriate environmental and educational intervention was implemented based on the results of need assessment. PRECEDE-PROCEED Model based questionnaires were used to assess changes in predisposing, reinforcing, and enabling factors immediately and two months after the intervention implementation.

**Results:** The educational intervention had significantly positive effect on predisposing, enabling, reinforcing factors and drug addiction behaviors immediately and two months after the intervention ( $P < 0.05$ ).

**Conclusion and recommendations:** PRECEDE-PROCEED Model is an effective method in planning for and providing health education to improve knowledge, attitudes and behaviors regarding drug abuse and addiction among adolescent students and promoting enabling and reinforcing factors that support prevention of such problem. The researchers recommended activating the role of school administration, psychologist, social worker, and school doctor and health visitor in controlling the problem of drug abuse; Drug abuse prevention education should be incorporated in one of the subjects in technical secondary schools.

**Keywords:** Drug addiction, Abuse, Adolescent students, Health education, PRECEDE-PROCEED.

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### I. Introduction

Drug abuse, misuse, and dependency is an unresolved nationwide and community health problem that constitute a serious threat to public health and to the safety as well as well-being of humanity-particularly children, Adolescent, young people and their families<sup>(1,2)</sup>. Young people can be easily got in to and influenced by drugs and sometimes they are involved in drug trafficking<sup>(3)</sup>.

Drug use occurs in young people due to peer pressure, imitation of parents, boredom, the need to experiment and the individual's self-image. Young people are often unaware of the truth about drugs, their physical, mental and spiritual effects and they do not realize the consequences of drug abuse<sup>(4)</sup>. National council reports in Cairo revealed that, children as young as 11 are using drugs and in Egypt the use among young people over 15 has jumped from 6.4% to 30%<sup>(5)</sup>. The World Drug Report 2016, released by the United Nations Office on Drugs and Crime (UNODC), showed that the prevalence of drug abuse was approximately 247 million people - just over 5 percent of people aged 15 to 64 worldwide - who took drugs Illegal in 2015<sup>(6)</sup>. According to The United Nations Office on Drugs and Crime reports, the rate of drug abuse reached 10% in Egypt, double the global rate of 5%, where it reached 2.4% of the total population, pointing out that the addiction spread in the age group between 15 to 60 years<sup>(7)</sup>. "Prevention is better than cure" there is an increasing awareness of the need for prevention of substance abuse related problems. The nurse is especially equipped to strengthen the bonds among adolescent and parents, health agencies and schools, law enforcement and hospitals to assist the community in the design and implementation of its own prevention program<sup>(8)</sup>. The school nurse is in a unique position to act as a change agent for youth substance abuse and addiction prevention<sup>(9)</sup>.

The nature of nursing practices has traditionally included responses to health-conducive behavior. Addiction and substance abuse prevention is the main choice of health matters that the community health nurse concerned with. The nurse provides the knowledge of addiction and abuse and assists the community in its health enhancement by using addiction and nursing theory, interpersonal process, research competencies, and teaching skills<sup>(8)</sup>.

In health education and health promotion, a number of a logic models were used and one of the most frequently used is the PRECEDE-PROCEED Model. When a problem affecting a particular population has been identified, health and the health professional must do something to fix the problem, a planning model like PRECEDEPROCEED, which has been the cornerstone of health promotion practice for more than three decades, can help guide this process. It is originally developed in the 1970's by Green and colleagues. According to most recent version of the model by Green and Kreuter (2005), this model prescribes eight phases in planning, implementing, and evaluating health promotion programs<sup>(10,11)</sup>.

The PRECEDE portion of the model (Phases 1-4) includes social, epidemiological, behavioral, environmental, educational, administrative, and policy assessments. The PROCEED portion of the model (Phases 5-8) includes implementation, process evaluation, impact evaluation, and outcome evaluation. The first portion of the model focuses on program planning and the second portion focuses on implementation and evaluation<sup>(10,11)</sup>. A major reason to use PRECEDE-PROCEED is that it is a logic model. As a result, it will provide a structure within which to plan for intervention, and organize both thinking and actions, so that the intervention will be a carefully-planned, coherent whole, rather than cobbled together. As a logic model, it also provides a guide for analyzing the issues involved, and choosing both the most likely areas to address and the most likely avenues to address them<sup>(12,13)</sup>.

Schools have been identified as a key setting for primary prevention activities and promotion of the preventive measures of most health problems among youth<sup>(14)</sup> Hence, in this research, we studied the effect of effect of an educational intervention based on the PRECEDE- PROCEED model on knowledge, behaviors and attitudes of adolescent students regarding drug abuse and addiction as a serious health problem affecting their future.

**Aim of the study:-** The aim of this study was to,

Evaluate the effect of an educational intervention based on the PRECEDE- PROCEED model on knowledge, behaviors and attitudes of adolescent students regarding drug abuse and addiction.

**Research Hypothesis:-** An educational intervention based on the PRECEDE- PROCEED model will change positively knowledge, behaviors and attitudes of adolescent students regarding drug abuse and addiction.

## **II. Materials And Methods**

- ❖ Study design: Quasi experimental study design was used in this study.
- ❖ Study setting:- This study was conducted in Five Year System Technical High School for Developed Textile Industries in Tanta City which contain large number of students with different ages. 2 classes from each grade were selected randomly. The total selected classes were 10 classes from all five grades.
- ❖ Study subjects: - the total study sample was 256 students (boys and girls) who enrolled in the previous selected classes and willing to participate in the study.
- ❖ Tools of the study:

At first, through a mixed quantitative and qualitative study, the first four steps' assessment of PRECEDE portion were conducted and then an appropriate intervention, based on their results, was developed, implemented, and evaluated. Qualitative data were collected through five focus group discussions with the participation of students from the five grades and from five in-depth interviews with key informants related to drug abuse and addiction prevention, such as public health specialists and consultants.

Quantitative data were collected through the questionnaire developed by the researcher, that was based on PRECEDE-PROCEED Model and included four sections, demographic characteristics; predisposing factors that included knowledge (47 questions on drug abuse and addiction overview, causes, signs & symptoms and consequences) and attitude (32 questions on beliefs and attitude based on Likert scale), and behavior (6 questions); enabling factors (4 questions); reinforcing factors (4 questions). Scores of Knowledge were classified as low (less than 35 %), moderate (35-65 %), and high (> 65 %) of total knowledge score. Attitudes puts on three likert scale classified as positive (>60%) and negative (<60%). Ten community and public health professionals confirmed the face and content validity of the questionnaire. The reliability of the attitude questionnaire was confirmed with a Cronbach's alpha reliability coefficient of 0.71, obtained in a pilot study on 25 students other than the main study groups. Test- Retest method used for determining the reliability of

predisposing, reinforcing, and, enabling questionnaires in the pilot sample, it has been achieved with a correlation coefficient of 0.75, 0.80, and 0.77, respectively.

#### **Ethical Consideration**

Informed consent to participate in the study was obtained from the study subjects (students) after explanation the purpose of the study and assurance the subjects about their privacy and confidentiality of the obtained data. The respondents were anonymous and participated willingly and voluntarily in this study

#### **Phases of the study based on model steps:-**

##### **❖ Social Assessment**

In this phase, the researchers identified factors affecting health outcomes and quality of life in the target population. We used some methods for data collection such as interviews with key informants and focus group discussions with the school students. Results showed that drug abuse and addiction can be one of the social and health problems in our country, which can affect adolescents and adult's health.

##### **❖ Epidemiological, Behavioral, and Environmental Assessment**

In this phase, the researchers collected existing data related to drug abuse and addiction such as types, prevalence rates, importance, and factors associated with drug abuse and addiction in Egypt and other countries, using data sources such as various online databases and national health surveys in Egypt and other countries. Then, in behavioral and environmental assessments, factors usually associated with drug abuse and addiction were systematically identified, and the most important and changeable behavioral and environmental factors associated with drug abuse and addiction were found. Finally, behavioral objectives and environmental objectives were constructed for each risk factor. Results of the focus group discussions and interviews were widely applied for this step. Review of the literature and existing data on drug abuse and addiction showed that adolescents are a high-risk group for morbidity and mortality related to drug abuse and addiction.

After identifying and rating the behavioral and environmental determinants in terms of importance and changeability, the determinants were selected. According to the results of qualitative study, in terms of behavioral determinants of the performance of preventive drug abuse behaviors, life skills applications related to prevention of drug abuse and addiction were considered as the target behavior. In terms of environmental determinants of the performance of preventive drug abuse and addiction behaviors, access to places, people, or informational resources, such as educational material and classes are considered as the target behavior. Some demographic variables such as parents' occupation and education, family size, birth order, housing, having a specific room, family status, and field of education were also considered as non-health factors related to quality of life in target population.

##### **❖ Educational and Ecological Assessments**

This phase entails identifying the predisposing, enabling, and reinforcing factors, which leads to behavioral change. Predisposing factors are antecedents to behaviors that motivate particular health related attributes, such as knowledge, attitudes, and beliefs related to drug abuse and addiction. knowledge and beliefs concerning the hazards of drugs; the individual's own perceptions of a drug's ability to harm; moral beliefs and attitudes about drug consumption; or the individual's social circumstances and prospects irrespective of family interaction.

Second are enabling elements. These are decision-making and economic or other circumstances relating directly to individual behavior in the situation of opportunity to consume a drug. The major enablers are of two kinds: (1) the availability and accessibility of drugs and prevention or treatment resources in the community and (2) the individual's skills to define and respond autonomously and effectively to problem situations such as the ones that drug availability presents. Enabling factors are those that facilitate performance of the health action, such as resources, skills, and supportive policies that are essential to conduct the behaviors<sup>(1)</sup>. In this study, the enabling factors were availability and accessibility to counseling centers, educational classes, and informational resources, such as books, website, etc.

Third are reinforcing elements, which are the environmental (especially social and economic) contingencies that attach to drug-related behavior. Reinforcement may result from social recognition by a significant other or members of an important reference group, in the form of giving or withholding approval (praise, prestige, esteem), disapproval (complaint, ridicule, or dislike), or intimacy; or earning money or acquiring property as a result of drug-related income. Major significant others and groups include parents (whose influence declines over time), peers (whose influence increases from childhood to adolescence); and teachers.

Parents may retain greater influence than peers in some families. Reinforcing factors are provided in reward and incentive for the persistence of the health related behavior, such as getting influence from significant

people. In this study, getting influences from parents especially mothers, teachers, school counselors, and peers are considered as the reinforcing factors. Finally, an appropriate educational and environmental intervention to promote Knowledge, positive attitudes and preventive behaviors of drug abuse and addiction was designed based on the results of this phase.

#### ❖ **Administrative and Policy Assessments**

The fourth phase of the model focuses on identifying resources, policies, supports, and facilities needed for implementing and evaluating the health education program <sup>(15)</sup>. We assessed a place and timetable for activities, budgeting, personnel, organizational barriers, facilitators, policies, responsibilities, necessary supports and coordination for implementing educational and environmental interventions. These items were mainly identified through the interviews with key informants (school directors, school health nurse, school doctor, School social and psychiatric specialists).

After these quadric assessments, the program's components were determined. Educational objectives, content of the educational program, messages, concepts, and materials were developed through finding expert's views and reviewing the scientific resources. Now, it was time to implement the program in the students group. The environmental intervention plan was also developed.

#### ❖ **Implementation**

After planning the intervention, the proposed program was implemented among students.

The main objectives of educational intervention was

1. To increase students' awareness about drug abuse and addiction causes, risk factors, signs and symptoms, consequences and prevention: holding lectures for life skills education and colloquy sessions about drug abuse and addiction twice a week for students from every grade (in the school seminars hall using Data Show which offered by the school director), distribution of the educational pamphlets related to drug abuse and addiction to students was done.

A module on Drug Prevention Education was developed by the researchers. It consisted of two parts, subject matter discussed on the first part were: Definition Of Terms: Drugs, Drug Abuse, Physical Addiction, Psychological Addiction, Drug Dependence, Drug User, Reasons behind drug abuse, Types and Common signs of drug abuse. Topics included on the second part of the module focuses on How Drugs Affect A Person, When Teens Combine Drugs With Sex, What do drugs do to the brain and the body, The common drugs of abused in the Egyptian's, The Role of the Youths, Parents, School and the Community in Drug abuse and addiction prevention.

2. To change students' attitude: holding focus group discussions with students about issues related to drug addiction, and benefits of avoidance of such behavior, until reaching the correct attitudes towards drug abuse and addiction avoidance.
3. To change student's behavior: role-playing with school students to improve skills associated with drug abuse and addiction avoidance stressing on "Just Say No" approach.
4. To promote the reinforcing factors: advocating and training school counselors (school health nurse, school social specialist and school psychologist) to effectively conduct drug abuse and addiction education for the students, encourage them to give positive reinforcement for students adhere to health behaviors especially drug avoidance behavior and distribution of the educational booklets to parents through their students to involve them, especially mothers, and reinforce messages learned at the school. Also encourage students to support each others in following proper health behaviors and avoidance of high risk behavior and being away from deviant peer group and drug sources.
5. To promote the enabling factors: coordination with available and free counseling, treatment and rehabilitative clinics in Psychiatric medicine hospital in Tanta City and introducing them to school students, introducing teachers and school counselors as enabling factors to students, and provision of the correct information to increase their awareness about drug abuse and addiction consequences and prevention through the introduction of books and reliable websites related to drug abuse and addiction prevention. The researchers refers also the ten students who report that they are addicted to some drugs and want to be treated and rehabilitated to the addiction treatment and rehabilitation clinic in Psychiatric medicine hospital in Tata City and follow up them and found that nine of them start treatment and go through the treatment process.

#### ❖ **Process Evaluation**

Process evaluation occurs during implementation of the program and is used to evaluate the process by which the program is being. In this phase, achieving the educational objectives is measured. In this study

process evaluation includes evaluating the program components such as the program staff, methods, materials used, and activities

#### ❖ **Impact Evaluation**

This phase determines the immediate effect of the program on the target behavior, and it occurs after the program ends<sup>(15)</sup>. In this study, impact evaluation consists of assessing changes in predisposing, reinforcing, enabling, and behavioral factors immediately after and two months after intervention activities through analysis of the questionnaires and meeting with students to ensure availability of positive enabling and reinforcing factors.

❖ Duration of the study:- all the study phases from the preparation phase until the end of post - post evaluation take about four months starting from February until end of May 2016.

### **III. Statistical Analysis**

The data was analyzed using the SPSS 20 statistical software, using chi-square and analysis of variance with repeated measures tests. To determine the effects of the intervention, repeated measures analyses of variance were done. Time was the within-subject factor with three levels (pre-test, post-test, and post-post-test).

### **IV. Results**

The students demographic characteristics are shown in **Table (1)**: The highest percent of the students belonged to the age 15-18 years represents (59.8%). More than half of the students live in rural area (52.3%) in; while more than one third (36.3%) had the first birth order. Regarding privacy in home more than half (55.4%) have privacy in home while (21.9%) haven't privacy in home. In relation to type of exercise, 30.9% of students were practice walking and 18.4% of them were practice football, only (3.9% &3.5%) of them were practice download weight and more than one type respectively.

**Table (2)**: Represents distribution of studied students according to their parents' socio-demographic data; the highest percentage of students' fathers and mothers (42.9 % & 47.6%) were Illiterate & read and write respectively. 39.1% and 39.5 % students' fathers and mothers had secondary education respectively. Nearly three quarters of their fathers (74.2%) have a job, while (75.8%) of their mothers were house wife, and nearly one half of the studied sample had from 4-5 family members as well as 43.4% of them had three rooms in their house and more than half had sufficient family income. 41% of studied students reported relation with their fathers as "understand each other" compared to 58.2% reported the same thing with their mothers.

**Table (3), figure (1)**: Comparison of students' knowledge about drug addiction pre, immediate and post intervention; in pre intervention, more than two third (68.36%) had low total knowledge score, while 31.25% of them had moderate knowledge score and only 0.39% had high knowledge score. On the other hand, immediately after intervention 85.94% of them had high knowledge score and it decreased to 69.92% two months post intervention. The differences was highly statistically significant in pre, immediately after and two months post intervention ( $\chi^2= 572.10$  and  $P=0.00$ ).

**Figure (2)**: Comparison of students' attitudes regarding drug addiction pre, immediate and post intervention; the highest percentage of the students (57.81%) had negative attitude and 42.19% of them had positive attitude in pre intervention. This compared to 67.58% of them had positive attitude in immediately after intervention and it was surprised that their positive attitude increased markedly to 94.92% two months post intervention. The differences was highly statistically significant in pre, immediately after and two months post intervention, ( $\chi^2= 164.28$  and  $P=0.00$ ).

**Table (4)**: Distribution of the studied students according to their reporting to the presence of `enabling factors that support drug avoidance behaviors; the highest percentage (80.5%) of the students reported that they did not know the availability of drug addiction counseling centers in Tanta city in pre intervention, while majority of them (78.5%) reported "yes" about availability of drug addiction counseling centers in Tanta city two months post intervention. As regard to school giving educational classes about drug abuse and addiction by school nurse, doctor, social specialist or psychological specialist, only (2.7%) reported "yes" and the majority (97.3%) reported "No" in pre intervention, but two months post intervention, the highest percentage (64.5%) reported "yes" and the rest (35.5%) reported "No". Finally the majority (84.4%) of the students reported "do not know" in pre intervention regarding presence of books or magazines contains information related to addiction and its prevention in the school library. While, two months post intervention about half (49.9%) of them reported yes regarding the presence of such books and about 50.8% do not know. The differences were statistically significant in pre and two months post intervention.

**Table (5)**: Distribution of the studied students according to their reporting to the presence of `reinforcing factors that support drug avoidance behaviors pre and two months post intervention; 70.3% of the

studied students pre intervention compared to 89.1% two months post intervention say "Yes" about getting positive influence from parents for good health behaviors ; 30.5% of them pre intervention compared to 62.5% two months post intervention say "Yes" about getting positive influence from peers for good health behaviors. Moreover, 25.8% of students pre intervention compared to 46.9% two months post intervention say "Yes" about getting positive influence from school teachers for good health behaviors. Regarding getting positive influence (incentives) from school counselors (school health nurse, social specialist or psychologist), 27.7% of students say "Yes" pre intervention compared to 73% post intervention. There was highly statistically significant difference between students reporting to the presence of reinforcing factors that support drug avoidance behaviors pre and two months post intervention.

**Tables (6&7):** Represent the distribution of the studied students by their drug addiction behavior pre intervention and two months post intervention, only 23 studied students (9%) reported history of drug taking before, from which (21.7% & 30.4%) taking Bango and Hashish respectively and 87% of them try to stop drugs, while 43.5% (10 students) of them still taking it. After two months post intervention, (90%) of those addicted students (9 students) start treatment and all of them didn't taken any drugs two months post session.

**Tables (8,9, 10):** Relationship between socio demographic data of the studied students socio demographic data of the students' family, students history of addiction and their total knowledge score. There was a statistically significant relation found between total knowledge score of the students and their age, sex and birth order (P= 0.009, 0.043 and 0.005) respectively. There was a statistically significant relation found between total knowledge score of the students and their mothers education and family income (P=0.232 , 0.019) respectively. Also, There was a statistically significant relation found between total knowledge score of the students and their history of drug taking before (p= 0.023).

**Tables (11, 12, 13):** Relationship between socio demographic data of the studied students, socio-demographic data of the students' family, students' history of addiction and their total attitude score. There was a statistically significant relation found between total attitude score of the students and their age, sex, residence, birth order and privacy at home (P=0.00, 0.01, 0.047, 0.021, 0.033) respectively. There was a statistically significant relation found also between total attitude score of the students and their mothers' education, fathers' education and family income (P=0.002, 0.011, 0.041) respectively. Also, There was a statistically significant relation found between total attitude score of the students and their history of having a person addicted in the family, history of drug taking before, duration of taken and the person who identified the student to addiction (p= 0.018, 0.034, 0.021,0.023) respectively.

**Table (1):** Frequency of socio-demographic data among studied groups.

Categories		(n=256)	
		N	%
1. Age	15-18	153	59.8
	19-22	103	40.2
	Mean±SD	18.02±1.50	
2. Sex	Male	126	49.2
	Female	130	50.8
3. Residence	Urban	122	47.7
	Rural	134	52.3
4. Birth Order	First	93	36.3
	Second	69	27
	Third	55	21.5
	fourth or more	39	15.2
5. Religion	Moslem	254	99.2
	Christian	2	0.8
6. privacy in home	Yes	142	55.5
	No	56	21.9
	Quite	58	22.7
7. Staying with	Parents	193	75.4
	Father	16	6.2
	Mother	32	12.5
	Grandfathers	15	5.9
8. relation with father	Understand each other	105	41
	Understand him to some degree	15	5.9
	Can not understand each other	39	15.2
	Be firm sometimes and other time smooth	50	19.5
	Be firm continuously	10	3.9
	Deal smooth with him but cannot	37	14.5

9. relation with mother	understand him or her		
	Understand each other	149	58.2
	Understand her to some degree	48	18.8
	Can not understand each other	19	7.4
	Be firm sometimes and other time smooth	25	9.8
	Be firm continuously	3	1.2
10. Conducting exercises	Deal smooth with her but cannot understand him or her	12	4.7
	Do not practice	72	28.1
	light exercise	39	15.2
	Foot ball	47	18.4
	Walking	79	30.9
	Heavy exercises	10	3.9
	more than one type	9	3.5

**Table (2):** Distribution of studied samples according to socioeconomic data of their families.

Categories		(n=256)	
		N	%
1. father education	Illiterate, Read and write	110	42.9
	Secondary education	100	39.1
	high education	46	18
2. mother education	Illiterate, Read and write	122	47.6
	Secondary education	101	39.5
	High education	33	12.9
3. father occupation	work	190	74.2
	does not work	23	9
	Die	43	16.8
4. mother occupation	work	54	21.1
	House wife	194	75.8
	Die	8	3.1
5. family members	2-3	59	23
	4-5	127	49.6
	>= 6	70	27.3
6. house rooms	1-2	57	22.3
	3	111	43.4
	4-5	88	34.4
7. family income	Suffecient	140	54.7
	Not suffecient	86	33.6
	Suffecient and increase	30	11.7

**Table (3):** Comparison of students' knowledge about drug addiction pre, immediate and two months post intervention (n=256)

Knowledge items		Pre		Immediate		Post two months		$\chi^2$	P
		N	%	N	%	N	%		
1. Drug addiction Overview	Low	125	48.83	0	0	0	0	398.81	0.00*
	Moderate	98	38.28	60	23.44	141	55.08		
	High	33	12.89	196	76.56	115	44.92		
2. Causes of drug addiction	low	120	46.88	0	0	0	0	389.97	0.00*
	Moderate	88	34.38	26	10.16	76	29.69		
	High	48	18.75	230	89.84	180	70.31		
3. Types and sings & symptoms	Low	137	53.52	0	0	0	0	367.65	0.00*
	Moderate	60	23.43	60	23.44	110	42.97		
	High	59	23.05	196	76.56	146	57.03		
4. Consequences	Low	151	58.98	0	0	0	0	466.34	0.00*
	Moderate	72	28.13	28	10.94	54	21.09		
	High	33	12.89	228	89.06	202	78.91		
Total knowledge score	Low	175	68.36	0	0	0	0	572.10	0.00*
	Moderate	80	31.25	36	14.06	77	30.08		
	High	1	0.39	220	85.94	179	69.92		

\* Significant at P<0.05 .

**Figure 1:** Total knowledge score of studied students regarding abuse and addiction

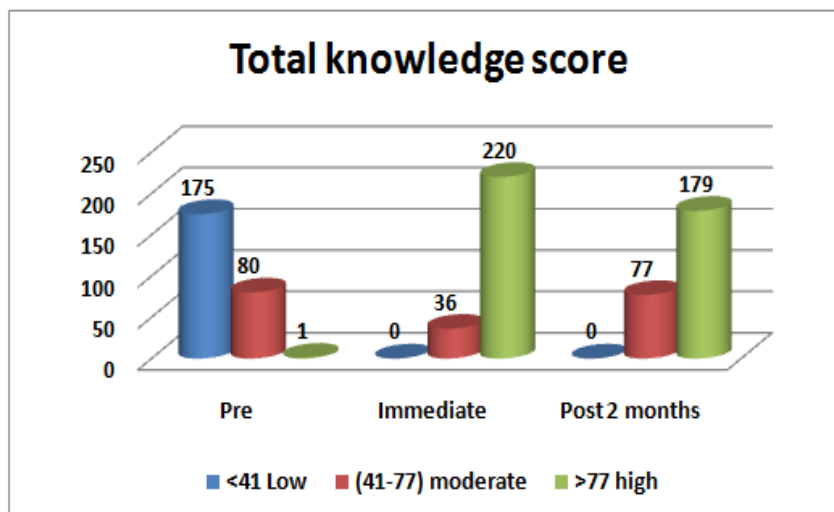


Figure 2: Comparison of students' attitudes regarding drug addiction pre, immediate and two months post Intervention.

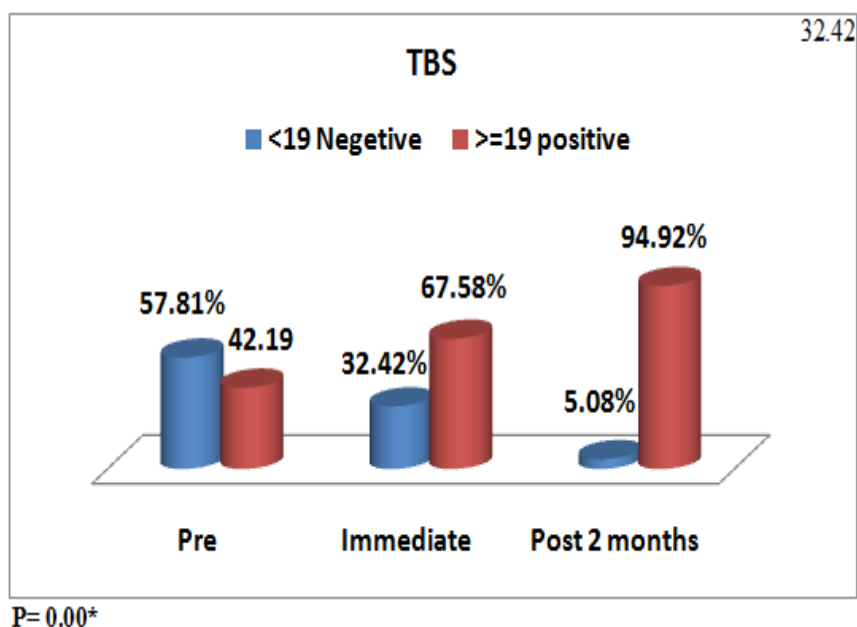


Table (4) Distribution of the studied students according to their reporting to the presence of `enabling factors that support drug avoidance behaviors pre and two months post intervention (No=256)

Categories		Pre intervention		Post 2 months		$\chi^2$	P
		N	%	N	%		
availability of drug addiction counseling centers in Tanta city	yes	50	19.5%	201	78.5%	17.002	0.00*
	do not know	206	80.5%	55	21.5%		
If yes, Is it easily accessible to you (N=50) (easy to reach and easy to use)	Yes	35	70%	45	90%	12.963	0.00*
	NO	15	30%	5	5%		
The school gives educational classes regarding drug abuse and addiction by school nurse, doctor, social specialist or psychological specialist	yes	7	2.7%	165	64.5%	3.969	0.046*
	NO	249	97.3%	91	35.5%		
Presence of books or magazines contains information related to addiction and its prevention in the school library	yes	0	0%	126	49.2%	48.912	0.000*
	NO	40	15.6%	0	0%		
	do not know	216	84.4%	130	50.8%		



**Table (5)** Distribution of the studied students according to their reporting to the presence of reinforcing factors that support drug avoidance behaviors pre and two months post intervention (No=256)

Categories		Pre intervention		Post 2 months		$\chi^2$	P
		N	%	N	%		
		Getting positive influence (incentives) from parents (especially mother) for good health behaviors (drug avoidance behaviors)	yes	180	70.3%		
	No	76	29.7%	28	10.9%		
Getting positive influence (incentives) from peers for good health behaviors (drug avoidance behaviors)	Yes	78	30.5%	160	62.5%	67.308	0.00*
	NO	178	69.5%	96	37.5%		
Getting positive influence (incentives) from school teachers for good health behaviors (drug avoidance behaviors)	yes	66	25.8%	120	46.9%	100.783	0.00*
	NO	190	74.2%	136	53.1%		
Getting positive influence (incentives) from school counselors (school health nurse, social specialist or psychologist) for good health behaviors (drug avoidance behaviors)	yes	71	27.7%	187	73%	36.252	0.00*
	NO	185	72.3%	69	27%		

**Table (6):** Distribution of the studied students by their drug addiction behavior history pre intervention

Categories		N	%
Having addicted friends	yes	69	27
	No	126	49.2
	Do not no	61	23.8
Go out with addicted friends	yes	19	7.4
	No	237	92.6
Having someone addicted in the family	yes	13	5.1
	No	231	90.2
	Do not know	12	4.7
taking any drugs before	yes	23	9
	No	233	91
	<b>If yes (n=23)</b>		
Type of drug taking	Bango	5	21.7
	Hashish	7	30.4
	Tramadol, Tamol	3	13
	Vabor substances (gola)	1	4.4
	Heroin	1	4.4
	Max	3	13
	cyntocinon (contraction injection)	2	8.7
	Antidepressant	1	4.4
Duration of taking	2 month	11	47.8
	4 month	6	26.1
	6 month	3	13
	8 month	3	13
who identified you on it	Friends	18	78.3
	Family	5	21.7
Try to stop	Yes	20	87
	No	3	13
still taking it	No	13	56.5
	Yes	10	43.5

**Table (7):** Distribution of studied addicted students two months post intervention (n=10).

Categories		(n=10)	
		N	%
1. Start treatment	yes	9	90
	No	1	10
2. Duration passed from the starting of the treatment	Treated himself	1	10
	30 days	3	30
	45 days	4	40
	50 days	2	20

3. still taking drugs two months post session	No	10	100
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**Table (8):** Relationship between socio demographic data of the studied students and their total knowledge score (n=256).

Categories		Total knowledge score Pre Intervention					
		Low <41		Moderate (41-77)		High >77	
		N	%	N	%	N	%
Age	15-18	115	44.9	37	14.5	1	0.4
	19-22	60	23.4	43	16.8	0	0
$\chi^2, P$		<b>9.326, 0.009*</b>					
Sex	Male	95	37.13	31	12.1	0	0
	Female	80	31.3	49	19.1	1	0.4
$\chi^2, P$		<b>6.275, 0.043*</b>					
Residence	Urban	78	30.5	43	16.8	1	0.4
	Rural	97	37.9	37	14.5	0	0
$\chi^2, P$		<b>3.957, 0.228</b>					
birth order	First	65	25.4	28	10.9	0	0
	Second	36	14.1	33	12.9	0	0
	Third	45	17.6	9	3.5	1	0.4
	fourth or more	29	11.3	10	3.9	0	0
$\chi^2, P$		<b>18.392, 0.005*</b>					
Religion	Moslem	173	67.6	80	31.3	1	0.4
	Christian	2	0.8	0	0	0	0
$\chi^2, P$		<b>0.933, 0.627</b>					

**Table (9):** Relationship between family socio-demographic data and total knowledge score among studied groups (n=256).

Family conditions		Pre					
		Low <41		Moderate (41-77)		High >77	
		N	%	N	%	N	%
father education	Illiterate , read and write	69	27	41	16	0	0
	Secondary education	73	28.5	27	10.5	0	0
	high education	33	12.9	12	4.7	1	0.4
$\chi^2, P$		<b>7.715, 0.103</b>					
mother education	Illiterate , read and write	79	30.8	43	16.8	0	0
	Secondary education	73	28.5	28	10.9	0	0
	High education	23	9	9	3.5	1	0.4
$\chi^2, P$		<b>8.417, 0.023*</b>					
father occupation	Work	128	50	62	24.2	0	0
	does not work	15	5.9	8	3.125	0	0
	Die	32	12.5	10	3.9	1	0.4
$\chi^2, P$		<b>6.332, 0.176</b>					
mother occupation	Work	34	13.3	19	7.4	1	0.4
	House wife	134	52.3	60	23.4	0	0
	Die	7	2.7	1	0.4	0	0
$\chi^2, P$		<b>5.588, 0.232</b>					
family income	Suffecient	95	37.1	45	17.6	0	0
	Not suffecient	61	23.8	24	9.4	1	0.4
	Suffecient and increase	19	7.4	11	4.3	0	0
$\chi^2, P$		<b>2.801, 0.019*</b>					

**Table (10):** Relationship between total knowledge score and students' history of addiction behaviors (n=256).

Categories		Pre					
		Low <41		Moderate (41-77)		High >77	
		N	%	N	%	N	%
having addicted friends	yes	45	17.6	24	9.4	0	0
	No	91	35.5	35	13.7	0	0
	Do not no	39	15.2	21	8.2	1	0.4
$\chi^2, P$		<b>4.705, 0.319</b>					
go out with addicted friends	yes	14	5.5	5	2	0	0
	No	161	62.9	75	29.3	1	0.4
$\chi^2, P$		<b>0.325, 0.850</b>					

having someone addicted in the family	yes	4	1.6	9	3.5	0	0
	No	163	63.7	67	26.2	1	0.4
	Do not know	8	31	4	1.6	0	0
$\chi^2, P$		<b>9.355 , 0.053</b>					
taking any drugs before	yes	10	3.9	13	5.1	0	0
	No	165	64.5	67	26.2	1	0.4
$\chi^2, P$		<b>7.552 , 0.023*</b>					
duration of taking	0	164	64.1	68	26.6	1	0.4
	2	3	1.2	8	3.1	0	0
	4	5	2	2	0.8	0	0
	6	1	0.4	1	0.4	0	0
	8	2	0.8	1	0.4	0	0
$\chi^2, P$		<b>9.684 , 0.288</b>					

**Table (11):** Relationship between socio demographic data of students and their total attitude score (n=256).

TBS		Pre Intervention			
		Negative		positive	
		N	%	N	%
Age	15-18	104	40.6	49	19.1
	19-22	44	17.2	59	23
$\chi^2, P$		<b>16.099 , 0.00*</b>			
Sex	Male	83	32.4	43	16.8
	Female	65	25.4	65	25.4
$\chi^2, P$		<b>6.610 , 0.01*</b>			
Residence	Urban	65	25.4	57	22.3
	Rural	83	32.4	51	20
$\chi^2, P$		<b>1.964 , 0.047*</b>			
Birth order	First	56	21.9	37	14.5
	Second	38	14.8	31	12.1
	Third	35	13.7	20	7.8
	fourth or more	19	7.4	20	7.8
$\chi^2, P$		<b>2.52 0.021*</b>			
Religion	Moslem	147	57.4	107	41.8
	Christian	1	0.4	1	0.4
$\chi^2, P$		<b>0.05 , 0.822</b>			
privacy in home	Yes	78	30.5	64	25
	No	33	12.9	23	9
	Quite	37	14.5	21	8.2
$\chi^2, P$		<b>1.363, 0.033*</b>			

**Table (12):** Relationship between family socio-demographic data and total attitude score of the studied groups (n=256).

TBS		Pre			
		<19 Negative		≥19 Positive	
		N	%	N	%
father education	Illiterate , read and write	59	23	51	19.9
	Secondary education	62	24.2	38	14.8
	high education	27	10.5	19	7.4
$\chi^2, P$		<b>1.520 , 0.002*</b>			
mother education	Illiterate, read and write	67	26.1	55	21.5
	Secondary education	63	24.6	38	14.8
	High education	18	7	15	5.9
$\chi^2, P$		<b>1.426, 0.011*</b>			
father occupation	Work	103	40.2	87	34
	does not work	14	5.5	9	3.5
	Die	31	12.1	12	4.7
$\chi^2, P$		<b>4.694 , 0.096</b>			
mother occupation	Work	27	10.5	27	10.5
	House wife	116	45.3	78	30.5
	Die	5	2	3	1.2
$\chi^2, P$		<b>1.736 , 0.420</b>			
family income	Suffecient	83	32.4	57	22.3
	Not suffecient	53	20.7	33	12.9

	Suffecient and increase	12	4.7	18	7
$\chi^2, P$		4.541, 0.041*			

**Table (13):** Relationship between total attitude score and students' history of addiction behaviors(n=256).

TBS		Pre			
		<19 Negative		≥19 positive	
		N	%	N	%
having addicted friends	yes	47	18.4	22	8.6
	No	68	26.6	58	22.7
	Do not no	33	12.9	28	10.9
$\chi^2, P$		4.112, 0.128			
go out with addicted friends	yes	14	5.5	5	2
	No	134	52.3	103	40.2
$\chi^2, P$		2.12, 0.145			
having someone addicted in the family	yes	3	1.2	10	3.9
	No	136	53.1	95	37.1
	Do not know	9	3.5	3	1.2
$\chi^2, P$		7.991, 0.018*			
taking any drugs before	yes	13	5.1	10	3.9
	No	135	52.7	98	38.3
$\chi^2, P$		0.017, 0.034*			
duration of taking	0	136	53.1	97	37.9
	1	2	0.8	9	3.5
	2	6	2.3	1	0.4
	3	1	0.4	1	0.4
	4	3	1.2	0	0
$\chi^2, P$		11.587, 0.021*			
who identified you on it	Not addicted	138	53.9	95	37.1
	friends	9	3.5	9	3.5
	family	1	0.4	4	1.6
$\chi^2, P$		3.573, 0.023*			

### V. Discussion

During the last few decades, different models of health education were applied to develop and implement health education programs, and PRECEDE-PROCEED Model has been used in the planning and implementation of the most health promotion programs. Studies result proved that this model could apply in different settings such as schools and others (16,18). According to our literature review, it is worth mentioning that this is the first study to apply the PRECEDE-PROCEED Model promoting preventive behaviors and attitudes of substance abuse and addiction. The aim of this study was to evaluate the effect of an educational intervention based on the PRECEDE- PROCEED Model on knowledge, behaviors and attitudes regarding drug abuse and addiction among adolescent students in Tanta city. The findings in this study indicated that PRECEDE-PROCEED Model is an appropriate model for planning and applying preventive intervention for substance abuse and addiction. In this study, results of the impact evaluation revealed significantly positive knowledge and attitude changes in the intervention students over time. Also, reinforcing and enabling factors showed significantly positive changes two months after intervention.

The focus of the intervention was on promoting knowledge and preventive attitudes toward substance abuse and addiction. Before implementation of the educational intervention the results confirmed lack of necessary knowledge and having negative preventive attitudes for prevention of substance abuse and addiction among adolescent students. However, a significant increase in knowledge levels and positive preventive attitudes immediately and two months after the intervention was observed in the intervention adolescent students (P <0.05).

However there was a slight decrease of the total high knowledge score in post two months intervention assessment than immediately post intervention assessment, but the percentage of positive attitude was increased from 67.58% in the post intervention assessment 1 (immediately) to 94.92% in the post intervention assessment 2 (after two months) which ensures and emphasize that school- based substance abuse education based on the PRECEDE-PROCEED Model appears to be the most effective at increasing positive attitudes toward prevention of drug abuse and addiction and there was a retention of knowledge of the respondents which affects positively their attitudes and behaviors. Thus the ten students who reported using of some drugs already go to treatment and rehabilitated clinic and decide to get rid of this habit and stop taking any substances.

One possible explanation for the intervention's success in promoting preventive attitudes and behaviors is that at first, we provided the rationale or motivation for target attitudes and behaviors through

promoting predisposing factors, and then through promoting enabling and reinforcing factors. The increase in the knowledge of the respondents can also be attributed to many factors. Manner of lecturing and the lecturer is another factor to consider. The students were interested in the lecture that most of them copied the topics written in the visuals aids. After the discussion there was an open forum where in students asked questions on certain topics that were not clear, and they did not understand. Moreover, we discuss some of the topics in a humorous way, so that understanding in the part of the students was easy. Judicious use of humor can facilitate students learning (Bryant, J., & Zillmann, D.198 8). Humor can be an effective element of classroom teaching, serving to reduce tension, increase motivation. Also, using planned role-play help students to acquire skills necessary to make informed decision to reject drugs and facilitate adopting of positive attitude.

The effectiveness of health education in school and college students was also noted in the studies done by Medha T, et al<sup>(19)</sup> and DREIZA M<sup>(20)</sup>. After the health education the students seemed to be more informed because there were statistically significant differences between the percentages of the correct answers of the pre-test and the re-test. Also, in the studies of S Sussman<sup>(21)</sup> and Louise Ann Rohrbach et al<sup>(22)</sup>, the Project Towards No Drug Abuse a look of interactive classroom- based prevention program drug abuse program revealed strong effects in highly interactive lessons. It is speculated that explicit action on the part of the teacher to make statements and ask questions of one another is the essence of effective drug education program delivery. Mahdi Moshki et.al<sup>(23)</sup> and Barati M et.al<sup>(24)</sup> reported also that Life skills' training is effective in the promotion of drug abuse preventive behaviors of university student and that a comparison of post-test mean scores of drug abuse preventive behaviors of both groups showed a significant difference ( $P < 0.01$ ).

The present study proved a positive significant relationship between father's and mothers' educational level and students' knowledge and attitudes of drug abuse. This supports the findings of Babayi who showed that students whose parents had a higher academic level had better information about drug abuse<sup>(25)</sup>. Probably families with higher academic levels have more potential skills and use various techniques to promote their children's insight toward drug abuse. This proves the crucial role that -parents play in forming a proper insight toward drug abuse and in turn in the formation of drug abuse preventive behaviors in their children.

Also one of the determinants of self-reported substance use is the gender. Boys reported greater levels of substance use at baseline than did girls in the drugs and behavior class. This supported by the result of our study which revealed a significant relationship between age and sex of the students and their knowledge and attitudes of drug abuse. Those who reported abusing some drugs are males and there is a significant association between history of taking drugs before and students' knowledge and attitudes toward drug abuse and addiction. This agrees with Keyes KM et.al who reported that a cross the entire sample; there was a trend toward higher levels of alcohol use and abuse at baseline among men than women, as would be expected from the literature<sup>(26)</sup>. Thus, school boys are in greater need of substance prevention and treatment efforts than girls. School substance use course may be a non-threatening outlet for substance use programming among this population.

Finally, we believe that the effectiveness of the intervention in our study can be attributed to the use of the PRECEDE-PROCEED Model as a conceptual framework, which can play an important role in enhancing the quality of the planning of drug abuse and addiction prevention programs. In addition, we can implement and evaluate the health education programs through defined stages of this model. Empowering adolescence and young adults to adopt preventive behaviors and positive attitudes of drug abuse and addiction can lead to decreasing this phenomenon in our country.

## **VI. Conclusion And Recommendations**

The present study concluded that following the PRECEDE-PROCEED Model is an effective method in planning for and providing health education to improve knowledge, attitudes and behaviors regarding drug abuse and addiction among adolescent students and promoting enabling and reinforcing factors that support prevention of such problem. The researchers recommended activating the role of school administration, psychologist, social worker, and school doctor and health visitor in controlling the problem of drug abuse; Drug abuse prevention education should be incorporated in one of the subjects in technical secondary schools; Further research is needed to examine the effectiveness of such model interventions in a variety of settings including universities and work places, and within different sectors.

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