

## Health Risky Behaviors Among University Students: Prevalence And Effect Of Health Education Program.

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### Abstract

**Background:** University students are at high risk of health-risky behaviors that could lead to serious physical complications, social dysfunction, and psychological disturbances which require different treatment approaches. Also they face social, emotional and educational challenges when entering the University. Well organized health education programs can change such behaviors by increasing knowledge and influencing attitude and behavior. **Objectives:** The main objective of this study is to rate the most frequent health risky behaviors among university students and to evaluate the effect of health education program on the level of changing the health risky behaviors among university students. **Methods:** An interventional study was used; the study was conducted on a sample of 853 randomly selected students at Zagazig University, during the 2<sup>nd</sup> term of the academic year 2014 -2015. A structured questionnaire to assess types and prevalence of health risky behaviors before and after intervention was used. Additionally anthropometric measurements were calculated. **Results:** unhealthy dieting behavior took the lowest satisfactory score (10%), followed by unhealthy nutritional behavior (17%) and smoking behavior (33.3%). The implementation of the educational program was effective in improving unhealthy behavior especially dieting behavior. **Conclusion:** health risk behaviors are common among college students, and raising awareness by regular health education programs can dramatically change the profile of these behaviors.

**Key Words:** University colleges, health, risky behaviors, health education.

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### Introduction

Health-risk behaviors can be defined as any activity undertaken by person with a frequency or intensity that increases risk of disease or injury <sup>(1)</sup>. It might cluster together into a risky lifestyle which influences cognitive performance, emotions, and the overall quality of life. Much of the morbidity and mortality is caused by individual behavioral patterns, psychological affairs, polluted environment or poverty <sup>(2)</sup>. Very few studies look at multiple behaviors for that smoking tends to be an elevated risk for other risk behaviors <sup>(3)</sup>. In a study performed by <sup>(4)</sup> they noted that large number of university students

smoke tobacco, binge drink, do not exercise enough and don't eat enough fruits and vegetables.

There are five categories of behaviors have been consistently found to correlate with increased morbidity and mortality identified by <sup>(5)</sup>. They are consuming a diet high in calories, fat and sodium, and low in nutrients; low levels of physical activity and high levels of sedentary activity; smoking cigarettes; abusing substances including alcohol, remedy and illicit drugs, and engaging in risky sexual behaviors. Conversely, health protective behaviors are actions that reduce disease

susceptibility or facilitate restoration of all aspects of health. Three health protective behaviors are established to be linked with better health and recovery from illness that are being physically active, eating fruits and vegetables, and being adherent with prescribed medication <sup>(6)</sup>.

Recent advances in brain research have confirmed a dangerous link between adolescence and health risk behaviors, clarifying the fact that adolescence is the critical period of risk for both health risk behaviors and its consequences. Adolescents are more vulnerable to health risk behavior than adults because the parts of the brain responsible for judgment, decision making, emotion and impulse control are not yet fully developed. Therefore, teens are more likely than adults to take risks, including experimenting with drug abuse and engaging in dangerous behaviors <sup>(7)</sup>.

The odds of having multiple risk behaviors increase over the course of development, especially during the teenage years. Through experimentation with substances, physical risks and sexual risk, some adolescents acquire unhealthy behaviors and peers that persist and discourage the development of other self-regulatory skills. Despite health promotion efforts, young adults continue to engage in high rates of health-risk behaviors as clarified by <sup>(8)</sup>. It is important to understand health-risk behaviors among youths, as modifications in this can enhance all dimensions of health, and lessen the risk of chronic illness later in life <sup>(9)</sup>.

Whether in the clinic, home, school, or community health setting, the psychiatric nurse plays an important role to provide education to college students. They have many opportunities

to organize individual, group, or family counseling sessions. Because the values, acceptance, and recognition of peers are so important during adolescence, the group can provide the support for dealing with problems and effecting change in addition. Accordingly, the mental health nurse is in excellent position to increase adolescents' self-esteem, which encourages them to face their problem, and try to cope with rather than avoid them. Therefore, it is crucial for nurses to be culturally competent in order to care for adolescents <sup>(10)</sup>.

The role of the psychiatric nurse in a community health risk behaviors prevention program is an increasing awareness of the need for prevention of health risk behaviors related problems. The psychiatric nurse is especially equipped to strengthen the bonds among adolescents and parents, health agencies, school and university, law enforcement and hospitals to assist the community in the design and implementation of its own prevention program. The nurse provides the knowledge and assists the community in its health enhancement by using nursing theory, interpersonal process, research competencies, and teaching skills <sup>(11)</sup>.

### **Rationale of the study:**

In Egypt, adolescents constitute approximately 33.5% from total population. Adolescents compose an important population group because their physical and emotional health is vital to the future of societies and because they require guidance and direction. The adolescence stage is considered a critical age and one of the most difficult and the most dangerous stages in human life as well as high prevalence of health risk behavior occur at this age group. This study attempts to throw out some light on

importance of targeted health education programs at universities because the university stage is considered one of the vital stages in studying health risk behavior among adolescents would help them to resort to adaptive rather than maladaptive behaviors.

**Goal:**

Improving quality of life among university students by decreasing the prevalence of the most common health problems.

**Objectives:**

- To rate the most frequent health risk behaviors among university students.
- To evaluate the effect of health education program on the level of changing the health risk behaviours among university students.

## Subjects and Methods

**Study design, setting & time:** An interventional study (community trial) was conducted on Zagazig University students. The field work was carried out during the 2<sup>nd</sup> term of the academic year 2014 -2015.

**Sample size:** was calculated using Epi info version 6.04<sup>(12)</sup>; According to the statistical letter of Zagazig University, the total number of registered students at the year 2013-2014 was 11987 student, with expected frequency of smoking as one of risky health behavior was 5.8%<sup>(13)</sup>, at confidence interval 95%, with study power was 80%. Accordingly, the total calculated sample size was 853 students.

**Sampling technique:** cluster sample technique was used in which the colleges of Zagazig University were listed, they are (15) faculties. Three colleges were chosen by simple random sample (two practical, faculty of

medicine and faculty of science) and one theoretical (faculty of commerce). The college's students were divided into sampling unit (sections for the practical colleges and specialties for the theoretical one) one section or specialty was chosen from each grade of each college by simple random sample. A list with the names of the students in the chosen sections and specialties were obtained from the students affairs of each faculty. All students in the chosen section or specialty were the target population. The students were reached mostly at the class rooms so almost the same students were reached for health education program.

**Inclusion criteria for study sample:**

Egyptian, under graduate students in Zagazig University from both sexes.

**Ethical consideration:**

- An informed written consent was obtained from all students before participation; it included data about aim of the work, study design, site, time, subject and tool. They were informed that all collected data will be confidential and used for scientific purposes only. They were informed also that no invasive or painful techniques will be carried upon them.

- An approval from The Research Ethics Committee in Zagazig faculty of medicine and in El Fayoum faculty of Nursing was obtained before conduction of this work.

**Tools of data collection:**

**1) Interview questionnaire sheet:** The questionnaire was adopted and modified according to *Abd EL-Rahim*<sup>(14)</sup>, it was revised by four academic professors to assess its content and construction validity and it includes data about the following topics:

**Part I:** Personal and socio demographic data of the students such as gender, age, college, grade, residence, living with whom, student-parent relationship (loving parents, frequent struggling with parents and telling parents about their problems) relation with peers (having big number of friends, enjoy being with them and sharing them with problems and good events in life) and religious commitment (as believing in the religion's role in protecting against risky behaviors and following basic religion instructions as praying).

**Part II:** This part was intended to assess student's health risk behaviors before and after health education program. It included a series of open and closed questions covering 5 categories of risky behaviors which are nutritional behavior, dieting, smoking, intake of tea and other substances, safety behaviors (including following traffic rules, safe use of harmful instruments at homes as knives and electrical devices, violence and illegal sexual intercourse), and driving behavior.

**Part III:** Medical history about chronic illness and compliance to treatment before and after health education program.

**Scoring:** practice items reported to be correct were scored "1" and the items not correct were scored "0". For each health risky behavior, the scores of the items were summed-up then these scores were converted into a percent score. Practice was considered satisfactory if the percent score was 60% or more and unsatisfactory if less than 60% (this cutoff point was the median of the answers according to the results obtained from the pilot study).

**2) Anthropometric measurements:** The height in meters and the weight in kilograms of each studied students were measured, and then body mass index (BMI) was calculated. BMI was classified as normal (BMI=18.5-24.9

kg/m<sup>2</sup>), overweight (BMI=25-29.9 kg/m<sup>2</sup>), and obese (BMI≥30 kg/m<sup>2</sup>)<sup>(15)</sup>.

**Data collection procedures:** The fieldwork of the current study was carried out through 5 phases

**1- Pilot study:** that was applied on 10% of the calculated sample. Its main goal was to assess the validity of the questionnaire and to assess acceptability of the students to the topic of the research. Some questions were not accepted at first as asking about sexual life, so the questions about this item were only limited to asking only about having illegal sexual intercourse. The results of pilot were not included on the final results of the research.

**2- Assessment phase** was intended for obtaining baseline data from students. This helped in the preparation of the educational program, and also as a pre test for further comparison before implementation of the health education program. The researchers first introduced themselves to students, and explained to them the purpose of the study briefly and an oral consent for participation was obtained.

**3- Planning phase** based on the results obtained from the assessment phase, the researchers designed the content of health education program. Accordingly, the program general and specific objectives were set, and the educational materials were prepared for each session. The researchers also prepared an illustrated booklet to help participants after the sessions. The contents of the booklet covered healthy nutritional behavior, dieting behavior, frequency of tea/coffee intake per day and

hazard of smoking and substance abuse, safety behaviors, driving behavior and importance of compliance to treatment. The teaching methods included lectures and group discussions (to identify the health risk behaviours from the point of view of the students as many of them tolerated the harmful effect of some behaviors and considered it as normal especially as regards smoking). The teaching media used involved posters in addition to the program booklet prepared by the researchers. The health education message included an orientation to the program objectives; this was followed by covering important issues related to healthy nutritional behavior, dieting behavior, frequency of tea/coffee intake per day, hazard of smoking and substance abuse, safety behaviours (as following traffic rules, use of harmful instruments at home as electrical devices, violence, and having illegal sexual intercourse) driving behavior and importance of compliance to treatment.

**4- Implementation phase:** The health education program was implemented to the students in groups (each group was about 30 students which was average number of students in seminars) to ensure that all students understand the program content. Every session took about an hour and it was done after the time of the seminar, the sessions were distributed among researchers to cover the whole sample. Data show presentations, videos and posters were used to make the sessions interesting. The researchers used simple language with no scientific terms. Motivation and reinforcement techniques as praise, distributing a plastic bag contains booklets, pens

and interesting photos were used to enhance active participation.

**5- Evaluation phase:** Evaluation of the effect of the health education intervention carried out through post-test after two months from intervention using the same data collection forms as in the pre-test by comparing result of pre and post test.

**Statistical analysis:** Data entry and statistical analysis were done using SPSS 19.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Comparison was done by McNemar Chi-Square test and paired t tests. Statistical significance was considered at p-value <0.05.

## Results

As regarding socio-demographic characteristics of the studied sample, Table 1 demonstrated that 75% of studied students were  $\geq 20$  years (maximum age was 23 years old), 60% females, 57.2% from theoretical college, 56% seniors, 69.1% had good degree, 55% from urban area, 68% live with their family with good student-parents relationship (61.9%), good friendship (78.3%) and Religious commitment (74%).

Figure 1 identified the prevalence of risky behaviors before and after program implementation. Dieting, nutritional and smoking behaviors took the least satisfactory scores respectively.

As regard the difference between pre and post test regarding satisfactory nutritional behavior among the studied sample as demonstrated in table 2: The dietary behavior of the students showed highly statistical significant improvements after the intervention as regard nutritional behavior. This was

revealed in all areas of nutritional behavior especially regarding frequency of vegetables eating/day in which 76.7% of the students had satisfactory behaviors in post test compared with 5.7% in pre test ( $p < 0.001$ ). Also, total satisfactory nutritional behavior increase from 17.7% in pre test to 61.8% in post test with highly statistical significant difference ( $p < 0.001$ ).

Table 3 illustrated that difference between pre and post test regarding dieting behavior among the studied group. It revealed that total satisfactory dieting behavior among over weight & obese students had significantly improved in post test to 66.2% compared to 10% in pretest with highly statistical significant difference ( $p < 0.001$ ).

Table 4 represented difference between pre and post test regarding smoking habits among the studied sample. It demonstrated that Total satisfactory smoking habits have improved from 33.3% in pretest to 68.2% in post test with highly statistical significant difference ( $p < 0.001$ ) (it included changing in opinion about smoking, trials to quit smoking and those who actually quitted smoking).

Table 5 represented difference between pre and post test regarding frequency of intake of tea, coffee and other substances among the studied group. It revealed that there was change behavior toward healthy one and improved from 85.3% in pretest compared to 90.6% in posttest with highly statistical significant difference ( $p < 0.001$ ) regarding these items.

As regard the pre and post test results for some safety behaviors among the studied group as demonstrated in table 6. There were no students carrying weapon, attempt to suicide or involved

in sexual intercourse. Total satisfactory safety behaviors increase from 86.2% in pre test to 94.8% in post test with highly statistical significant difference ( $p < 0.001$ ).

Table 7 showed that there was improvement in total satisfactory driving behaviors among the students who drive a car from 58.4% in pretest to 72.3% in post test with statistically significant difference ( $p = 0.016$ ).

Table 8 illustrated correlation between total satisfactory scores of risky health behaviors and socio-demographic characteristics of the studied sample. It revealed that students  $\geq 20$  years, females, seniors, having good degree, from urban area, living with their family, with good parents relationship, good friendship and with religious commitment had improvement in post test with highly statistical significant difference ( $p < 0.05$ ).

## Discussion

When adolescents take one risk behavior, they also tend to take other risks. The interrelationship or cluster of health risk behaviors can be labeled as "risk behavior syndrome" that occurs in different combinations<sup>(46)</sup>. This study was carried out in order to identify the frequency of each type of health risk behaviors among college students, in addition to compare the difference in this frequency before and after an organized health education program.

The socio-demographic characteristics of studied sample were those of typical adolescent university students, with a higher percentage of the females, more than 20 years old, derived from theoretical faculties, seniors with last degree in the faculty as good. Most of them were from urban areas live with their families where good parents' relationship was common. In addition

most of them enjoy good friendship and religious commitment (as believing in the religion's role in protecting against risky behaviors and following basic religion instructions as praying) as clarified in table 1.

The prevalence of unhealthy risk behaviors before and after intervention program was noted in figure 1, where unhealthy dieting behavior took the lowest satisfactory score (10%), followed by unhealthy nutritional behavior (17%) and smoking behavior (33.3%). Of course the unhealthy dieting behavior (high BMI and physical inactivity) are the results of unhealthy nutritional behavior. The bad nutritional behavior may be explained by large number of fast food places all around the university, with delicious taste of this type of food. An alternative explanation is due to most of the students spend more than half of the day outside their homes forcing them to use these types of food and may be lack of knowledge and healthy food culture about the criteria of health diet and how many calories and fat energy ratio they need.

In consistence with these results a comparative study by **Rabab et al** (17) between Egyptian and Saudi adolescent females, ranked unhealthy nutritional and dieting behaviors as the most common, with one in four students of both Egyptian and Saudi female adolescents reported that they are either slightly overweight or very obese. Another study done by **Malakeh 2015**(18) who found smoking (55%), physical inactivity (15%) and unhealthy dieting (14%) as the most frequent health risk behavior. In this instance, physical exercise played an important role in regulating the metabolic profile parameters as the significant decrease of most of these parameters is more

among those who followed diet and exercise regimen.

As well as in a study done by **Vanphanom et al 2011** (19) who reported that smoking and drinking alcohol are the most prevalent risky behaviors. This explains the imitation theory of peers. Smoking behavior as well as the continuation of smoking can be referred to the peer effect, the influence of family members and the availability of cigarettes with affordable prices. Current smokers were introduced to smoking by a friend and they smoked because their friends did so. University students face social, emotional and educational challenges when they enter the university and also Stress was the main reason for participants to start and/or continue smoking, followed by belonging and being cool.

Nutritional behavior among the studied sample was listed in table 2, significant change occurred in the total nutritional behavior after the health education program. The marked change in the nutritional behavior was noticed in consumption of fast food, nipping and regular meals times that can be explained by availability of large number of fast food restaurants all around the university with affordable prices. In addition they spend a lot of time in the university with absence of the chance to follow regular meal times. The most noted improvement after intervention as regards the type of the used food was in the use of vegetables, because most of Egyptian from their childhood hate eating vegetables, in addition most of the mothers are working, depending upon delivery and fast food with absence of meals containing vegetables. In a study implemented by **Eaton et al 2008** (20) who found that, 21.4% of the study population reported meeting the recommended serving suggestion of

five or more fruits and vegetables a day. Compared to study done by **Monterio et al 2010**<sup>(21)</sup> who noticed that less than half of the students meet the recommended daily servings of fruits and vegetables.

The dieting behavior was illustrated in table 3 that indicated most of the sample was of normal BMI, after implementation of the program there was significant increase in the number of those who tried to make a diet and followed a physical activity program, these changes have a positive impact on their physical and psychological health. The prevalence of overweight in a study performed by **Eaton et al 2008**<sup>(20)</sup> was 15.6%, obese was 11.4%. They also noticed that over half (56.8%) of the participants met the physical activity recommendations and only 2% of them did not get at least 60 minutes of physical activity on any day during the week. In another study done by **Jill et al 2012**<sup>(22)</sup> who found that over 35% of students spend three or more hours per day in sedentary behavior as watching TV and playing computer games. As well as **Rey et al 2008**<sup>(23)</sup> tied the relation between physical activity and body weight in the terms of Accumulating 60+ minutes of moderate/vigorous physical activity 5 or more days/week was both independently associated with weight status and remained significant after controlling for all covariates in the regression models, which suggests that meeting the physical activity recommendation is an important factor related to weight status.

Smoking habits were shown in table 4, no significant difference between pre and post intervention as regards prevalence of smoking (7.7 and 6% respectively). The effect of health education was obvious in change in

number of smoked cigarettes per day with decrease in the number of students smoked more than five cigarettes per day. Also the change in number of smoking cessation trials was increased significantly after the program. Interestingly the number of those who perceive smoking harmful was increased significantly. The absence of change in prevalence in smoking may be explained by that it is a habit and behavior that needs longer period to stop it and the same person may enter the cycle of changing behavior many times with multiple relapses until exit from the circle occurs. This may be due to the failure, in most situations and trials, to provide the necessary multi-disciplinary support. Also the change in behavior needs not only health education but more incorporated and integrated actions. The change in the previous three items may be due to the knowledge obtained from the program which they perceived it as vital. In consistence with these results of the study performed by **Teuku et al 2013**<sup>(24)</sup> who suggested that their health education programs were effective in increasing students' knowledge about health-related aspects of cigarette smoking.

Similarly in a study performed by **Islam and Johnson 2005**<sup>(25)</sup> that showed that, after the implementation of the tobacco prevention education program, 89.1% of the students expressed that they became less desirable to smoke and 92.3% of them became more willingly to stop smoking. A previous meta-analysis of 47 school-based smoking programs showed that 98% of the reviewed programs successfully increased participants' knowledge<sup>(26)</sup>. In contrast with **Flay 2009**<sup>(27)</sup> who concluded that only six of 12 reviews found positive effects of tobacco use prevention programs on smoking behaviors, with two reporting



promising effects, and three no effects. These results were explained by **Dobbins et al 2008** <sup>(28)</sup> who recommended that, in order to decrease the rate of adolescent smoking, the tobacco prevention education should be implemented and promoted before students' initiation of tobacco use to convey the knowledge of tobacco hazard and form the positive attitudes against smoking. Smoking was often seen as a habit not an addiction. If a person wanted to quit smoking, s/he could do it without any additional assistance.

The health risks and consequences of smoking were underestimated by the students, and they expressed no interest in quitting or taking familial advice against smoking seriously. Youth do not tend to value or follow the advice given to them by their parents and or teachers on smoking. This is largely because they perceive being told not to smoke by one who does so him/herself as meaningless hypocrisy.

Table 5 clarified the difference between pre and post test regarding intake of tea, coffee and other substances among the studied sample. A noticed significant reduction in the use of these substances was noticed after program implementation except for coffee that can be referred to caffeine present in coffee with its dependence effect. Consistently college students consume some form of caffeine on a daily basis, making this substance the most commonly used drug in the world <sup>(29)</sup>. The results of a study done by **Sifferlin 2013** <sup>(30)</sup> who found that 50 percent of college students drank at least one to four energy drinks per month, so coffee has become more popular than soda among adults. In a study done by **Avena et al 2008** <sup>(31)</sup>, they reached to a result that caffeine use is associated with

impulsivity, sensation seeking, and risk taking behaviors.

Violence related behavior and safety behaviors were assessed in table 6, marked improvement after the program was noticed especially in the item of following traffic rules and following safe behavior with using instruments at home. In Egypt most of Egyptians don't have any idea about traffics and its rules in addition to haphazard design of streets so not following traffic rules was not a surprise. In consistence with these results **Bokhorst et al 2010** <sup>(32)</sup> noted that risky traffic behavior is the commonest risk behavior among adolescents and they explained that by adolescents travel increasingly large distances as road users and they can make use of new modes of transport. Consistently **Feenstra et al 2010** <sup>(33)</sup> named risky traffic behavior as the main cause of mortality especially among youth. In the same line, **Hans et al 2014** <sup>(34)</sup> recommended in his study to integrate courses about traffics in schools since childhood to make an established behavior. In addition **Rahul et al 2008** <sup>(35)</sup> found that the most common violence behavior was carrying a weapon.

The driving behavior among students who drive cars was assessed in table 7, using seat belt (helmets), using mobile phones while driving and following the allowed speed were the most significantly changed items after program implementation. As there is no strict rules that are applied on those who not follow proper driving behaviors so most of adolescents not follow such rules. In addition most of them are not aware about why to wear seat belt or helmets, or why not to stop talking in cell phones while driving. Also most of roads in Egypt are not observed by radar devices so most of the drivers usually don't follow the allowed speed. In a

study performed by **Sharma et al 2007**<sup>(36)</sup> they reported that More than half (52.4%) of sample does 'not always wearing a seat belt and never wearing a helmet.

In table 8 the correlation between total score of risk behaviors and the socio-demographic criteria of the sample was studied. Significant relation between all socio-demographic criteria of the students in study sample and the risky behavior was reflected that may be referred to that most of risk behaviors are multi-factorial and the difference in social class, age, friendship and residence markedly enhance or arrest the risky behavior. As well as **Roberto et al 2014**<sup>(37)</sup> who found that only gender was associated with risk behavior with higher prevalence among males especially violent and drinking behavior. In a study performed by **Mark and Elsie 2004**<sup>(38)</sup> who found that the health of rural resident adolescents was worse than urban and contributed that to adoption of risk behavior specially smoking, physical inactivity and unhealthy diet in rural adolescents. In consistence **Atav and Spencer 2002**<sup>(39)</sup> noted differences in risk behaviors regarding use of tobacco, alcohol, and illegal substances; sexual activity; and carrying weapons with higher rate in rural residence. In congruent with **Springer et al 2006**<sup>(40)</sup> who found a strong relationship between family supports, parental relations and family ties with risk behavior especially physical fighting, victimization, suicidal ideation, substance use, and sexual intercourse). In a study performed by **Gonzales et al 2008**<sup>(41)</sup> they found that use praise and rewards to reinforce desirable behavior, replace criticism and physical punishment with mild and consistent negative consequences for undesirable behavior and increase positive involvement with their children can markedly decrease

risk behavior. Analyses of results of a study done by **James et al 2005**<sup>(42)</sup> suggested that peer influence was small but reliable when both selection effects and parallel events were taken into account. **Lynn et al 2013**<sup>(43)</sup> reached to a result that adolescent's religious commitment significantly predicted all health-promoting behaviors (nutrition, physical activity, safety, health practices awareness, stress management).

College students are following multiple health risk behaviors that need more integrated efforts and continuous health education programs to change such behaviors as recommended by **Zaki 2009**<sup>(44)</sup>, **Eid et al 2015**<sup>(45)</sup> and **Abdelwahid et al 2012**<sup>(46)</sup>. Finally, the information provided will allow other research groups to benefit from the collective experience of the study team and facilitate the implementation of well- designed programs to address the lack of quality interventions in this important public health issue.

## Conclusion

Health risk behaviors are common among college students, and raising awareness by regular health education programs can dramatically change the profile of these behaviors.

### Limitations of the study

- The study questionnaire was long that needed a longer time for completing it.
- Studying multiple risk factors was to some extent confusing so separate study for every risk factor may be more useful.
- Some topics in the questionnaire were rejected to be discussed specially the item of sexual behavior.
- Big sample size was a great

burden on the researchers.

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### Conflicts of interest

We have no conflict of interest to declare.

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**Table (1): Socio-demographic characteristics of the studied sample (No. =853)**\*Juniors: 1<sup>st</sup> three year. \*\* Student hostel, with friends, private flats.

Socio demographic characteristics		No.	%
Age (20.8±1.7)	<20 years	213	25.0
	≥20 years	640	75.0
Gender	Male	341	40.0
	Female	512	60.0
Collage	Theoretical	488	57.2
	Practical	365	42.8
Grade	Juniors*	375	44.0
	Seniors	478	56.0
Degree	Bad	264	30.9
	Good	589	69.1
residence	Rural	384	45.0
	Urban	469	55.0
Place of living	With family	580	68.0
	Away from family**	273	32.0
Student-parent relationship	Good	528	61.9
	Bad	325	38.1
Friendship	Good	668	78.3
	Bad	185	21.7
Religious commitment	Yes	631	74.0
	No	222	26.0

**Table (2): Difference between pre and post test regarding satisfactory nutritional behavior among the studied sample.**

Satisfactory Nutritional behaviour regarding	Pre		Post		p. value
	No.	%	No.	%	
Regular meals	214	25.1	501	58.7	<0.001
Nippling (snacks)	187	21.9	525	61.5	<0.001
Fast food	272	31.9	611	71.6	<0.001
Type of Used fat	86	10.1	217	25.4	<0.001
1-Frequency of fruits eating/day*1	81	9.5	628	73.6	<0.001
2-Frequency of vegetables eating/day*1	49	5.7	654	76.7	<0.001
3-Frequency of drinking milk/day*2	171	20.0	498	58.4	<0.001
Total satisfactory nutritional behavior	151	17.7	527	61.8	<0.001
Total	853	100.0	853	100.0	

paired t test was used

**Table (3): Difference between pre and post test regarding BMI, dieting behavior and physical activity among the studied sample.**

Characteristics		Pre		Post		p-value
		No.	%	No.	%	
<b>BMI</b> 26.3±4.2	Normal	462	54.2	509	59.7	<b>&lt;0.001</b>
	Overweight	320	37.5	311	36.5	
	Obese	71	8.3	33	3.9	
<b>Total</b>		853	100.0	853	100.0	
<b>Dieting (n=391)</b> *	Yes	123	33.8	208	53.2	<b>&lt;0.001</b>
	No	268	66.2	183	46.8	
<b>Physical activity(n=391)</b> *	Yes	39	10.0	311	79.5	<b>&lt;0.001</b>
	No	351	90.0	80	20.5	
<b>Total satisfactory dieting behavior *</b>		39	10.0	259	66.2	<b>&lt;0.001</b>
<b>Total</b>		391	100.0	391	100.0	

\*Over weight & obese students.  
McNemar Chi-Square was used



**Table (4): Difference between pre and post test regarding smoking behavior among the studied sample.**

Smoking behaviors		Pre		Post		p. value
		No.	%	No.	%	
Smoking status	Yes	66	7.7	51	6.0	0.151
	No	787	92.3	802	94.0	
Total		853	100.0	853	100.0	
No./day (n=66)	< 5	26	39.4	50	75.8	<0.001
	≥ 5	40	60.6	16	24.2	
Site of smoking (n=66)	Indoor	35	53.0	21	31.8	0.014
	Outdoor	31	47.0	45	68.2	
Smoking Cessation trial (n=66)	Yes	13	20.0	28	42.4	0.005
	No	53	80.0	38	57.6	
Opinion about smoking (n=66)	Harmful	20	30.0	58	87.9	<0.001
	Not harmful	46	70.0	8	12.1	
Total satisfactory smoking behavior(n=66)		22	33.3	45	68.2	<0.001
Total		66	100.0	66	100.0	

McNemar Chi-Square was used

**Table (5): Difference between pre and post test regarding intake of tea, coffee and other substances among the studied sample.**

Items	variable	Pre		Post		p. value
		No.	%	No.	%	
Frequency of tea intake/ day	<3	547	64.1	635	74.4	<0.001
	≥3	306	35.9	218	25.6	
Frequency of Coffee intake/ day	<3	831	97.4	841	98.6	0.083
	≥3	22	2.6	12	1.4	
Substance abuse	Yes	45	5.3	11	1.3	<0.001
	No	808	94.7	842	98.7	
Total satisfactory behaviors		728	85.3	773	90.6	<0.001
Total		853	100.0	853	100.0	

Paired t and McNemar Chi-Square tests were used

**Table (6): Difference between pre and post test regarding some safety behaviors among the studied sample.**

----- = invalid

Variable		Pre		Post		P.value
		No.	%	No.	%	
<b>Follow traffic Rules</b>	Yes	469	55.0	752	88.2	<b>&lt;0.001</b>
	No	384	45.0	101	11.8	
<b>Follow Safe behavior with using instruments at home (as knives and electrical devices)</b>	Yes	613	71.9	743	87.1	<b>&lt;0.001</b>
	No	240	28.1	110	12.9	
<b>carry a weapon</b>	Yes	0	0.0	0	0.0	-----
	No	853	100.0	853	100.0	
<b>Engaged in Physical fight in 1<sup>st</sup> term</b>	Yes	85	10.0	54	6.3	0.006
	No	768	90.0	799	93.7	
<b>Attempt suicide</b>	Yes	0	0.0	0	0.0	-----
	No	853	100.0	853	100.0	
<b>Involved in sexual intercourse</b>	Yes	0	0.0	0	0.0	-----
	No	853	100.0	853	100.0	
<b>Total satisfactory safety behaviors</b>		735	86.2	809	94.8	<b>&lt;0.001</b>
<b>Total</b>		853	100.0	853	100.0	

McNemar Chi-Square was used

**Table (7): Difference between pre and post test regarding driving behavior among the studied students who drive a car (n=137).**

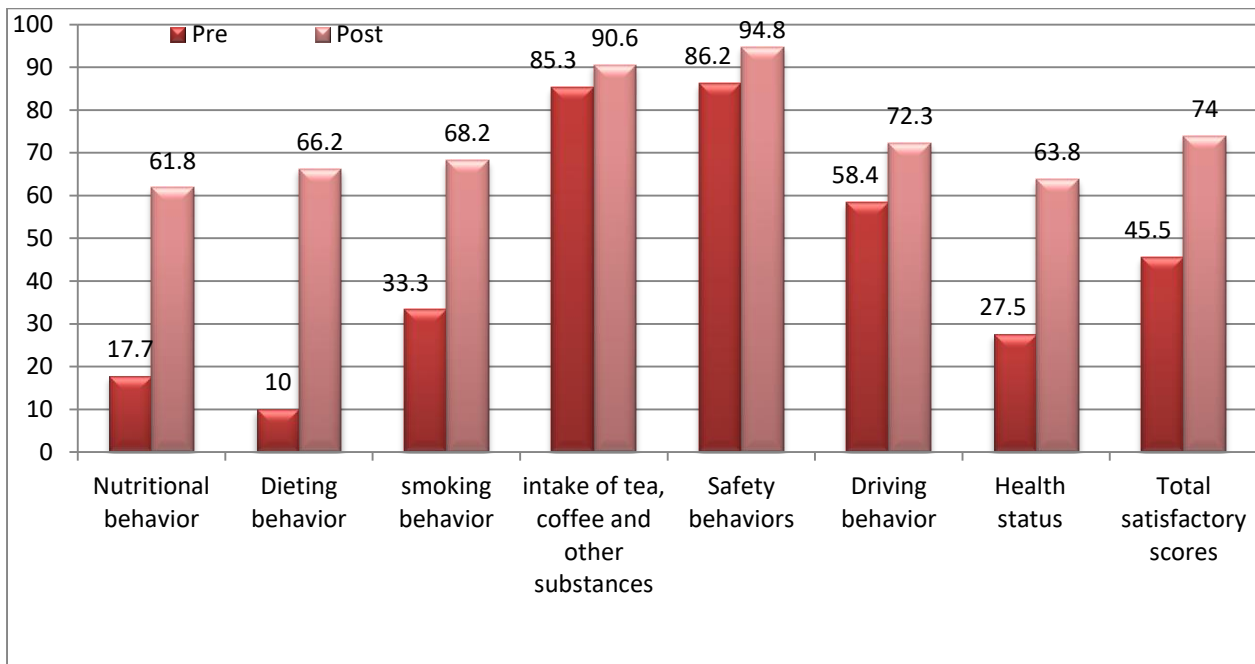
variable		Pre		Post		P.value
		No.	%	No.	%	
Having license	Yes	83	60.6	86	62.8	0.709
	No	54	39.4	51	37.2	
Using Seat belt/ helmet	Yes	76	55.5	109	79.6	0.002
	No	61	44.5	28	20.4	
Using mobile while driving	Yes	27	19.7	8	5.8	<0.001
	No	110	80.3	129	94.2	
Follow the allowed Speed	Yes	52	38.0	71	51.8	0.021
	No	85	62.0	66	48.2	
Total satisfactory driving behaviors		80	58.4	99	72.3	0.016
Total		137	100.0	137	100.0	

McNemar Chi-Square was used

**Table (8): Association between total satisfactory scores of risky health behaviors and sociodemographic characteristics pre/post scores.**

Socio-demographic characteristics		Total satisfactory scores (≥60%)				p. value
		Pre		Post		
		No.	%	No.	%	
Age	<20 years	109	28.1	239	37.9	0.001
	≥20 years	279	71.9	392	62.1	
Gender	Male	108	27.8	227	36.0	0.007
	Female	280	72.2	404	64.0	
Grade	Juniors	114	29.4	246	39.0	0.002
	Seniors	274	70.6	385	61.0	
Degree	Bad	102	26.3	242	38.6	<0.001
	Good	286	73.7	389	61.6	
Residence	Rural	148	38.1	354	22.5	<0.001
	Urban	240	61.9	277	77.5	
Place of living	With family	201	51.8	427	67.7	<0.001
	Away from family	187	48.2	204	32.3	
Student- parent relationship	Good	226	58.2	471	74.6	<0.001
	Bad	162	41.8	160	25.4	
Friendship	Good	238	61.3	463	73.4	<0.001
	Bad	150	38.7	168	26.6	
Religious commitment	Yes	241	62.1	452	71.6	0.002
	No	147	37.9	179	28.4	
Total		388	100.0	631	100.0	

Paired t test was used



**Figure (1): Difference between pre and post test regarding total satisfactory scores of risky health behaviors.**