



HEALTH HAZARDS OF ELECTRONIC HOOKAH SMOKING AMONG UNIVERSITY STUDENTS

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Cite this article:

Hadil A.A.A., Sahar A.S., Ons S.E. (2022), Health Hazards of Electronic Hookah Smoking Among University Students. African Journal of Health, Nursing and Midwifery 5(3), 111-125. DOI: 10.52589/AJHNM-KTTHUOEG.

Manuscript History

Received: 1 April 2022

Accepted: 7 May 2022

Published: 16 June 2022

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ABSTRACT: *Background:* Electronic hookah (e-hookah) is a modern spine off the classic traditional hookah .Electronic hookah contain several agents known to cause lung cancer and it can irritate mouth that increase risks for oral cancer. **Aim of the study:** The present study aimed to assess health hazards of E-hookah smoking among university students. **Design:** A descriptive research design was utilized to conduct this study. **Sample:** A multistage random sample used in this study. **Sample size:** 322 university students. **Setting:** Study conducted at South Valley University, Faculty of Arts, Journalism and faculty of archaeology. **Tools of data collection:** Two tools were used for data collection in the present study. The first tool was Structural interviewing questionnaire composed of two parts:Part I: demographic characteristics and Past and present medical history, Part II: University student s' knowledge about E-hookah smoking. The second tool was University student's attitude about electronic hookah smoking. **Result:** The study results revealed that 70% of university students had unsatisfactory knowledge about e-hookah, 60% of them had negative attitude regarding e-hookah while 40% of them had positive attitude **Conclusion:** there was highly significant positive correlation between total knowledge scores and total attitude scores regarding Electronic hookah. **Recommendations:** Continuous health education for university students about hazards of e-hookah.

KEYWORDS: Health Hazards, Electronic-hookah, University Students



INTRODUCTION

Electronic hookah is the new style of portable, travel-friendly hookahs. An electronic hookah is easy to use with no setup required and completely electronic. Electronic hookah, also known as electronic shisha or e-hookah, offers the same quality smoke as regular hookah but with a futuristic twist. There is much different type of e hookah pens and each is used slightly different. A disposable vape pen may have a specific puff count before needing to be thrown away, usually around 320 puffs, while a rechargeable e- hookah pen has a battery that can be recharged for continued use (1).

Electronic hookah smoking is an electronic device that simulates tobacco smoking. It consists of an atomizer, a power source such as a battery, and a container such as a cartridge or tank. Instead of smoke, the user inhales vapor. As such, using an e-cigarette is often called "vaping". The atomizer is a heating element that atomizes a liquid solution called e-liquid. Electronic hookah smoking is activated by taking a puff or pressing a button. Some look like traditional cigarettes and most versions are reusable (2).

The health effects of electronic hookah smoking are a major cause of cardiovascular morbidity and mortality. Despite being heavily advertised and actively glamorized in the mass media as a healthier tobacco alternative, the toxicological constituents of hookah smoke including nicotine, carbon monoxide, particulates, oxidants, heavy metals, phenols and flavorants indicate the potential to cause adverse cardiovascular events and other conditions associated with the toxins and chemicals include: heart disease, respiratory diseases like emphysema, which causes difficulty breathing (3).

The World Health Organization (WHO) estimates that there are 1.1 billion smokers globally. There has been rapid uptake of e-hookah in some countries in Europe and in North America. In 2018, number of vapors 4.6 million in the south-East Asia region . In the UK the percentage of the adult population using e-hookah rose from 1.7% in 2012 to 7.1% in 2019. The prevalence of e-hookah in European countries varies between less than 0.2% and more than 7% (4).

Many factors seem to have promoted electronic hookah smoking, including social acceptance/less restrictions, accessibility, use of flavored aromatic tobacco, curiosity, peer pressure, fashion, higher socioeconomic status, and need for amusement. Majority of users believe in the "no or less harm" of hookah compared to cigarettes. Some users argue that they do not inhale the smoke (keep it in the mouth cavity), therefore protecting themselves from nicotine absorption/addictive effects (5).

Electronic hookah smoking cannot be prevented only by increasing the knowledge about its dangers or consequences. Thus, one of the best ways to prevent the spread of electronic hookah smoking is the inability to access the electronic hookah at home. In particular, families can be effective in preventing the entry of hookah into homes because family has a large influence on the selection or exclusion of a healthy or social behavior. Some families are using electronic hookah smoking as a traditional entertainment. Thus, replacing electronic hookah with another family pastime can reduce the spread of electronic hookah smoking in Iranian families (6).



Community health nurses offer education to students about maintaining their health. So, they can decrease the occurrence of diseases. They plan educational assemblies, conduct health screenings and referral for medications. Community health nurse promote healthy lifestyle, prevent health problems, provide direct care, spiritual care, educate students about managing health conditions and making healthy choices and conduct research to improve awareness about hazard of electronic hookah smoking Community health nurses providing nursing care for university students complain from hazards of electronic hookah smoking (7).

Significance of the study

Egypt is a developing country where electronic hookah consumption is steadily increasing through years and imposes public health burden. The number of Electronic hookah smoking users has greatly increased in Egypt over the last decade (WHO, 2020). Last Egypt Stepwise Survey, 2019 showed that (18.7%) of the Egyptians older than 18 years old are current electronic hookah smokers (8).

Worldwide, 2017, an estimated 590,000 university students had smoked electronic hookah and 2.6 million adults used electronic hookah or water pipe. Rates were significantly higher among men than female. The highest prevalence of electronic hookah was noticed among young people that are highly educated and people from high socioeconomic classes (9).

Electronic hookah contains many toxic agents that can cause clogged arteries, heart disease, lung, bladder and oral cancers. Also, infections may be passed to other smokers by sharing electronic hookah (10). Therefore, this study was conducted to assess health hazards of electronic hookah among university students.

Aim of the study: The aim of this study is to assess health hazards of electronic hookah smoking among university students through the following objectives:-

- 1- Assessing knowledge of university students about health hazards electronic hookah smoking
- 2- Assessing student's attitude about health hazards electronic hookah smoking

Research question:

- 1- What are university student's knowledge regarding health hazards of electronic hookah smoking?
- 2- What are university student's attitudes regarding health hazards of electronic hookah smoking?
- 3- Are there relation between demographic characteristics of university students and their knowledge and attitude about health hazards of electronic hookah smoking?

Subject and Methods:-

Subject and methods for this study will portrayed under the four main items as the following:-



I- Technical item.

II- Operational item.

III- Administrative item.

IV- Statistical item.

I- Technical item:-

The technical item includes research design, setting, subject and tools for data collection.

Research design:-

A Descriptive research design was applied to achieve the aim of this study

Setting:

The study was conducted at South Valley University that contains 5 theoretical faculties. These three faculties were been chosen randomly, the study was conducted on three faculties, faculty of Archaeology, faculty of journalism and faculty of arts

Sampling:

Multistage random sample was used according to the following stages:

First stage: The total number of theoretical faculties in South Valley University are 5 faculties; the study was conduct on 60% of theoretical faculties (3 faculties).

Second stage: These three faculties were be chosen randomly. The number of students in second year of faculty of Archaeology were (86) , faculty of journalism were (150) and faculty of arts were (1727).

Third stage: Students that entrolled in the second year was chosen randomly from each faculty

Sample size: The sample size was calculate by following equation:-

$$n \geq \frac{N*(Z)^2*r*q}{N*(d)^2+(Z)^2*r*q} \quad (11).$$

$$n \geq \frac{1963 \times ((1.96))^2 \times 0.5 \times 0.5}{1963 \times (0.05)^2 + (1.96)^2 \times 0.5 \times 0.5}$$

$$n = \frac{(1884.48)}{5.86}$$

$$n = 322$$

The actual size of sample was 322 students through academic year 2020-2021.

Tools for data collection:

Two tools of data collection were used to carry out the current study namely, A Structural interviewing questionnaire and University student's attitude about electronic hookah smoking.



Tool I: A Structural interviewing questionnaire:

This tool was developed by researcher after reviewing the national and international related literature. It will consist of two parts:

First part: A) Demographic characteristics of university students included: Sex, age, marital status, residence, monthly income, place of residence during studying, type of Faculty and academic achievement It cover questions from Q1 : Q8

B) Past and present medical history of university students included: Electronic hookah smoking status, place of smoking of electronic hookah, with home smoke , when first start of smoking electronic hookah, number of electronic hookah smoking sessions per day, length of electronic hookah smoking sessions per day, electronic hookah smoking causes, previous medical history of heart disease, past medical history of respiratory disease, have past medical history of infectious disease, received help or advice to help stop electronic hookah smoking. It cover questions from Q9 : Q19

Second part: University student s' knowledge about electronic hookah smoking: Include items as meaning of electronic hookah, reasons, risk factors, protective factors against electronic hookah initiation, side effects of electronic hookah smoking, health effects associated with electronic hookah use, what should do if slip electronic hookah smoking, complications , best methods to stop electronic hookah and treatment of stopping electronic hookah smoking

Scoring system:-

For knowledge items, a correct complete answer was scored (Two scores), while correct incomplete answer was scored (One score) and wrong or don't know was given (Zero score), according to university students answers. It includes 10 item with total score equal 20. Their knowledge was categorized into:

Satisfactory knowledge $\geq 50\%$ (10 -20)

Unsatisfactory knowledge $< 50\%$ (0 – < 10)

Tool II: University student's attitude about electronic hookah smoking developed by (12) Concerned with university student s' attitude include 24 items such as sharing electronic hookah mouthpieces can spread infectious diseases such as tuberculosis, influenza and hepatitis, electronic hookah smoking can exposes the smoker to much larger volume of smoke than inhaled from a cigarette, the amount of nicotine present in electronic hookah is less compared to tobacco cigarettes, electronic hookah smoke are more harmful than cigarette , electronic hookah use has been linked with cardiovascular diseases, electronic hookah use has been linked with respiratory diseases, electronic hookah use has not been linked cancer, electronic hookah use has been linked with gum and mouth disease, electronic hookah smoke are dangerous to health and electronic hookah consider one of good stress-coping strategy.



Scoring system:

Attitude scale include 24 item with total score equal 72. Each item has three responses. The likert scale include agree (equal 3 score) neutral (equal 2) and disagree (equal one score). Total score are calculated and converted into percent scores as:

Positive attitude ≥ 60 (44-72)

Negative attitude < 60 (24-43)

Validity:-

The revision of the tools for clarity, relevance, comprehensiveness, understanding and applicability was done by a panel of three experts from the community health nursing faculty of Nursing Helwan university to measure the content validity of the tools and the necessary modification was done.

Reliability:

To assess reliability, the study tools were tested by using calculating Cranach's Alpha which was 0.894 for knowledge and 0.924 for attitude of students about electronic hookah smoking.

Ethical consideration:

An official permission to conduct the proposed study was being obtained from the Scientific Research Ethics Committee. Participation in the study was voluntary. Subjects was given complete full information about the study and their role before signing the informed consent. The ethical considerations were including explaining the purpose and nature of the study, stating the possibility to withdrawal at any time and confidentiality of the information were being guaranteed. Ethics, values, culture and beliefs were be respected.

Preparatory phase:

A review of the past and current literature covering all aspects helpful in designing and processing of data collection tools were available books, Journals, Internet and article.

Pilot study:

Pilot study has been conducted to test the clarity, applicability and understandability of the tool. It has been conducted on 10% (32) of university students. They have been selected from South Valley University students. The results of the pilot helped in refining the interview questionnaire and to schedule the time framework. The participants of the pilot were included in the main study sample.

Field work:

Data of the current study were collected within 3 months through the academic year 2020-2021 till the needed sample was completed, once official permissions were granted.

The investigator collected data 2 day per week (Monday, and Wednesday from 9 am to 2 pm) to collect the needed sample. Then, university students' oral acceptance to be included in the study was obtained, after explaining the purpose and the nature of the study. From the first



contact with the student the interviewing questionnaire was filled individually. As well as university student's knowledge and attitude about electronic hookah smoking sheet was filled. The investigator collected about 10 – 14 students per day.

Statistical design:

The collected data were categorized, tabulated, analyzed and statistically analyzed using the SPSS software version 24 for analysis, the range, mean and standard deviation. For qualitative data which describe categorical set of data by frequency and percentage or proportion of each category. Pearson's, spearman and Kendall's correlation coefficient (R) was applied between variables.

Significance of the results:

Highly Significant at P-value < 0.01

Statistically significant was considered at P-value < 0.05

Non-significant at p-value >0.05

RESULT

Table (1) Show that, 90% of studied university students were male. 77.6% of them in the age group 19-<21 with the mean age \pm SD was 20.01+ 6.043. Regarding to marital status, 96.3% of them were single. 55.9% of them live in urban area. 59.1 % of them have enough income. 93.2% of the live with family during studying and 55.9% of them had academic achievement were Acceptable.

Figure (1): Illustrated the 70.0% of studied university students had unsatisfactory knowledge about electronic hookah smoking while 30% of them had satisfactory knowledge.

Figure (2): Show that 60.0% of studied university student had negative attitude regarding electronic hookah smoking, While, 40.0 % of them had positive attitude regarding electronic hookah smoking.

Table (2) : Shows that, there was a highly statistically significant relation between total knowledge score and their age, marital status, academic achievement, place of residence and monthly income $p = < 0.01$.

Table (3): Shows that there was a highly statistically significant relation between total attitude score and their age, academic achievement and monthly income $p = < 0.01$.

Table (4): shows that there was a highly statistically significant positive correlation between total knowledge score and total attitude score regarding electronic hookah smoking $p = < 0.01^*$

**Table (1) Demographic Characteristics of the Studied university students(n=322)**

Demographic characteristics	No.	%
Sex:		
Male	290	90.1
Female	32	9.9
Age:		
19 - <21	250	77.6
21 - <22	72	22.4
mean age ± SD	20 .01+ 6.043	
Marital status:		
Single	310	96.3
Married	12	3.7
Residence:		
Urban	180	55.9
Rural	142	44.1
Monthly income		
Enough and save	20	6.2
Enough	190	59.1
Not enough	112	34.7
Place of residence during studying		
With family	300	93.2
With friends	22	6.8
Type of Faculty:		
Journalism	50	15.5
Archaeology	28	8.7
Arts	244	75.8
Academic achievement		
Acceptable	180	55.9
Good	72	22.3
Very good	40	12.4
Excellent	30	9.4

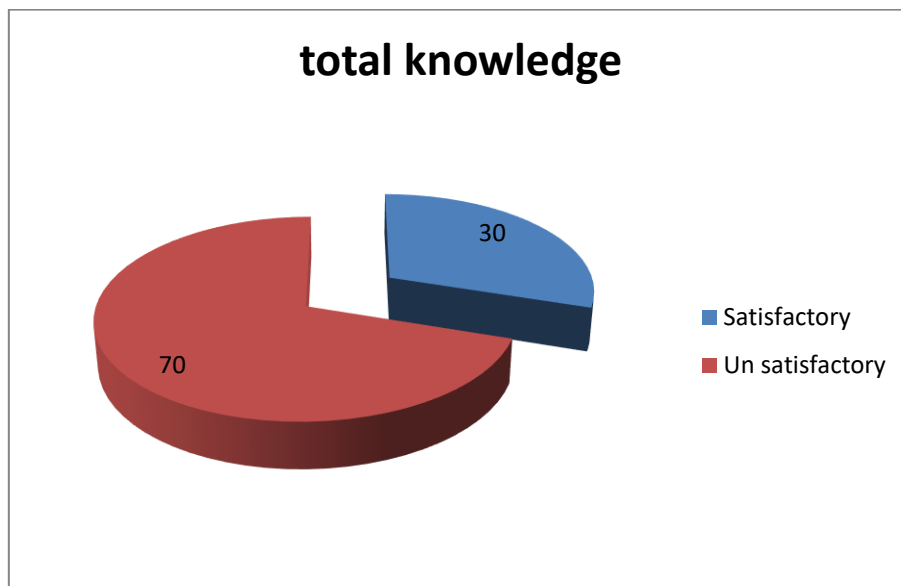


Figure (1): Total Knowledge Scores of University Students about Electronic Hookah Smoking (n=322)

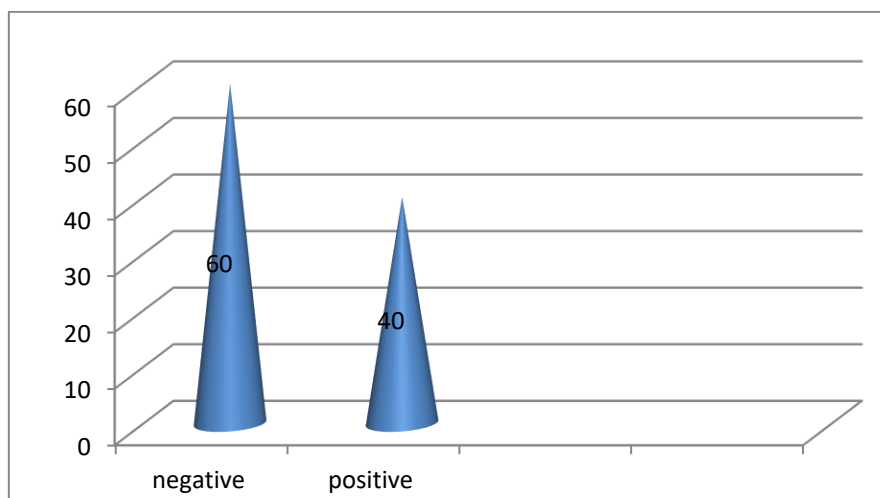


Figure (2): Total Attitude scores of Studied University Students about electronic hookah smoking (n=322)



Table (2): Relation between total knowledge scores regarding electronic hookah smoking and demographic characteristics of the studied sample (n=322)

Demographic characteristics		Total Knowledge			T-Test	P-value
		Mean	±	SD		
Age	19 - < 21	9.833	±	10.665	22.761	<0.001*m
	21 - <22	8.066	±	9.422		
Marital status	Single	8.823	±	9.579	24.710	<0.001*
	Married	8.710	±	9.544		
Academic achievement	Acceptable	7.754	±	8.632	14.821	<0.001*
	Good	7.065	±	8.682		
	Very good	8.644	±	9.622		
	Excellent	8.899	±	10.722		
Place of residence	Rural	7.823	±	8.544	22.761	<0.001*
	Urban	10.644	±	11.543		
Monthly income	Enough	6.933	±	7.552	21.396	<0.001*
	Not enough	8.854	±	9.443		
	Enough and saved	7.422	±	8.7 22		



Table (3): Relation between total attitude scores regarding electronic hookah smoking and demographic characteristics of the studied sample (n=322)

Demographic characteristics		Total attitude			T-Test	P-value
		Mean	±	SD		
Age	19 - < 21	8.782	±	9.445	22.761	<0.001*
	21 - <22	6.077	±	8.491		
Marital status	Single	7.077	±	8.691	24.710	≥0.05
	Married	8.677	±	9.755		
Academic achievement	Acceptable	7.823	±	8.544	14.821	<0.001*
	Good	10.711	±	11.65		
	Very good	6.955	±	6.568		
	Excellent	9.988	±	10.722		
Place of residence	Rural	7.227	±	8.544	22.761	≥0.05
	Urban	7.233	±	8.622		
Monthly income	Enough	8.755	±	9.644	21.396	<0.001*
	Not enough	7.853	±	8.566		
	Enough and saved	8.822	±	10.792		

Table (4): Correlation between total knowledge scores and total attitude scores of studied university students regarding electronic hookah smoking (n=322)

Variable	Total knowledge	
	R	P value
Total attitude	0.49	<0.001**

r = correlation coefficient

(**) Highly statistically significant



DISCUSSION

Electronic hookah smoking has grown quickly to become a global tobacco epidemic but its users are exposed to toxic substances that are shown to increase the risk of developing many of adverse health effects such as lung, oral cancers and heart disease. The e-hookah aerosol that users breathe from the device and exhale can contain harmful and potentially harmful substances as nicotine that is highly addictive drug that can have lasting damaging effects on adolescent brain development. Therefore, This study was conducted to assess health hazards of e-hookah smoking Unger&, Unger (13).

Regarding to university students age ,The current study revealed that about more than three quarters of the studied sample aged from 19 - < 21 years with the mean \pm SD were 20.01+ 6.043, this result were agree with Caponnetto et al., (14). The study conducted in United States about “The emerging phenomenon of electronic cigarettes.” Mentioned that 80% of the student were aged from 19 - <21 years.

Regarding to gender of university students , This study showed that the majority of studied sample were male as culture in Egypt that most smokers from males not females , while, the minority of them were female; this result were agreed with Etter et al.(15) the study conducted in India about “ Electronic nicotine delivery systems: a research agenda ”. Found that, the majority of study sample were male. From the investigator point of view most of the smokers in Egypt were male, cultures in Egypt do not allow female to smoke.

Regarding to marital status of the finding of the current study revealed that the majority of them were single as most of them delay marriage after finishing their studying. This result was matched with Bahl, et al.(16) the study conducted in China about” Comparison of electronic cigarette refill fluid cytotoxicity using embryonic and adult models.” The study found that, the majority of the study sample were single.

Regarding to university student place of residence, the current study revealed that , more than half of them live in urban area , more than half of them the had enough monthly income as they dependents on their parent's income , and the majority of them residence during studying with family as they need interest and caring from their families . This result agreed with El Dib et al.(17) in Turkey about "Electronic nicotine delivery systems and/or electronic non-nicotine delivery systems for tobacco smoking cessation or reduction: A systematic review and meta-analysis"and found that , 60% of the study sample live in urban area , 61% of them had enough monthly income and 85% of them the place of residence during studying with family.

Regarding to university student academic achievement, the current study revealed that, more than half of them had acceptable degree. This result agreed with Valento (18). in North American about” Nicotine poisoning following ingestion of e-Liquid. Annual Meeting of North American Congress of Clinical Toxicology”. and found that , 58 % of the study sample had acceptable academic degree .

Regarding total knowledge scores of university students about e-hookah , more than two thirds of the study sample had unsatisfactory knowledge, while more than one quarter of them had satisfactory knowledge about electronic hookah smoking. This result was agree with Bitzer et al., (19) in Japan entitled “ Effect of flavoring chemicals on free radical formation in electronic cigarette aerosols” and found that ,68% of the study sample had



unsatisfactory knowledge and 32% of them had satisfactory knowledge about electronic hookah smoking. From the investigator point of view most university student not participate in any health education program which lead to poor knowledge regarding hazards of electronic hookah smoking.

Regarding total score of attitude regarding to electronic hookah smoking, The finding of current study revealed that more than half of studied university students had negative attitude regarding electronic hookah smoking, While, two fifths of them had positive attitude regarding electronic hookah smoking. This result was agree with Williams et al., (20) in Saudi Arabia about “Metal and silicate particles including nanoparticles are present in electronic hookah cartomizer fluid and aerosol. “and found that 60% of them had negative attitude regarding electronic hookah smoking, While 40% of them had positive attitude regarding electronic hookah smoking. From the investigator point of view, the students had negative attitude towards the use of electronic hookah smoking because most of the students did not participate in any program that raises awareness about the dangers of electronic hookah smoking and its impact on health.

Regarding relation between total knowledge and demographic characteristics of the studied university students about electronic hookah, the current study revealed that , there were highly statistically significant relation between total knowledge of studied university students and their age, marital status and place of residence. Also, there were statistically significant relation with academic achievement and monthly income. This finding agree with Ratajczak et al., (21) in Northeastern about “ How close are we to definitively identifying the respiratory health effects of e-hookah” the study found that, there was a highly statistically significant relation between total knowledge score and demographic characteristics of the studied university students. From the investigator point of view, these result may be due to university students had unsatisfactory knowledge about e-hookah smoking.

Regarding the relation between demographic characteristics and total attitude of the studied university students , the current study revealed that, there were highly statistically significant relation between total attitude of studied university students and their age, monthly income and academic achievement. This result was in agreement with Bhatnagar (22). The study conducted in brazils about “E-hookah and cardiovascular disease risk: Evaluation of evidence, policy implications, and recommendations. *Curr Cardiovasc Risk Rep*” and found that, there was a highly statistically significant relation between total attitude studied university students and their monthly income. Also, statistically significant relation with their age and academic achievement .From the investigator point of view, these results may be due to students who had enough monthly income and good academic achievement had positive attitude regarding electronic hookah.

Regarding to the correlation between total knowledge score and total attitude scores, the current study revealed that , there was a highly statistically significant positive correlation between total knowledge scores and total attitude scores for university students $p < 0.01^{**}$.This result were in agreement with Qasim et al .,(23) in Iran about “Knowledge, Attitude and beliefs towards E-hookah smoking among students .” and found that, there was a highly statistically significant correlation between total attitude score and total knowledge scores . From the investigator point of view, increased university student knowledge lead to improved student attitude.



CONCLUSION

On the light of results of the current study and answers of the research questions, it concluded that, there was 70.0% of studied sample had unsatisfactory knowledge about E-hookah smoking while 30.0% of them had satisfactory knowledge about E-hookah smoking,, 60% of studied university student had negative attitude regarding electronic hookah smoking, while, 40% of them had positive attitude regarding electronic hookah smoking. There were highly statistically significant relation between total scores of knowledge of studied sample and their age, marital status, place of residence and monthly income at($p= <0.001$). Also, there is highly statistically significant relation between total attitude scores of studied sample and their age, monthly income and academic achievement at ($p= <0.001$). In addition there is highly statistically significant positive correlation between total knowledge scores and total attitude scores regarding E-hookah smoking among the studied sample at($p= <0.001^{**}$) &(r=0.49)

RECOMMENDATION

On the light of the current study findings, the following recommendations are suggested.

- ❖ Continuous health education for university students about hazards of e-hookah smoking
- ❖ Dissimilation of borshor and booklet about hazards of electronic hookah smoking for university students.
- ❖ Further research on a large sample and other setting is needed.

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