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RESEARCH ARTICLE

Cancer Awareness among Non-medical University Students in Sudan

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Abstract

Background: Cancer is now the second leading cause of death, after cardiovascular world wide, approximately 10 million people are diagnosed with cancer annually and more than 6 million die of the disease every year . Through early education and widened community awareness, modifiable risk factors could be ameliorated to decrease the population's lifetime risk and some studies have shown that, despite the scientific evidence, the public is not well informed about the link between cancer and lifestyle and other cause that there are many factors that make population risk full for getting cancer

Objective: The aim of the present study is to determine the extent of knowledge and preventive measures of cancer among adolescent groups, aged 17 to 23 , residing in Sudan on the .**Subject and methods:** descriptive research design was used included 277 non- medical university students from (El- Khartoum State) in Sudan . Data were collected through using one tool contains 4 main parts based on literature review & modified tool from Zyoud et al ,2010 . **Results:** The study revealed significant Relation between knowledge level regarding cancer risk factors scores with marital , the most of students aware with risk factors and warning signs of cancer and there are satisfactory total knowledge scores of studied cases in items related to types of cancer, warning signs and risk factors. **Conclusion & recommendations:** The present study concluded that there are obvious needs for educational programme to increase students awareness of all types of cancer and it's risk factors.

Introduction

Adolescence is a time of transition and change. It is a period of "physical, cognitive, psychological and moral development that often results in risk-taking behaviour. Doors are opened to new social, cultural and political pressures where a whole new world of decision-making is revealed. these decisions include choices relating to substances and situations that are considered risky. Also, Many lifelong habits begin during adolescence. These habits can have profound, long-term ramifications on health. ***(Easley, 2006 & Freeman et al , 2000)***

The term "cancer" is commonly used to cover a wide range of diseases which all share a common feature, namely that cells in affected organs or tissues of the body (e.g. breast, lung, skin or bone marrow) continue to grow indefinitely, without reference to the needs of the body. Many cancers have the capacity to spread to other parts of the body and to kill the patient. With more than 3 million new cases and 1.7 million deaths each year , cancer currently represents the second most important cause of death and morbidity in Europe. (**Coleman et al ,2008)** . Cancer is now the second leading cause of death, after cardiovascular worldwide, approximately 10 million people are diagnosed with cancer annually and more than 6 million die of the disease every year (***Zyoud et al ,2010)***

In Sudan, the largest and most diverse country in Africa, is experiencing a growing cancer problem, but little is presently known on tumor patterns, cancer epidemiology and ethnic or environmental cancer risk factors.

(Awadelkarim et al , 2012) . In Egypt .According to NCI (2001) the number of new cancer patients per year was estimated to be 65.000 in Egypt , Accumulated patients represent about three times the number of new cases . the number of cancer patient's in Egypt is expected to expand in the future as the population continues to grow and age , as well as the prevalence of known etiological factors increase ***(Gab-Alla , 2003).*** Similar to the cancer types and rates for women throughout the world, breast cancer is the most common cancer in Turkey . The rate of breast cancer in Turkey is 26.5% and it accounts for the second highest cause of deaths caused by cancer (***Gürsoy et al ,2009***)

In Saudi Arabia, the incidence of cancer continues to escalate, more attention must be directed at adolescent population, if the burden of chronic illness (cancer) among Saudis is to be lightened. It has been estimated as around 800 new cases per million population per year, 70% of who are in an advanced stage. According to the National Cancer Registry of the Ministry of Health, the total number of cases in the year 1994 was 7,028 cases. Males accounted for 3,954 of the cases and the rest were females. The number of Saudis diagnosed with cancer represents almost 72% of the total number of cases reported during that period(***Hashim,2000***)

In Nigeria there is no available nationwide incidence rate, however, records from the University College Hospital (UCH) Ibadan cancer registry showed that from 1980 to 2007; 179 men and 5,006 women (ratio 1:28) constituting 2.6% were diagnosed to have breast cancer. Similarly, the University of Maiduguri Teaching Hospital Cancer Registry record showed that between 2001 and 2005, a total of 1,216 cases of cancer were registered within the period under review. Breast cancer accounted for 13.9% out of which eight occurred in men and 161 occurred in women (ratio1:20). The age range in this review was between 17 and 85 years with bimodal peak age group of 40–49 years and 60-69 years while Zaria has MBC incidence of 6.0% .More specifically, little is known about the knowledge of adult males on male breast cancer especially those working in the university environment, who are responsible for imparting knowledge and disseminating evidence based information to the younger generation and the public at large (***Arulogun& Peter-Kio ,2013***)

In addition to, Cancer rates are rising among the South Asian population and, more specifically, among South Asian American women from India, Pakistan, and Sri Lanka. About 1 in 9 Pakistani women will suffer from breast cancer at some point in her life. Research shows many cancer deaths could be prevented if individuals at risk were properly screened. Studies show that being situated in two different cultures may have negative health implications that may lead to low screening levels. (***Jafri, 2011)***

The term "risky" in this situation is defined as any action involving risk or danger by which there is awareness for potential harm or loss It is believed that most adolescents understand at least some connections between many risky behaviours and negative outcomes; however, it is unclear whether or not adolescents feel they are personally vulnerable to the negative implications associated with these risky behaviors . The harmful effects of tobacco use have been widely noted and according to statistics, smoking is one of the most notorious health risk behaviours, particularly among adolescents. Recent statistics show that the appeal of smoking has increased over the years, predominantly among female adolescent populations ***(Easley, 2006)***

Therefore, Cancers have many causes. A few are the result of faulty genes; some are a consequence of an individual's life history (e.g. how many children they have borne); some represent the long-term effects of exposure at any stage of life to cancer-causing agents such as tobacco smoke; and many involve a combination of these factors. The cause or causes of many cancers remain unknown. Most cancers become much more common with advancing age. The total annual numbers of new cases and deaths (per 100 000 population) for all cancers combined vary as much as two-fold between Member States of the European Union (EU). The range of survival rates is similarly wide. For individual cancers, the variation across Europe is even greater. This reflects a wide range of social and epidemiological factors in Member States: cancer prevention programmes; screening programmes; cancer control plans; individual lifestyles and occupational (**Coleman et al ,2008)**

Additionally , many factors influence a person's ultimate risk of developing skin cancer in his or her lifetime. Those factors include ethnically inherent skin color and type, personal and familial history of skin cancer, presence of freckles or moles, exposure to ultraviolet rays, and use of sun protective measures .Race, inherent skin color, and genetic predisposition may not be modifiable, however, through early education and widened community awareness, modifiable risk factors could be ameliorated to decrease the population's lifetime risk and some studies have shown that, despite the scientific evidence, the public is not well informed about the link between cancer and lifestyle and

other cause that there are many factors that make population risk full for getting cancer such as(older age, smoking , a relative with cancer , low fiber diet , low fruit and vegetables diet , oral contraceptive pills, high fat diet , overweight and family history ***(Easley, 2006 & Zyoud et al ,2010***).

In Britain, Little is known about adolescents' cancer awareness and help-seeking behaviour in Britain. This study assessed adolescents': awareness of cancer symptoms, common cancers, and the relationship between cancer and age; anticipated delay and perceived barriers to seeking medical advice; and examined variation by age, gender, ethnicity and whether individuals knew someone with cancer. There are certain groups of adolescents with poor cancer awareness. Cancer messages need to be targeted and tailored to particular groups to prevent the emergence of health inequalities in adulthood. Interventions to raise adolescents' cancer awareness have the potential for a life-long impact on encouraging early diagnosis and survival. (**Kyle et al ,2012)**

Thus, The level of knowledge or awareness of these risk factors is important because individual can take precautions and follow safe behavior that may prevent cancer and take early detection of cancer (***Zyoud et al ,2010***) . Accurately assessing the undergraduates' knowledge of cancer is essential not only for medical students but also for non- medical students to determine the needs of this category and evaluate the effects of educational intervention. For these reasons , this study was carried out to assess the extent of knowledge among adolescent groups, aged 17 to 23 , residing in Sudan regarding the knowledge and preventive measures of cancer .

Objectives of the Study

To assess the extent of knowledge among adolescent groups of non-medical university students aged 17 to 23, residing in Sudan regarding cancer

Significance of study:

This study may help determine the extent of knowledge of Adolescent groups, on the different preventive measures of cancer. Thus, the findings of the study could serve as a basis for the local health units to determine which areas of their adolescent's health programs they need to enhance or improve. The study may also serve as a springboard or basis for future researches, especially those which will delvelop on topics regarding the improvement of cancer awareness programs in our arab communities**.** ***(Christopher et al ,2013)***

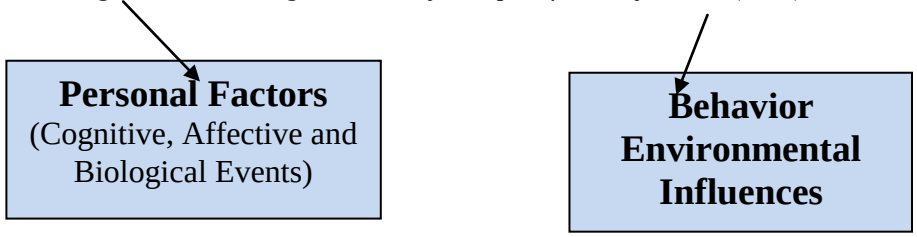
Cancer was estimated in 2000 to be responsible for about 7 million deaths (12%) worldwide, only preceded by cardiovascular diseases (30%) and by infectious and parasitic diseases (19%) , 30% increase in the number of cancer deaths in developed countries and more than twice this amount (71%) in developing countries, between 1990 and 2010 (**Ageep et al ,2007**).

Theoretical Framework

Emerging theory that has been successfully used in the area of adolescent health promotion is that of Informational-Motivational-Behavioral Skills Model (IMB). This model identifies that information and motivation equally influence prevention behavior skills and ultimately the prevention behavior itself. (***Thomas , 2006***)

Individuals are affected by their environment, as the influence of the peer group is so strong. One teen watches the behavior of the group and the feedback that the group gets for that behavior. The feedback reinforces not only their desire to participate in the same behavior but also their feelings of self efficacy. In positively influencing adolescent health behavior when the schools, parents and the community support the particular behavior modification. In this way, the environmental influence (***Thomas , 2006***)

Figure 1. *Social Cognitive Theory. Adapted from Pajares, F. (2002)*



The study question

What are the extents of health literacy of Adolescent aged 17- 23 years old, belonging to El-Khartoum University, on cancer screening and prevention, using a descriptive exploratory study design?

HYPOTHESIS

H_1: There will be significant association between the knowledge regarding risk factors of cancer and selected demographic variables of non-medical university students in Sudan.

H_2: There will be significant association between the knowledge regarding symptoms & warring signs of cancer and selected demographic variables of non-medical university students in Sudan.

H_3: There will be significant association between the knowledge regarding types & common age of cancer and selected demographic variables of non-medical university students in Sudan.

SUBJECTS AND METHODS

A descriptive exploratory research design will be utilized in this study; the study will be portrayed under the four main designs as follows:

1- Technical Design.
2-Operational Design.
3-Administrative design.
4- Statistical Design.

Research design

The present study is a descriptive exploratory study aiming to assess the extent of knowledge among adolescent groups, aged 17 to 23 , from non - medical colleges , residing in Elkhartoum state regarding cancer.

(1)Technical Design:

The technical designs for this study included research setting, subjects, tools and methods of data collection.

A-Study Setting:

This study was carried out in El- Khartoum University and in Sudan

Target population

The target populations were all available students matched inclusion criteria from one to fourth year as mentioned above.

Inclusion criteria:

- Students who are 18 to 22 years.
- Students who are willing to participate.
- Students who are available at the time of data collection

Exclusion criteria:

- Student who are above 23 years of age
- student who are not available during the data collection
- students from medical college as medicine , nursing , pharmacists , dentists colleges

B-Subjects:

All available students were selected for this study. It included 277 university students from (**Elkhartoum University**) in Sudan from 6 nonmedical colleges as Agriculture , Engineering, Education , Arts , Commerce and Computer college .

C-Tools for Data Collection:

Data was collected by using one tool contains 4 main parts based on literature review & modified tool from **Zyoud et al , 2010** as follows

Part I- Sociodemographic data:

Was Contains information related to demographic characteristics of the studied students as their age, gender, educational class level,

Part II : knowledge regarding symptoms & warning signs Questionnaire:

It includes 9 questions related to **symptoms and warning signs of cancer**

Part III: knowledge regarding cancer risk factors Questionnaire:

It includes 11 Questions related to student's awareness of cancer risk factors

Part IV: Knowledge regarding types of cancer :

It includes 9 Questions related to student's Knowledge regarding common age , gender for each types of cancer

Methods of Data collection:

Ethical considerations:

1. Explain the aim of the study to the Academic coordinator of the college to take his permission to do this study with students.
2. Explain the aim of the study to each student's to be familiar with the importance of her participation.
3. A brief explanation of the purpose and importance of the study was given to the student's and assured that the obtained information will be confidential and used only the purpose of the study. Confidentiality of the information was assured by the researcher.

(2)-Operational Design:

The operational design includes preparatory phase, content validity, reliability, pilot study and fieldwork.

A-Preparatory Phase:

It includes reviewing of literature, different studies and theoretical knowledge of various aspects of the research subject using books, articles, internet, periodicals and magazines.

B- Content Validity:

Validated tools were used from Published sources as mentioned before in tools of data collection.

C-Content Reliability:

Was done through:

Pilot Study:

Pilot study was carried out after the development of the tools on 10% of the students to test applicability of the tools then necessary modification were done according to the results of the results of pilot study and expertise opinions. The purpose of pilot study was:

1- To test the applicability of the study tools.

2- To estimate any need for addition in the tool.

Otherwise, the ten percent students were then excluded from the sample of research work to assure the stability of answers

3) Field work:

The interview sheet was filled out individualized with the students. Data was collected from the selecting settings by the researcher using the pre constructed tools.

1) Each student was individually filling questionnaire ; the questionnaire was collected from all the students while they are in free time of classes , purpose of the study was explained prior to get the questionnaire sheet, and it distributed to be answered within (30 -45 minutes) then collected.

2) The questionnaire was filling from about 5-10 students per day started from February to April 2013, over a period of two months starting according to students schedule and availability of time for both students and the researcher.

(4) Statistical Design:

Collected data was arranged, tabulated and analyzed according to the type of each data.

Scoring system:

Scoring system was ranged from 0 to 1 scores as zero for incorrect answer and one for correct answer for all parts of the questionnaire except for the part regarding risk factors of cancer, it contains 11 questions and answer ranged from Strongly agree to strongly disagree which strongly agree take 4, agree take 3, neutral 2, disagree 1, strongly disagree takes zero.

Statistical analysis:

Data analysis:

Data was collected and entered into a database file. Statistical analysis was performed by using the SPSS 16 computer software statistical package. Data was described by summary tables and figures. For comparing the (Knowledge and attitude) with socio-demographic characteristics, Chi ^{2} or Fisher Exact test was used. Statistical significance was considered at P-value <0.05 and highly significance at P-value <0.00.

Descriptive statistics:

-Numbers and percentages:

Used for describing and summarizing qualitative data.

The following statistical measures for significant relation were used:

1-Chi square (χ^2):

Used to test the association between the two qualitative variables and to compare between the proportions.

2- MC: Monte Carlo test

They were used because X^2 is not valid (>20%of the expected cell have count less than 5).

Limitation of study

The researcher were made a great over to match and organized the time with all students from different colleges to collect data which is more than the researcher prediction.

Results:

Table (1): shows that there are a near equal percentage of gender (50.9%, 49.1%) for male and female respectively, about (47.3%) in age group between 18-20 years , (30 , 31.8%) of students from level 2 and 4 respectively , also near one quarter of students (26.4 % , 24.2%) from engineering and commercial colleges , (42.2%) of students had GPA between 66- 75 and 75.5% of them haven't any family history of cancer , finally , about (79.4%) of student's doesn't know any information's regarding indicators of cancer .

Table (2) : Shows that about (60.3%) of students answers that the present of cysts is a sign of cancer while (44.4, 43.3, 39.4%) agree that the complaining of unknown pain is a sign of cancer, delayed /poor healing of wounds/inflammation signs for cancer , weight loss is a signs for cancer were a signs and indicators of cancer respectively , on the other hand (57.8% , 47.7, 41.2) of them disagree that cough /sore throat , change of stools/urine /eliminations, change of appearance/size of moles are signs of cancer respectively

Table (3): revealed that the most students' (77.6%) strongly agree of smoking as risk factors of cancer and (54.9%) strongly agree of alcohol, while (40.8%) have neutral opinion for low fruit food and weight gain as a risk factors, also (34.3%) of the agree of cervical inflammation as a risk factors, (30.0%) highly disagree for vigorous exercises as a risk factors of cancer.

Table (4): shows that there are (63.5%) of student's opinion that there are no relation between age and cancer and (91.3%) of them shows that breast cancer is a common cancer types between women while (57.8%) of them shows lung cancer is a common types of cancer among men

Table (5): regarding cervical cancer , (53.1 %) of student's didn't know information towards test types of cervical cancer and (75.1%) of them reported that cervical cancer more common in age group between 30-50 years , while (54.2%) doesn't know information of stomach cancer and (84.4%) answer that it more common in age group between 30-50 years .

Table (6): revealed that there are no significant relation between total student's knowledge level regarding cancer types & common age scores with their sex, age, college, levels and marital , p= (0.457, 0.997, 0.267, 0.586, 0.115) respectively

Table (7): revealed that there are no significant relation between total student's knowledge level regarding cancer warning signs scores with their sex, age, college, levels and marital , p= (0.504, 0.910, 0.689, 0.584, 0.723) respectively

Table (8) : revealed that there are no significant relation between all total student's knowledge level regarding cancer risk factors scores with their sex, age, college, levels and only relation found with marital status , p= (0.024)

Figure (1): Revealed that there are unsatisfactory total knowledge scores of studied cases in items related to types of cancer, warning signs and risk factors.

Table (1) : Description of the studied cases according to their demographic data

	No	%
Sex		
Male	141	50.9
Female	136	49.1
Age		
18 – 20	131	47.3
21 – 23	62	22.4
More than 23	84	30.3
College		
Agriculture	38	13.7
Engineering	73	26.4
Education	29	10.5
Arts	21	7.6
Commerce	67	24.2
Computer	49	17.7
Level		
First	52	18.8
Second	83	30.0
Third	54	19.5
Fourth	88	31.8
Materials		
Single	239	86.3
Married	34	12.3
Divorced	4	1.4
GPA		
Below 65	45	16.2
66 – 75	117	42.2
76 – 85	85	30.7
More than 86	30	10.8
Are you have in your family/ friends cancer person		
I'm	1	0.4
Father/Mother	4	1.4
Sibling	3	1.1
Family member	43	15.5
Friend	17	6.1
No one	209	75.5
What the indicators and signs of cancer		
Wrong answer	220	79.4
Right answer	57	20.6

Table (2) :Description of the studied cases awareness of warning signs of cancer

	Yes		No		I don't know	
	No	%	No	%	No	%
• Present of cysts is a sign of cancer	167	60.3	75	27.1	35	12.6
• Complaining of unknown pain is assign of cancer	123	44.4	95	34.3	59	21.3
• Bleeding is a sign for cancer	81	29.2	119	43.0	77	27.8
• Cough /sore throat is assigns of cancer	53	19.1	160	57.8	64	23.1
• The change of stools/urine /eliminations are signs of cancer	48	17.3	132	47.7	97	35.0
• The difficulty swallowing is assigns of cancer	81	29.2	128	46.2	68	24.5
• The change of appearance/size of moles are signs of cancer	90	32.5	114	41.2	73	26.4
• Delayed /poor healing of wounds/inflammation signs for cancer	120	43.3	92	33.2	65	23.5
• The weight loss is assigns for cancer	109	39.4	106	38.3	62	22.4

Table (3): Description of the studied cases perception of factors that increase the risk of cancer

	Strongly agree		Agree		Neutral		Strongly disagree		Disagree	
	No	%	No	%	No	%	No	%	No	%
• Cigarette smoking	215	77.6	44	15.9	6	2.2	9	3.2	3	1.1
• Passive smoking	83	30.0	106	38.3	65	23.5	10	3.6	13	4.7
• Alcohol	152	54.9	40	14.4	56	20.2	13	4.7	16	5.8
• Low fruit eaten	9	3.2	30	10.8	113	40.8	55	19.9	70	25.3
• High red meat ingestion	9	3.2	28	10.1	105	37.9	62	22.4	73	26.4
• Canned foot ingestion	22	7.9	71	25.6	99	34.7	28	10.1	57	20.6
• Wight gain	29	10.5	47	17.0	109	39.4	36	13.0	56	20.2
• Sunburn from childhood	15	5.4	43	15.5	114	41.2	47	17.0	58	20.9
• Old age	11	4.0	38	13.7	86	31.0	65	23.5	77	27.8
• Family history of cancer	21	7.6	57	20.6	87	31.4	55	19.9	57	20.6
• Cervical inflammation	39	14.1	95	34.3	109	39.4	17	6.1	17	6.1
• Moderate vigours exercises	14	5.1	28	10.1	70	25.3	82	29.6	83	30.0

Table (4) :Description of the studied cases awareness of types of cancer

	No	%
Liable risk age for cancer		
20 – 29	17	6.1
30 – 39	16	5.8
40 – 49	26	9.4
50 – 59	22	7.9
60 – 69	4	1.4
70 – 79	11	4.0
More than 80	5	1.8
Cancer no relation with age	176	63.5
More common cancer types between women		
Uterine	12	4.3
Cervical	7	2.5
Breast	253	91.3
Lung	4	1.4
Others	1	0.4
More common cancer types between men		
Bladder	48	17.3
Colorectal	38	13.7
Lung	160	57.8
Colorectal	30	10.8
Prostate	1	0.4
Others	0	0.0

Table (5): Description of the studied cases according to information about common age & tests for cancer

	No	%
Tests available for cervical cancer		
Yes	44	15.9
No	86	31.0
I don't know	147	53.1
Common age to cervical cancer test		
Below 30	64	23.1
30 – 50	208	75.1
Above 50	5	1.8
I don't know	0	0.0
Tests available for stomach/gastric cancer		
Yes	29	10.5
No	98	35.4
I don't know	150	54.2
Common age to stomach cancer		
Below 30	36	13.0
30 – 50	235	84.8
Above 50	6	2.2
I don't know	0	0.0

Table (6) :Relation between total knowledge level regarding cancer tests & common age scores with sex, age, college, and levels and marital

	Total knowledge level regarding cancer tests &liable age				Test of sig.
	Unsatisfactory (<60 %)		Satisfaction (≥60 %)		
	No.	%	No.	%	
Sex					
Male	131	51.6	10	43.5	χ^2p= 0.457
Female	123	48.4	13	56.5	
Age					
18 – 20	120	47.2	11	47.8	
21 – 23	57	22.4	5	21.7	χ^2p= 0.997
More than 23	77	30.3	7	30.4	
College					
Commerce	66	23.8	1	0.4	
Education	28	10.1	1	0.4	
Arts	16	5.8	5	1.8	χ^2p= 0.267
Enginnering	56	20.2	17	6.2	
Computer	48	17.3	1	0.4	
Agriculture	28	10.1	10	3.6	
Levels					
First	49	19.3	3	13.0	
Second	73	28.7	10	43.5	^{MC}p= 0.586
Third	50	19.7	4	17.4	
Fourth	82	32.3	6	26.1	
Marital					
Single	222	87.4	17	73.9	
Married	28	11.0	6	26.1	^{MC}p=0.115
Divorced	4	1.6	0	0.0	

P: p value for comparing between the two studied groups
χ^2: Chi square test
MC: Monte Carlo test

Table (7) :Relation between total knowledge level regarding cancer warning signs scores with sex, age, college, and levels and marital

	Cancer warning signs				Test of sig.
	Unsatisfactory (<60 %)		Satisfaction (≥60 %)		
	No.	%	No.	%	
Sex					
Male	124	50.2	17	56.7	χ^2p= 0.504
Female	123	49.8	13	43.3	
Age					
18 – 20	117	47.4	14	46.7	
21 – 23	56	22.7	6	20.0	χ^2p= 0.910
More than 23	74	30.0	10	33.3	
College					
Engineering	60	21.7	13	4.7	
Arts	18	5.1	3	1.1	^{MC}p= 0.689
Education	28	10.1	1	3.3	
Commerce	60	21.7	7	2.5	
Computer	40	14.4	9	3.2	
Agriculture	30	10.8	8	2.9	
Levels					
First	48	19.4	4	13.3	
Second	72	29.1	11	36.7	χ^2p= 0.584
Third	50	20.2	4	13.3	
Fourth	77	31.2	11	36.7	
Marital					
Single	214	86.6	25	83.3	
Married	29	11.7	5	16.7	^{MC}p= 0.723
Divorced	4	1.6	0	0.0	

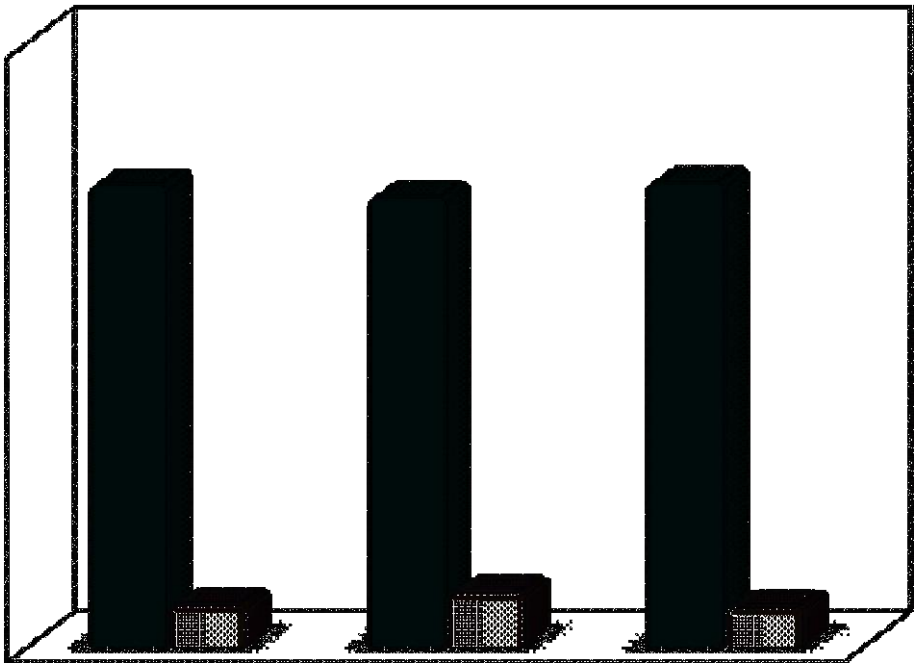
P: p value for comparing between the two studied groups
χ^2: Chi square test
MC: Monte Carlo test

Table (8) :Relation between knowledge level regarding cancer risk factors scores with sex, age, college, levels and marital

	Cancer risk factors score				Test of sig.
	Unsatisfactory (<60 %)		Satisfaction (≥60 %)		
	No.	%	No.	%	
Sex					
Male	132	51.8	9	40.9	χ^2p= 0.328
Female	123	48.2	13	59.1	
Age					
18 – 20	122	47.8	9	40.9	
21 – 23	58	22.7	4	18.2	χ^2p= 0.528
More than 23	75	29.4	9	40.9	
College					
Agriculture	30	10.8	8	2.9	
Arts	18	6.5	3	1.1	
Education	28	10.1	1	0.4	MCp= 0.264
Commerce	18	6.5	49	17.7	
Engineering	58	20.9	15	5.4	
computer	28	10.1	21	7.6	
Levels					
First	48	18.8	4	18.2	
Second	78	30.6	5	22.7	χ^2p= 0.512
Third	47	18.4	7	31.8	
Fourth	82	32.2	6	27.3	
Marital					
Single	220	86.3	19	86.4	
Married	33	12.9	1	4.5	MCp= 0.024*
Divorced	2	0.8	2	9.1	

p: p value for comparing between the two studied group
χ^2: Chi square test
MC: Monte Carlo test
*: Statistically significant at p ≤ 0.05

Figure (1): Distribution of studied cases according to total knowledge scores regarding types of cancer, warning signs and risk factors



Discussion

The overall number of cancer cases is increasing and, therefore, strengthening cancer prevention has become a priority. The institutions responsible for its control establish guidelines for primary prevention. These include recommendations, such as: not smoking, following a healthy diet, doing daily physical exercise or avoiding overweight. Adolescence is a period of adoption and/or consolidation of health behaviours, and both school- and family-based interventions have proven effective to improve them. Furthermore, online and mobile phone educational interventions are encouraging. Consequently, the main aim of this study is to assess the efficacy of an intervention in which these requirements (school, family, the Internet and SMS) are combined to prevent behavioural cancer risk. (**Lana et al ,2013).**

In recent years growing attention has been given to health and the development of health promotion within the hospital setting. This is in order to tackle the soaring medical costs and foster health improvement in the population. **(Shoqirat , 2009)**

Thus, Health literacy plays a crucial role in chronic disease self-management. In order to manage chronic or long-term conditions on a day-to-day basis, individuals must be able to understand and assess health information, which often includes a complex medical regimen, plan and make lifestyle adjustments, make informed decisions, and understand how to access health care when necessary. A lack of skill in these areas prevents many patients from engaging in effective self-management. (***Kanj and Mitic ,2009***)

Furthermore, Students possess some knowledge of cancer, although this knowledge was not uniform. There were misconceptions about cancer and its prevention. The researcher concludes that the development and implementation of school health education programs on cancer are needed in this population Prevention of cancer is possible and for many types of cancers cure is feasible when detected early. The incidence in the country could be reduced with behavior, changes as knowledge improves. Several studies have suggested a severe lack of knowledge among the public about the disease. Unfortunately, very limited work has been done in Saudi Arabia with public knowledge and attitude towards cancer. (***Hashim,2000***)

In spite of the numerous implemented strategies for cancer control, it has not yet been possible to slow down the increasing number of diagnosis of this disease around the world. According to different estimates, in the less economically developed countries the incidence of cancer cases will be multiplied during the next decades; even in the richest countries, an immediate decrease is not expected . If we also bear in mind the significant consequences

(both mortal and non-mortal) that frequently take place after cancer is diagnosed , it is the disease which people and governments are most worried about . Consequently, the percentage of the total health expenditure which is invested in cancer has increased in all countries, and it could even be unsustainable in the near future. For this reason, nowadays prestigious institutions are demanding an urgent improvement and the implementation of prevention strategies (**Lana et al ,2013) .** Therefore, the aim of the current study was to assess the knowledge of university students in Sudan.

Concerning sociodemographic characteristics, the present study revealed that a near equal percentage of gender for male and female and below half of studied sample in age group between 18-20 years, also near one quarter of students from engineering and commercial colleges and had GPA between 66- 75 and two third of sample haven't any family history of cancer, finally more than two third of students doesn't know any information's regarding indicators of cancer. these findings goes in the same line with ***Nielsen , 2006*** who stated that More than half of all incident cancers in women and more than one third of all incident cancers in men in the Western world seem to be related to endogenous levels of sex steroid hormones. This includes common cancers such as breast, colorectal and prostate cancers . Each of these cancer constitutes is a major public health problem and known risk factor that can only partly explain their incidence. In order to prevent these diseases, modifiable risk factors, which affect the cancer process directly via initiation or promotion of the carcinogenesis or indirectly through changes in hormone levels, should therefore be identified

Regarding student's awareness of symptoms & warning signs as indicators of cancer , the present study revealed that above half of students answers that the presence of cysts are signs of cancer and agree that the complaining of unknown pain, delayed /poor healing of wounds/ inflammation , weight loss are signs and indicators of cancer of cancer , while below half of them disagree that cough /sore throat , change of stools/urine /eliminations, change of appearance/size of moles are signs of cancer . This findings goes in the same line with ***Allen, 2010*** who reported that Men and women spontaneously recall the same top three signs or symptoms, a lump or swelling, pain and a change in the appearance of a mole. However, women are more likely to spontaneously recall a greater number of symptoms overall than men, 2.94 compared to 2.7. The symptoms that women recall at a significantly higher level are pain (43% , 37% males), changing moles (36% , 31%), bleeding (30% , 23%) and a sore that won't heal (9% , 3%). While ***Robb et al , 2009*** stated that The literature on cancer awareness goes back to the 1950s, and recent studies consistently indicate low public recognition of early warning signs of cancer .

As regard, student's awareness of cancer risk factors the present findings revealed that the most students' strongly agree of smoking as risk factor of cancer and above half of them strongly agree of alcohol, while below half of them have neutral opinion for low fruit food and weight gain and agree of cervical inflammation as a risk factor, while below half of them highly disagree for vigorous exercises as a risk factors of cancer. This finding goes in the same way of ***Allen, 2010*** who stated that student's recognition of smoking, passive smoking and sunburn, around a third were drinking alcohol (38%), a family history of cancer (34%) and passive smoking (30%). Spontaneous recall of exposure to the sun as a cancer risk is perhaps a little lower than would be expected, but this could be a reflection of the fieldwork timings are the top three suggestions in each area that respondents agree give an increased cancer risk. In contrast, he found that higher levels of awareness that poor diet and lack of exercise are factors that can increase the chance of getting cancer.

On the other hands, a majority of participants knew that sun exposure increases the risk for skin cancer; however, only 29% correctly identified behaviors that reduce this risk. Mean attitude score was 5.26 ± 2.73 (11 questions). Sixty-nine percent agreed that all people should take precautions against skin cancer; however, only 51% believed they themselves should practice sun safe behaviors. Mean behavior score was 1.29 ± 1.22 (9 possible). Only 3.1% reported avoiding the sun during peak hours, and only 5.1% regularly use sunscreen when exposed to the sun. (***Spradlin et al ,2010***)

In Malaysia, A study of ***Loo et al ,2013*** conducted on 965 students (36.0% males and 64.0% females) and founded that the majority of the students were from private universities (73.1%) while 26.9% were from public universities. Majority of the students had low awareness (94.4%) and knowledge (64.9%) scores but have high attitude scores (76.9%). Awareness, knowledge and attitude scores were significantly higher among female students and science faculty students. Only knowledge score was significantly higher among students from Chinese

ethnicity. Emotional and practical barriers were determined as the main barrier in seeking medical advice among the participants.

While ***Holman, 2011*** mentioned that Diet is thought to play an important role in cancer risk. A large discrepancy exists between expert recommendations about diet and cancer and actual dietary practices among young people and points to the need for more research to better promote the translation of science into practice. Future research should focus on developing and evaluating policies and interventions at the community, state and national levels for aligning the diets of youth with the evolving scientific evidence regarding cancer prevention. .

In Turkey, Nutritional status and healthy lifestyle are important factors not only in cancer etiology but also for prevention efforts. A good nutritional status contributes to a healthy life with high economic, social and cultural level. Unhealthy eating habits are part of risky behavior seen from adolescence . Eating habits and the level of cancer prevention knowledge were similar for both genders, except for the exercise issue. Although they have some information, the adolescents surveyed did not have preventive skills relative to their practical life. In general in order to ensure cancer prevention and a healthy life style social, cultural and sportive activities should be encouraged and educational programmes supporting these goals should be designed and applied for all stages of life, starting in early childhood. (***can , 2008***)

From another point of view , ***Hashim , 2000*** recommended that there is a need for a joint effort between the agents that influence students' social behavior to foster the making of healthy choices in such complex social behaviour as smoking and eating habits. Much of the behavior recommended to reduce the risk of cancer require the making of lifelong healthy decisions early. The role of the mass media in raising public awareness about cancer cannot be overemphasized. Special cancer education programs should be directed to adolescents and the youth.

Regarding student's awareness of cancer types and it's common age , about half of students didn't know information towards test types of cervical cancer and two thirds of them reported that cervical cancer is more common in age group between 30-50 years , while half of them doesn't know information of stomach cancer and the most of them answer that it is more common in age group between 30-50 years . Additionally , the findings of the present study revealed that there are no significant relation between total student's knowledge level regarding cancer types & common age scores with their sex, age, college, levels and marital. This findings goes in the same way of ***Freeman et al , 2000*** who reported that The majority of students knew what a mammogram is (92%) and how often screening should occur (65%), however, only 25% knew at what age screening should begin. It was encouraging that 80% of the students knew how often to perform SBE although only about half (53%) knew the time of the month this should be done. It was also encouraging that 83% knew that breast cancer is the second leading cause of cancer death, but the knowledge regarding risk factors that could possibly affect them was poor (36%). A statistically significant findings was that in the twenty percent of the students who had been taught SBE, 10 (43.5%) actually perform them. This is in relation to 2.2% of students who perform exams without any prior instruction.

On the other hands, ***Allen, 2010*** reported that the most common cancer in women is actually breast cancer (31%), followed by bowel (colorectal) cancer (12%), and lung cancer (11%)1. When respondents were asked, without prompting, to name the top three cancers in women the majority of respondents correctly identified breast cancer as the most common cancer type in women (84%), with the next most commonly mentioned being cervical cancer (8%)and lung cancer (2%).Cervical cancer is thought to be the second most common cancer in women (49%),with just 4% stating the correct answer bowel cancer. Cervical cancer is in fact a rare cancer (<1% of all cancers). The third most common cancer mentioned lacks the focus of the first and second, but the highest mentioned cancer type is lung cancer (16%),with 11% suggesting bowel cancer.

In contrast, ***Livingston et al ,2001*** founded that Over 80% of adolescents at both time periods knew about the issues related to skin cancer prevention, frequency of burning and burning on cloudy days. When the confounding variables were adjusted for, the risk of adolescents knowing that skin cancer is easily cured if detected early, decreased by 3% over time. However, the risk of adolescents knowing that one can get sun burnt on cloudy days was 4% greater over time. There was no change in the proportion of adolescent students who knew that one could get skin cancer without getting burnt often.

In the other point of view, ***Breitkopf et al ,2005*** stated that the Minority women and those of low socioeconomic status had poor understanding of Pap testing. Identifying misunderstandings in this vulnerable population and improving patient education on the most basic aspects of Pap testing may increase adherence to follow-up when abnormalities are detected. In addition to , ***Rashwan et al , 2011*** mentioned that the students had poor knowledge level of cervical cancer, its prevention and HPV vaccination acceptance. More efforts should be made to improve cervical cancer knowledge and awareness of the public especially secondary school students in Sarawak. This in turn will enhance the practice of prevention against cervical cancer among students.

According to the present study findings , there are no significant relation was found between total student's knowledge level regarding cancer warning signs scores with their sex, age, college, levels and marital , in contrast , ***Kamau , 2011*** stated that Cancer fatalism has continued to increase among especially young women, this is the belief that women have had that diagnosis of cancer directly translates to inevitable death therefore they find it better to avoid going for screening and are with no knowledge whatsoever on their health status.
Based on the present study findings there are no significant relation between all total student's knowledge level regarding cancer risk factors scores with their sex, age, college, levels and only relation found with marital , in configuration , ***Ahmed , 2012*** stated that The level of cancer awareness is low amongst Sudanese northern state inhabitants even after delivering an educational program. More than 30% of cancer cases could be prevented by modifying lifestyle or avoiding key risk factors. Helicobacter pylori, hepatitis B and C viruses, and HPV were responsible for 1.9 million cases, mainly gastric, liver, and cervix uteri cancers. Around 30% of infection-attributable cases occur in people younger than 50 years. In contrast, ***Allen, 2010*** found that younger respondents were less likely to acknowledge that eating less than 5 portions of fruit and vegetables a days was a cancer risk factor. In fact, more 18-24 year olds disagreed with this suggestion (40%) than agreed (32%), giving a negative net agreement score. All other age groups showed a low, but positive level of net agreement (14% 25-44 years, 21% 45-64 years, 7% 65+ years). Overall, young respondents tended to be less likely to acknowledge the suggestions as giving an increased chance of getting cancer.

However, there is a need for further investigation of the ways in which different approaches to measuring cancer knowledge relate to behavioural outcomes, and to determine the most useful measures for predicting early detection behaviours. ***(Robb et al ,2009)*** . While ***Kamau, 2011*** emphasized on that Education and Knowledge on both breast cancer and cervical cancer has continued to decrease as the cancer fatalism increases not because there is no available information but because the women have been ignorant to enlighten themselves.

More recently, ***Alharbi et al ,2011*** highlight on another view in teenage awareness that teachers play an effective role in communication and motivation of young students, assessment of their knowledge, attitudes and behaviors is essential to reduce the risk of cancer among future young generations. However, the practice of any of cancer screening methods is dependent on the awareness about cancer. If this knowledge is poor among those who should teach others, there will be difficulty in promoting these life saving methods.

Conclusion& Recommendations:

From the foregoing discussion, it can be seen that there are obvious needs for instructional scheme offered on simple media to increase university student's regarding cancer. In addition to , This study provides a valuable basis of information toward the formulation of relevant cancer prevention strategies, especially within the scope of health education among the undergraduate students. Within this context, there is a great demand for strategies and programs that take into consideration all the needs of those students as a part of public awareness. Efforts should be carried out to design and implement interventions that suit the adolescent students as a part of community evidence.

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