

## AWARENESS ABOUT ANTICANCER FRUITS: A QUESTIONNAIRE BASED STUDY

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### ABSTRACT

*Cancers have been the leading cause of death worldwide and poor diet and physical inactivity are major risk factors in cancer-related deaths. Cancer caused over 8 million deaths worldwide in 2013 and has moved from the third leading cause of death in 1990 to the second leading cause behind cardiovascular disease in 2013. Aim of this study was to assess the base line knowledge of Dental Graduates about the anti-cancer dietary components with the aim that their knowledge will have an impact on the awareness of the community.*

*The study was conducted through a 18 instrument questionnaire on a sample consisted of sixty four dental graduates (24 males and 40 females) from University College of Dentistry, The University of Lahore.*

*Awareness regarding different fruits that can have anticancer effect was assessed through the questionnaire. Dental graduates were aware of the fact that different fruits have an anticancer effect thus should be included in the diet however, it was important to note that only 61.33% dental graduates were aware of the fact that citrus fruits exhibit anti carcinogenic activity. Moreover in this study 40%, 55.67% and 50.33% dental graduates considered straw berries, rasp berries and blue berries respectively exhibiting anti-carcinogenic effect. Awareness level of dental graduates regarding role of berry fruit as anti-carcinogen was limited.*

*This study concludes that though base line knowledge about anti-cancer diet was there but further anticancer diet awareness surveys and programs are needed. This may help in changing the dietary habits and thus may help in reducing the increasing incidence of cancers.*

**Key Words:** *Anti-cancer diet, fruits, cancer awareness program.*

### INTRODUCTION

Cancers have been one of the leading cause of death in the world and poor diet and physical inactivity have been attributed as major risk factors in cancer associated deaths.<sup>1</sup> Worldwide deaths due to Cancer in 2013 have been reported as over 8 million that has moved cancer from the third leading cause of death in 1990 to the second leading cause of death in 2013.<sup>2-5</sup> In the recent past though exponential progress in the prevention and management of cancers have taken place

but as mentioned already its incidence is increasing at an alarming rate day by day owing to increasing population, smoking, obesity, and dietary patterns.<sup>2</sup> It has been reported by the American Institute for Cancer Research and the World Cancer Research Fund that 30-40% of all cancers can be prevented by diet control, physical work, and maintenance of body weight.<sup>6</sup> Thus one of the most important messages of modern nutrition research is that diet rich in fruits and vegetables protects against cancer.<sup>1,6</sup> Block et al reviewed about 200 studies of cancer and fruit and vegetable intake and found statistically significant protective effect of fruits and vegetables in 128 of 156 studies that gave relative risks.<sup>7</sup> Steinmetz and Potter reviewed the relationship between fruits, vegetables and cancer in 206 human and 22 animal epidemiologic studies and found that fruit and vegetable reduces chances of cancer occurrence.<sup>8</sup> A joint report by the World Cancer Research Fund and the American Institute for Cancer Research found an elaborative evidence that a high fruit

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and vegetable intake can reduce cancers of the mouth and pharynx, esophagus, lung, stomach, and colon and rectum.<sup>9</sup> Winn DM in his study suggested that there is a protective effect of high fruit consumption against cancers.<sup>10</sup> Gut microbiome has been implicated in the etiology of cancer, not only as an infectious agent but also by altering exposure to dietary compounds that influence disease risk.<sup>11,12</sup>

Though research have shown the importance of diet and physical activity in preventing cancers and awareness programs have been introduced and reported but still studies available on awareness programs regarding anti-cancer diets and life style are limited. Fotedar V et al in their study concluded that though the mean knowledge of the population about cancers is good but the knowledge and practices about risk factors had to be reinforced.<sup>13</sup> Carter LM et al in their study concluded that there is a need for improved education of undergraduate medical and dental students regarding oral cancer left alone the masses.<sup>14,15</sup> Altin C et al in their study concluded that limited cancer literacy

instruments are available.<sup>16</sup> Aim of this study is thus to assess the base line knowledge of Dental Graduates about the anti-cancer dietary components with the aim that their knowledge will have an impact on the awareness of the community.

**METHODOLOGY**

The study sample consisted of one hundred and fifty House Surgeons and Demonstrators (54 males and 96 females) from University College of Dentistry, The University of Lahore. After obtaining informed consent they were given a questionnaire. Questionnaire comprised of 18 instruments each testing different fruits / dry fruits that might have an impact as anti-cancer diet as given in Fig 1. Data were then analyzed using SPSS 16.0 and frequency and percentage for each instrument for each subject was then calculated.

**RESULTS**

Dental Graduates perspective regarding anti-cancer fruits and vegetables has been discussed in Table 1, 2 and Fig 2, 3.

<b>Questionnaire</b>		
Q1 Do you know that diet has an impact in preventing cancers?	Yes	No
Q2 Most common causes of Cancers especially Oral/Digestive System Cancers.	Genetic	Environmental Both
Q3. Can excessive use of spices increase the incidence of oro-gastric cancers?	Yes	No
Q4. Can use of Betal Nuts &, Pan increase the incidence of Oro-gastric Cancers?	Yes	No
Q5. Can excessive smoking and alcohol use increases the incidence of Oro-gastric Cancers?	Yes	No
Q6. Do you think that excessive tea / coffee use has any impact on cancers?	Yes	No
Q7. What do you think whether Citrus fruits like Oranges, Mousami, Malta, Pomegranate and Grape Fruits have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q8. What do you think whether fruits like Pear and peach have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q9. What do you think whether Kiwi fruit have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q10. What do you think whether fruits like Banana have any effect on Cancer incidence?		
Q11. What do you think whether Leechie have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q12. What do you think whether Mangosteen have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q13. What do you think whether strawberry have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q14. What do you think whether rasp berry have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q15. What do you think blue berry Cherries have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q16. What do you think whether Sunflower Seeds have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q17. What do you think whether Jujube have any effect on Cancer incidence?	Antic-carcinogenic	Neutral
Q18. Do you think that this questioner has improved your awareness regarding anti-cancer fruits?	Yes	No

Questionnaire to assesses student`s awareness regarding anti-cancer fruits

TABLE 1: FREQUENCY AND PERCENTAGE OF EACH QUESTION USED TO ASSESS THE ROLE OF SPICES, PAN/CHHALIA, SMOKING/ALCOHOL AND TEA/COFFEE AS RISK FACTOR FOR CARCINOGENESIS

	Q1		Q3		Q4		Q5		Q6	
	n	%age	n	%age	n	%age	n	%age	n	%age
Yes	123	82	79	52.67	139	92.67	117	78	97	64.67
No	32	18	81	47.33	11	7.33	33	22	53	35.33
	150	100	150	100	150	100	150	100	150	100

TABLE 2: FREQUENCY AND PERCENTAGE OF QUESTIONS USED TO ASSESS THE AWARENESS REGARDING DIFFERENT COMMONLY USED FRUITS

	Q7		Q8		Q9		Q10		Q11		Q12	
	n	%age	n	%age	n	%age	n	%age	n	%age	n	%age
Anti-Carcinogenic	58	38.67	86	57.33	50	33.33	65	43.33	64	42.66	124	82.67
Neutral	92	61.33	64	42.67	100	66.67	85	56.67	86	57.33	26	17.33
	150	100	150	100	150	100	150	100	150	100	150	100
	Q13		Q14		Q15		Q16		Q17			
	n	%age	n	%age	n	%age	n	%age	n	%age		
Anti-Carcinogenic	60	40	74	49.33	67	44.47	109	72.67	76	50.67		
Neutral	90	60	76	50.67	83	55.33	41	27.33	74	49.33		
	150	100	150	100	150	100	150	100	150	100		

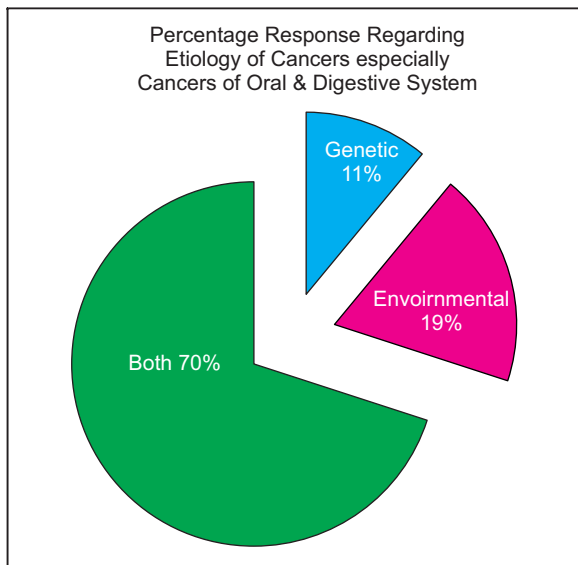


Fig 1: Response to Question 2

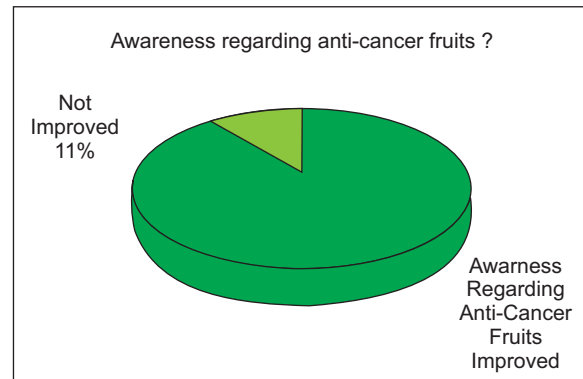


Fig 2: Response to Question 18

**DISCUSSION**

There are certain food components which act as cancer risk factors and are termed as carcinogenic while there are certain dietary habits which have an anti-carcinogenic effect.<sup>7,8</sup> Questionnaire comprised of 18 instruments related to cancer diet awareness was presented to each subject and base line knowledge of dental graduates regarding carcinogenic and anti-carcinogenic diet was assessed. First question was related to the fact that whether they have any idea about the

role of diet in preventing cancers; 82% of the dental graduates were aware of this fact in present study. When knowledge about the etiology of cancers especially cancers of oro-gastric region was questioned 70% responded that both genetics and environmental factors acts as etiological factors, while 19% considered only environmental factors such as pan, betal nuts, spari, gutka and smoking as etiological agents.

**Excessive Use of Spices**

Excessive use of chilies and spices have been considered as one of the pre-disposing factor for many pre-malignant oral lesions.<sup>17,18,19</sup> In this study only 52.67% dental graduates believed that excessive use of spices and chilies can be a risk factor for oro-gastric cancers.

### Use of Pan / Betal Nuts

Literature has reported, excessive use of Pan Masala, Betal Nuts, chhalia and sparietc as one of the risk factors / cause for oral squamous cell carcinoma.<sup>20,21</sup> In this study 92.67% dental graduates responded positive to this question thereby confirming that they are pretty much aware of this.

### Smoking and Excessive Use of Alcohol

Tobacco smoking and alcohol consumption has been linked as a risk factor / etiological agent for the cancers.<sup>22-25</sup> In this study 78% dental graduates reported positive to this question thereby confirming that they are pretty much aware of this

### Excessive Use of Tea/ Coffee

Imad Al-Dakak supports the hypothesis of an inverse association between caffeinated coffee drinking and risk of cancer of the oral cavity and pharynx.<sup>26</sup> Radoi L et al in their study concluded that tea and coffee drinking may decrease the risk of oral cavity cancer through antioxidant components which play a role in the repair of cellular damages.<sup>27</sup> 64.67% of the dental graduates in this study also feel that use of tea and coffee doesn't increases the incidence of oro-gastric cancers.

### Citrus Fruits in diet

Turati F et al in their study have reported fruits specially citrus fruits as anti-carcinogenic.<sup>28</sup> Jaganathan SK et al in their study reported that pomegranate and other citrus fruits acts as crusaders in fighting against cancers.<sup>29</sup> Foschi R et al in their study indicated that citrus fruit has a protective role against cancers of the digestive and upper respiratory tract.<sup>30</sup> Miller EG et al in their study concluded that citrus fruits especially Grape fruit due to high concentration of favonoids may reduce the risk of cancers.<sup>31</sup> Chainani-Wu N. in his study found that use of green vegetables and fruits specially citrus fruits reduces the carcinogenic activity.<sup>32</sup> It was important to note that 61.33% dental graduates were aware of the fact that citrus fruits exhibit anti carcinogenic activity.

### Peer, peach and Kiwi fruit

Freedman ND et al in their study reported that fruits including pear and peach are linked with reduced risk of head and neck cancers.<sup>33</sup> Motohashi N et al in their study have gone a step ahead by saying that extracts of kiwifruit can be used to prevent and treat cancers.<sup>34</sup> Hunter DC et al have reported natural healing and anti-oxidant effects of kiwi fruits.<sup>35</sup> It was quite astonishing that 42.67% and 66.67% dental graduates were aware of the fact that pear/peach and kiwi fruits respectively exhibit anti carcinogenic activity.

### Banana in Diet

Zhang CX et al in their study concluded that consumption of vegetables and fruits such as dark green leafy vegetables, cruciferous vegetables, carrots and tomatoes, banana, watermelon/papaya/cantaloupe are all inversely and significantly related with breast cancer risk. There role in oral cancers have not been reported in literature. 56.67% dental graduates in this study replied yes to its anti-carcinogenic effect.<sup>36</sup>

### Leechy and Mangosteen use in Diet

Jeremy J et al in their study found that Mangosteen exhibit anti-cariogenic activity for prostat cancer.<sup>37</sup> Setiawan AS in another study reported its anti-carcinogenic activity in tongue cancers.<sup>38</sup> Shan T et in their study concluded that Xanthones from mangosteen extracts acts natural chemopreventive agents.<sup>39</sup> Ibrahim SR, Mohamed G Ain their study concluded that Litche fruit exhibit anti-cancer activity.<sup>40</sup> Hsu CP et al concluded that Litchi seed extract can Induce apoptosis and cell cycle arrest in human colorectal carcinoma.<sup>41</sup> In this study 57.33% and 17.33% dental graduates answered that Leechy and Mangosteen and respectively exhibit anti-carcinogenic effect. No study has been found showing relationship of these foods with oro-gastric cancers.

### Berry Fruits in Diet

Seeram NP et al in their study found that berry fruits inhibit growth and exhibit apoptic activity of human cancer cells in vitro. However they recommended that the data provided by the current study and from other laboratories warrants further investigation into the chemopreventive and chemotherapeutic effects of berries using in vivo models.<sup>42</sup> Seeram NP in another study reported the anti-carcinogenic effect of berry fruits.<sup>43</sup> Giampieri F et al in another study reported the anti-carcinogenic effect of strawberries.<sup>44</sup> In this study 60%, 50.67% and 55.33% dental graduates considered straw berries, Rasp berries and blue berries respectively exhibiting anti-carcinogenic effect. Awareness level of dental graduates regarding role of berry fruit as anti-carcinogen is limited.

### Sunflower Seeds and Jujube in Diet

Giada MD and Mancini-Filho J in a study found that the high antioxidant capacity observed for the aqueous extract of the studied sunflower seed may prevent in vivo oxidative reactions responsible for the development of several diseases, such as cancer.<sup>45</sup> Tahergorabi Z et al in their study found that jujube exhibit strong anticancer effect. Shen X et al and Pawlowska AM et al in separate studies found strong anti-oxidant effect of jujube.<sup>46,47</sup> In this study only 27.33% and 49.33% dental graduates were aware of anti-cariogenic effect of theses fruits respectively.

In last 89% of dental graduates believed that this questionnaire has improved their base line knowledge about anti-cancer diet. These types of surveys and awareness camps should be conducted at regular intervals to improve the base line knowledge of health professionals and community.

## CONCLUSION

This study concludes that though base line knowledge about anti-cancer diet is there but further anticancer diet awareness surveys and programs are needed. This may help in changing the dietary habits and thus may help in reducing the increasing incidence of cancers.

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#### CONTRIBUTION BY AUTHORS

- |                           |                                                                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1 Saad Asad:</b>       | Concept development, questionnaire development, introduction, data compilation, results, discussion, conclusion writing and literature search. |
| <b>2 Saqib Naeem:</b>     | Questionnaire development. & statistics analysis.                                                                                              |
| <b>3 Mahrukh Tanveer:</b> | Helped in data collection & data compilation.                                                                                                  |
| <b>4 Amna Asif:</b>       | Helped in data collection & data compilation.                                                                                                  |