

# RISING PREVALENCE OF CANCER AMONG WOMEN IN KERALA



Edited by  
Dr Bhagya D

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Proceedings of National Seminar  
**RISING PREVALENCE OF CANCER AMONG WOMEN IN KERALA**

Organised By  
DEPARTMENT OF HOME SCIENCE  
**ST. JOSEPH'S COLLEGE FOR WOMEN, ALAPPUZHA**

*Celebrating 60 years of excellence*

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Editor

**Dr Bhagya D**

*Assistant Professor, Department of Home Science  
St. Joseph's College for Women, Alappuzha, Kerala, India.*

*E-mail : [bhagyadp81@gmail.com](mailto:bhagyadp81@gmail.com)*

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## International **E** - Publication

427, Palhar Nagar, RAPTC, VIP-Road, Indore-452005 (MP) INDIA  
Phone: +91-731-2616100, Mobile: +91-80570-83382  
E-mail: [contact@isca.co.in](mailto:contact@isca.co.in) , Website: [www.isca.me](http://www.isca.me) , [www.isca.co.in](http://www.isca.co.in)

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## Preface

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells, which can result in death. It is caused by both external factors (chemicals, radiation, viruses) and internal factors (hormones, immune conditions, inherited mutations). Causal factors may act together or in sequence to initiate or promote carcinogenesis. Cancer as a disease process reminds us often unexpectedly of our mortality. It frequently compromises the patient's vitality. It is also a burden emotionally and physically on family, friends, significant others, community, and other social resources. Every year, millions are diagnosed with cancer, leaving their lives and those of their loved ones irrevocably changed. Yet constant advancements in medicine and medical technology are slowly but surely tipping the battle against cancer in our favour.

It is a dreadful disease threatening the lives of millions especially women. The incidence of cancer among women has risen and the male to female ratio of cancer patients in the State has reversed in the last 30 years. Women in Kerala are at an increased risk of cancers viz breast, cervix, ovarian and thyroid. Since health problem in women are of great importance in any society and culture as they form the sheet anchor for the upkeep and integrity of family and society. It's high time to sensitize the women in the detection, prevention and management of cancer. Hence the thrust areas of the seminar were focussed to discover the fundamental causes of cancer, to develop new tools in cancer treatment, importance of nutraceuticals in cancer treatment and creating awareness regarding the disease by debunking the myths.

I am glad that there has been good response from the teaching faculty, scientists, research scholars and students for the seminar. I hope that the deliberations of the seminar would enable the community to address the debilitating effects of cancer in a practical way and to ward off the ignorance and myths associated with cancer.

Dr. Bhagya D  
Convener,  
Assistant Professor, Dept. of Home Science,  
St. Joseph's College for Women,  
Alappuzha– 688 001, Kerala, India.

4<sup>th</sup> February, 2014

## *Alappuzha*

**Alappuzha**, also known as **Alleppey**, is a city in Alappuzha District of Kerala state of southern India. It is the administrative headquarters of Alappuzha District. Alappuzha is considered to be the oldest planned town in this region. As per 2001 census Alappuzha is the sixth largest city in Kerala. Alappuzha is situated 62 kilometres to the south of Kochi and 155 kilometres north of Trivandrum. Alappuzha is an important tourist destination in India. A houseboat cruise in these backwaters is a delightful experience. Alappuzha is also the access point for the annual Nehru Trophy Boat Race, held on the Punnamada Lake, near Alappuzha, on the second Saturday of August every year which is the most competitive and popular of the boat races in India. The mullackal chirap is also one of the attractions of Alappuzha which is the festive season held ten colourful days every year in the month of December.

Other attractions in Alappuzha are Alappuzha Beach, Ambalappuzha Sri Krishna Temple, Mannarasala Temple, Chettikulangara Devi Temple, Haripad Subrahmanya Swamy Temple, Mullakkal Temple, Edathua Church, Alappuzha CSI Christ Church (oldest Anglican church in Kerala) and Champakulam Valia Palli. Krishnapuram Palace also attracts many tourists. The tasty ambalappuzha payasam is a popular dessert. Coir is the most important commodity manufactured in Alappuzha.

One of the major feature of this land is the region called Kuttanad, the 'granary of Kerala'. Kuttanad is also known as the rice bowl of Kerala and is one of the few places in the world where farming is done below sea level. Owing to its proximity to the sea, the climate of Alappuzha is humid and hot during the summer, although it remains fairly cool and pleasant during the months of October and November.

Education in Alappuzha got a boost with the development of many schools, computer institutes and colleges all over the district. Alappuzha holds a distinct position in Kerala in terms of literacy rate.

*Here nature has spent up on the land her richest bounties. Alleppey, the Venice of the East.*

## **ST. JOSEPH'S COLLEGE FOR WOMEN**

*St. Joseph's College for Women, Alappuzha*, One of the pioneering institutions in the field of higher education for women was established in 1<sup>st</sup> July 1954 with the motto "*Virtue and Knowledge*". The college offers 9 UG courses and 3 PG courses. The College, affiliated to the University of Kerala, managed by the Canossian Educational Society, has registered remarkable progress in the women's education and welfare in the coastal belt. The college now celebrating its *60 years of excellence* has been re-accredited at the '*A Grade*' level by the National Assessment and Accreditation Committee (NAAC). To fulfil the vision of the beloved foundress of the Congregation, St. Magdalene of Canossa in the "*formation of hearts*", the college is committed to shape and foster intellectually trained, morally upright, socially committed and spiritually inspired young women especially from among the poor and the marginalized.

## **The Department of Home Science**

The Department of Home Science, established in the year 1960 is credited as one of the prestigious departments of the college. The department has been imparting quality education to women with the mission of empowering by upholding the basic values of life. Backed by a competent team of faculty members, the department excels in all the aspects of higher education teaching, consultancy, research and extension. The department has excellent infrastructural facilities, well equipped laboratories and a well stocked library, all of which contribute to make the teaching – learning experience a truly enriching one. The department offers B.Sc. Home Science with residence course and M.Sc. Nutrition and Dietetics with internship. In addition, certificate course by MSME and add-on course in tailoring is also conducted on a regular basis. The department cater to the holistic development of the students. The department strives to boost the special talents and skills of the students, provides avenues for their creativity, promotes leadership qualities and organizational skills, arranges interface with prominent personalities and acknowledges the achievements of students. Career guidance and placement of students is an important ongoing activity of the department. The department also offers counselling , remedial coaching and value education for the overall development of the students.

## **The Seminar**

Cancer- a life threatening issue, is responsible for one in eight deaths, worldwide. Kerala has roughly 35,000 new cancer cases every year based on cancer registry data. Current statistics shows that cancer incidence in women is increasing at an alarming rate. Health problems in women are of great importance as they form the sheet anchor for the upkeep and integrity of family and society. Women in Kerala are at an increased risk of cancers viz breast, cervix, ovarian and thyroid. The incidence of cancer types are influenced by factors such as age, sex, race, local environmental factors like life style, diet and genetics. The objective of assessing the cancer problem in women is to aid control of cancer. The need for public education is highlighted which consists of self examination and screening. This seminar focuses on the incidence of cancer among women in Kerala and its management which is the need of the hour. Since ignorance and myths are found to be the main agents which aggravates the incidence of the disease. The main aim of the seminar is to create awareness regarding cancer prevalence , detection, prevention and treatment strategies ie to “debunk the myths”. The other areas addressed are the role of nutraceuticals, nutrition in cancer and health of women.

## **ORGANIZING COMMITTEE**

- Patron : Rev. Sr. Philo Puthenpura  
Manager, St. Joseph's college for Women
- Chairperson : Sr. Dr. Janat Augustine K  
Principal, St. Joseph's College for Women
- Convener : Dr. Bhagya D  
Assistant Professor  
Dept. of Home Science
- Joint Conveners : Ms. Anju M Neeliyara  
Head, Dept. of Home Science  
Ms. Jiby Abraham  
Assistant Professor  
Dept. of Home Science
- Committee Members : Ms. Nimmy Jacob  
Lecturer, Dept. Of Home Science  
Ms. Sreelakshmi S  
Lecturer, Dept. Of Home Science

## PROGRAMME SCHEDULE

- 9.00 am : Registration
- Prayer**
- 10.00 am – 11.00 am : Inaugural Session
- Welcome** : **Ms. Anju M Neeliyara**  
Head, Dept. of Home Science
- Presidential Address** : **Rev. Sr. Philo Puthenpura**  
Manager, St. Joseph's College for Women, Alappuzha
- Inauguration&** : **Dr. Jacob Varghese**  
**Inaugural Address** Deputy DMO  
District Medical Office, Alappuzha
- Key note Address** : **Dr. Sr. Janat Augustine.K**  
Principal, St. Joseph's College for Women, Alappuzha
- Felicitation** : **Dr. Krishna E**  
Assistant Prof, Dept. of Mathematics,  
St Joseph's College for Women,  
Alappuzha
- Vote of Thanks** : **Ms. Sreelakshmi S**  
Lecturer, Dept. of Home Science
- Scientific Session- I**
- 11.00 a.m – 12.00 p.m : **Dr. V.P Gangadharan**  
Medical and Peadiatric Oncologist,  
Lake shore Hospital, Ernakulam
- Poster Presentations**
- 12.00 p.m – 1.00 p.m : **Paper Presentations**

**Chair** : **Ms. Anu Zachariah (R.D)**  
Chief Dietitian, Ernakulam Medical Centre

Lunch Break

**Scientific Session II**

1.30- 2.30 p.m : **Dr. Hema Arvind (R.D)**  
Chief Dietitian  
M.S Ramaiah Group of Hospitals, Bangalore

**Scientific Session III**

2.30 – 3.30 p.m : **Dr. Bindu S M**  
Assistant Professor, Dept. of Radiotherapy  
T.D Medical College, Vandanam

3.30-4.0 p.m : **Valedictory Session**

Distribution of certificates

**Vote of thanks** : **Dr. Bhagya D**  
Assistant Professor, Dept. of Home Science  
St. Joseph's College for Women, Alappuzha.

# *Seminar Presentations*

## **Therapeutic potential of fenugreek seeds for the prevention and management of colorectal cancer**

**Arun K. B., Akhil G. C., Nisha P. \***

Agroprocessing and Natural Products Division,  
CSIR-National Institute for Interdisciplinary Science and Technology,  
Industrial Estate P O. Pappanamcode. Thiruvananthapuram-695019. Kerala. India

\*E-mail: bp.nisha@yahoo.com

### **Abstract**

The antioxidant and anticancer potential of crude extracts of fenugreek seeds were evaluated and the prebiotic potential of dietary fibre isolated from the seeds was determined. The antioxidant activity were assessed in terms of TPC, TFC, CUPRAC, FRAP, Metal chelating activity and its ability to scavenge DPPH and NO radicals. The polyphenols present in extracts were identified by HPLC. MTT and scratch-wound assay were performed in HT 29 cell lines to analyze the anticancer potential of extract. The morphology of dietary fibre isolated from the seeds was determined by SEM and its prebiotic efficacy was evaluated using *Lactobacillus casei* and *Bifidobacterium bifidus* species. From various antioxidant assays it was found that the methanol extract was more active and efficiently scavenge free radicals especially NO (IC<sub>50</sub>-56.54 µg/ml). HPLC profiling proves that the methanol extract is rich in poly phenols like syringic acid, p-coumaric acid and ferulic acid. The methanol extract is toxic to HT 29 cell lines (IC<sub>50</sub>-294.26 µg/ml) and reduces the area of migration up to 1.8% at 250 µg/ml. The soluble dietary fibre (0.441 g/g dry sample) isolated from fenugreek seeds effectively promotes the growth of probiotic species selected for the study. Thus, the results from our study conclude that fenugreek seeds are good source of antioxidant dietary fibre which can lower the risk of developing colon cancer and can maintain a healthy digestive system.

**Key Words:** Fenugreek, Cancer, Antioxidant.

### **Introduction**

The revolution in lifestyle leaves its mark by affecting the human health. The excessive use of junk food, drug abuse, alcohol drinking, lack of exercise and stress leads to many life style associated diseases like diabetes, colon cancer, cardiovascular problems etc. Cancer is one of the frequently mentioned and most feared diseases that fall under the genre of lifestyle diseases that have evolved, rather rapidly, in the past two decades. Colorectal cancer is the third most common cancer in both men and women. However the mortality rates for colorectal cancer have declined in both men and women over the past few decades which highlight the improvements in early detection and treatment. Geographic differences in colorectal cancer rates and changing risks among immigrant populations over time suggest that diet and lifestyle strongly influence colorectal cancer risk. Studies suggest that consuming a healthy diet with an emphasis on plant sources rich in dietary fibre and consuming the recommended levels of calcium will help reduce the risk of developing colorectal cancer. In the 1970s, Burkitt proposed the hypothesis that dietary fibre reduces the risk of colorectal cancer, based on the observation of low rates of such cancer among rural Africans who ate a diet with high fibre content. Several reasonable mechanisms including stool bulking with subsequent dilution of colonic luminal carcinogens and production of anticarcinogenic short-chain fatty acids have been proposed to account for the ecologic association.

Fenugreek (*Trigonella Foenum-gracium*) is an annual leguminous herb possessing wonderful medicinal values; traditionally used in India, China and Egypt for its well known galactogogue, antibacterial, anti-inflammatory, insulinotropic, and rejuvenating effects. It is a rich source of soluble dietary fibre also. The present study was carried out to reveal the potential of fenugreek seeds as a source of prebiotic dietary fibre and its ability to prevent the risk of developing colorectal cancer.

## **Materials and Methods**

### ***Sample, Cell lines & Microorganisms***

Fenugreek seeds were collected from National Seeds Corporation Ltd. 21/75, Thiruvananthapuram branch, Kerala. Human colon cancer cell line HT29 was purchased from the National Centre for Cell Sciences (NCCS), Pune, India. The freeze dried cultures of *Lactobacillus rhamnosus* (NCDC18), and *Bifidobacterium bifidum* (NCDC255) were supplied by National Dairy Research Institute, Karnal, Haryana, India.

### ***Sample Preparation***

Seeds were dried and powdered. Powdered seeds were sequentially extracted with hexane, ethyl acetate, and methanol. Crude extracts were studied for its antioxidant and anticancer potential. Dietary fibre was isolated from powdered Fenugreek and black gram seeds according to the standardized protocol.

### ***Antioxidant activity***

The antioxidant capacity was assessed in terms of total phenolic content (TPC), total flavonoid content (TFC), FRAP assay, Metal chelating assay, DPPH and nitric oxide radical scavenging activity, and CUPRAC assay as described as (1-7).

### ***HPLC-DAD analysis***

The active extracts and reference compounds solutions (1 mg/mL) were prepared in methanol and filtered through 0.45µm PTFE filter; 20 µL was injected into the HPLC system. The analysis was performed on a Shimadzu (Japan) HPLC system by the method of Rodriguez-Delgado et al. (8) with some modifications. The eluted fractions were monitored at 280 nm. Peaks were identified by comparing retention times of peaks for the experimental and standard samples.

### ***MTT Assay and Scratch-Wound Assay***

Cytotoxicity of ethyl acetate and methanol extracts in HT29 cell lines was determined by the MTT assay as previously described (9). The scratch-wound assay is a simple, reproducible assay done as described by Komorowski et al (10).

### ***Isolation of Dietary Fibre***

Dietary fibre was isolated from the sample with slight modified procedure (11, 12).

### ***Scanning electron microscopy (SEM)***

SEM analysis was performed for dietary fibre obtained from two samples.

### ***Prebiotic efficacy soluble dietary fibre***

Prebiotic efficacy was measured based on optical density and dry weight basis.

## **Results and Discussion**

The antioxidant studies shows that methanol extract is having higher yield, TPC, TFC and better scavenging of NO radical. The results are shown in Table1 & 2. The HPLC profiling of the crude extracts shows that the extracts are rich in syringic acid, p-coumaric acid etc. (Fig 1). The methanol extract is toxic to Ht29 cell lines (Fig 2) and reduces the area of migration up to 1.8% at 250 µg/ml (Fig 3). Results shows that the fenugreek seeds are good source of dietary fibre. The dietary fibre isolated from seeds is free of starch (Table3 and Fig 4) as seen from SEM figures. The prebiotic studies show that the dietary fibre promotes the growth of probiotic bacteria

efficiently. (Fig.5-8). Thus, the results from our study conclude that fenugreek seeds are good source of antioxidant dietary fibre which can lower the risk of developing colon cancer and can maintain a healthy digestive system.

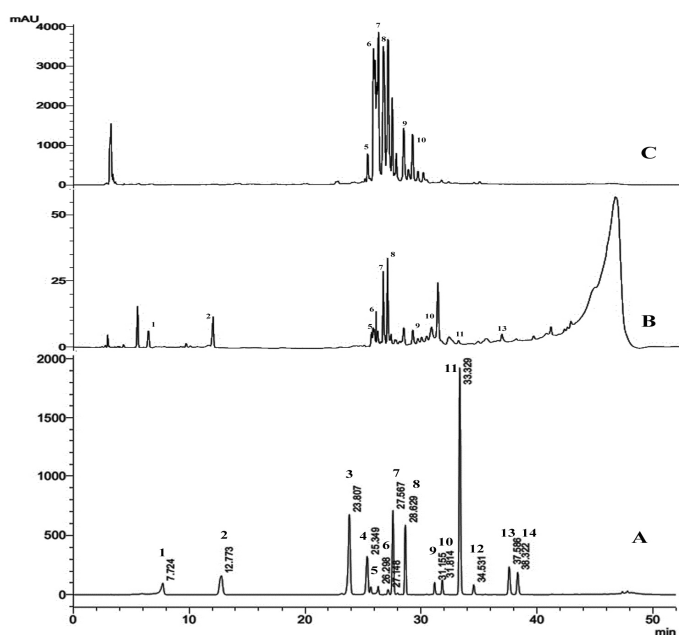
**Table 1: Yield, TPC, TFC, CUPRAC & FRAP**

	Fenugreek	
	Ethyl acetate	Methanol
Yield (mg/ml)	15 ± 2.33	148 ± 3.66
TPC (mg GAE/g dry weight)	4.3 ± 1.01	18.5 ± 0.90
TFC (mg QE/g dry weight)	54.36 ± 3.85	92.07 ± 10.36
CUPRAC (mg TR/g dry weight)	7.11 ± 2.41	10.67 ± 1.31
FRAP (µM AA/g dry weight)	13.19 ± 4.01	26.13 ± 2.41

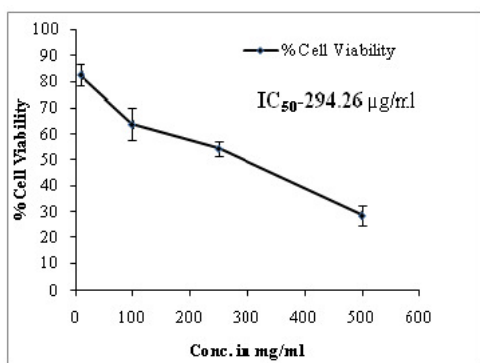
**Table 2: Radical Scavenging Assays (IC<sub>50</sub>)**

Assays	IC <sub>50</sub> values	
	Fenugreek (Methanol)	Standards
DPPH	277.78	3.01 (Gallic acid)
NO	56.54	90.02 (Curcumin)
Metal Chelating	659.2	19.75 (EDTA)

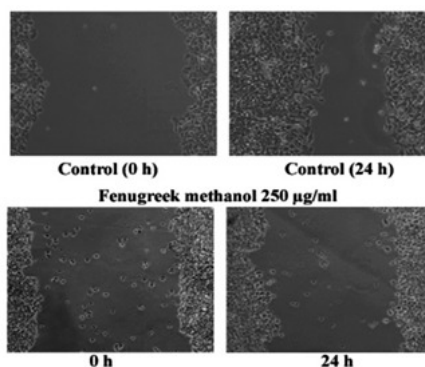
**Figure 1:** HPLC chromatogram (280 nm) of (A) authentic standards (B) ethyl acetate extract of FG; (C) methanol extract of FG



**Fig 2:** MTT assay



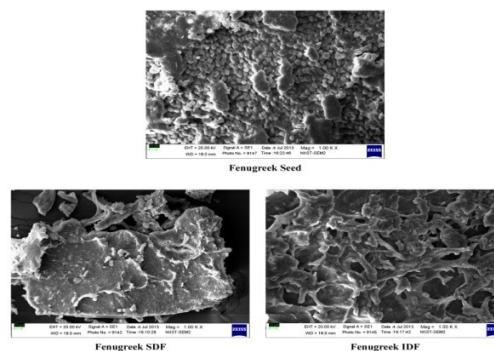
**Fig 3:** Scratch –Wound Assay



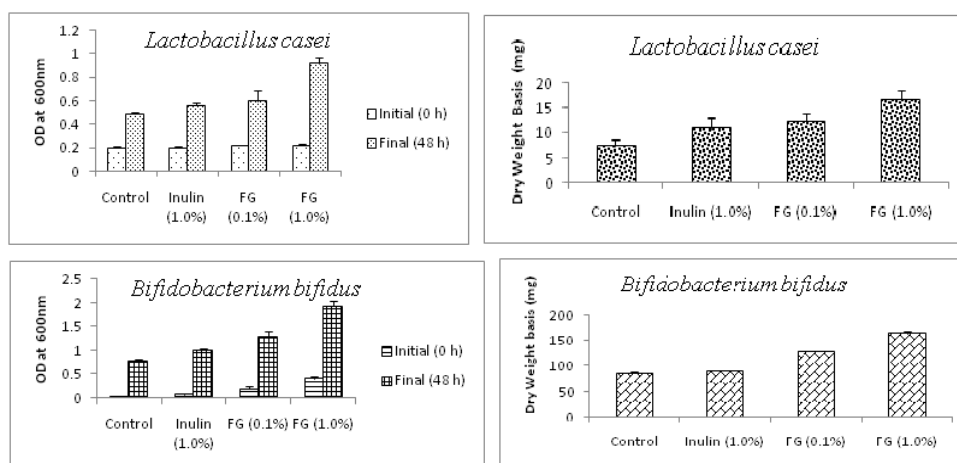
**Table 3: Dietary fibre from Fenugreek Seeds**

Dietary fibre	Fenugreek (g/g dry weight)
Soluble	0.441±0.2234
Insoluble	0.135±0.0296
Total	0.576±0.253

**Figure 4: SEM analysis**



**Fig 5-8: Prebiotic study**



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## **Assessment of Pre- Cancerous Dietary Pattern of Patients Suffering from Middle and Lower Gastro-Intestinal tract Cancers**

**GAYATHRY,C.P\*, ROSHAN MARY VARGHEESE**

\*Dietician, Government E.S.I Hospital, Peroorkada, Thiruvananthapuram, Kerala, India.

\*E- mail: gayathryabhilash@gmail.com

### **Abstract**

Epidemiological studies have shown nutrition as one of the most important factors influencing carcinogens. Many human cancers that are widely prevalent today can be prevented through modification of life styles of which diet appears to be an important agent. Prompt action has to be taken to spread the message of healthy life style and dietary practices. The objective of the study was to assess the pre-cancerous diet pattern of the selected middle and lower GIT cancer patients. 100 patients suffering from middle and lower GIT cancer from Regional Cancer Centre, Thiruvananthapuram (63), Medical College Hospital, Kottayam (22) and Century Hospital, Chengannur (15) were selected using non-random sampling method. Demographics such as sex, age, monthly income, pre-cancerous stage height, and weight and body mass index of the patients were collected from the medical records. Details on life style habits, dietary pattern, and food consumption frequency during the pre-cancerous stage were studied using an interview schedule. 39 per cent of the males smoked and drank alcohol. More than half of the subjects never exercised. The average BMI of both males and females were in the Grade I Overweight category. 92 per cent of the subjects were non-vegetarians. 86 per cent of the subjects chose white rice or long grain rice for daily consumption. 45 per cent of the subjects consumed Dhals daily, not whole grams (14%). Consumption of salads was not preferred by majority of the subjects. Consumption of mutton and beef were higher when compared to chicken. The intakes of non-vegetarian foods were preferred during all the meals, except breakfast. Thus lack of physical activity, low fibre and anti-oxidants in the diet, preference towards red meat and fatty foods were identified in the diet of selected subjects, which has direct association with the development of cancer of middle and lower GIT.

**Key Words:** Gastro-intestinal Cancer, Diet.

### **Introduction**

Cancer essentially represents abnormal and uncontrollable division of cells, if untreated or not treatable, leads to death. Globally cancer is a major public health problem. One of the ten deaths occurs due to cancer (WHO, 1997). The Gastro-Intestinal Tract (GIT) is the site of more cancers than any other organ system in the body. In terms of morbidity and mortality, the main GIT cancers are colo-rectal, gastric and oesophageal. According to Parkin (1997), in the developing world, the stomach cancer is the second most frequent cancer among men and third most frequent among women.

Most of the cancers have some relationships with diet, predominant among them are cancers of the upper aero digestive tract (mouth, throat), oesophagus (food pipe and lungs), stomach, large intestine, and breast cancer in women. The idea that nutrition is an important factor in cancer causation is not new. Epidemiological studies have shown nutrition as one of the most important factors influencing carcinogens. Many human cancers that are widely prevalent today can be prevented through modification of life styles of which diet appears to be an important agent (Krishnaswamy and Polasa, 1995). An analysis of dietary patterns or combinations of foods may provide insight regarding the influence of diet on the risk of GIT cancer. Prompt action has to be taken to spread the message of healthy life style and dietary practices.

## **Objective**

The study was carried out with the major objective;

- ❖ Assess the pre-cancerous diet pattern of the selected middle and lower GIT cancer patients.

## **Materials and Methods**

Present work was a hospital based study for one year. Hundred patients suffering from middle and lower GIT cancer were the selected subjects. 63 from Regional Cancer Centre, Thiruvananthapuram, 22 from Medical College Hospital, Kottayam and 15 from Century Hospital, Chengannur were selected for the study using non-random sampling method. The inclusion criteria of selection included: 1) patients suffering middle and lower GIT cancer, 2) > 30 years of age, both male and female, 3) duration of disease < 5 years since diagnosed, 4) be able to read and understand the questionnaire (though interview method was adopted), 5) I and II clinical stages of the disease (of the assumption that those in the III and IV would be under physical and mental distress due to the disease), 6) those who can properly communicate with the investigator. Demographics such as sex, age, monthly income, pre-cancerous stage height, and weight and body mass index were collected from the medical records using secondary data collection method. Details on life style habits, dietary pattern, and individual food consumption frequency of the subjects during the pre-cancerous stage were studied using a well structured interview schedule.

## **Results and Discussion**

A. Demographic and Socio-economic Details: 70 per cent of the patients were in the age group 50-70 years. A study conducted by Rodrigues (2001) supports the above data, as patients with GIT cancer are predominantly of middle or elderly age group. 83 per cent of the patients represented the married group. Illiterate subjects consisted of 8 per cent and half of the subjects had qualification SSLC or below. Regarding occupation status, 28 per cent of the subjects had clerical type of job. 22 per cent represented the unemployed group. Three fourth of the subjects belonged to nuclear type of family. The subjects were classified based on their income per month (HUDCO, 1998) and it was observed that 21 per cent of the subject belonged to Economically Weaker Section of the society and 15 per cent represented High Income Group.

B. Lifestyle and Physical Activity Practices: 39 per cent of the males smoked and drank alcohol (of which half of the subjects smoked and drank alcohol daily), which shows supporting to the findings of Gajalakshmi (1996) as there is a two fold increase in incidence of stomach cancer in smokers than non-smokers. There were 12 per cent of betel and pan chewers among the subjects including males and females. During the study, it was observed that more than half of the subjects never exercised. Of those exercised only 14 per cent did exercise regularly.

59 out patients and 41 in patients comprised the study group. Table 1 depicts that close to half of the subjects were suffering from cancer of the colon, and rectal cancer took the second position with 29 per cent. Patients with cancer of small intestine were relatively a smaller percentage (5%). When the duration of disease was studied, it could be assessed that nearly half of the patients (49%) were diagnosed the disease during the last 3-5 years and close to three fourth of the patients were under radiotherapy and chemotherapy for the management of the disease. 19 per cent of the subjects underwent surgery and surgery was planned for 32 per cent of the patients. The average BMI of both males and females were in the Grade I Overweight category. One study, using NCI Surveillance, Epidemiology, and End Results (SEER) data, estimated that in 2007 in the United States, about 34,000 new cases of cancer in men (4 percent) and 50,500 in women (7 percent) were due to obesity (Flegal et.al, 2010).

Table 1: HEALTH AND DISEASE DETAILS OF THE SUBJECTS

Affected system/organ (in percentage)	Stomach	17
	Small intestine	5
	Colon	49
	Rectum	29
Type of patients (in percentage)	Out patients	59
	In patients	41
Duration of disease (in percentage)	Less than 1 years	14
	1-3 years	37
	3-5 years	49
Treatment undergoing (in percentage)	a)Radiotherapy alone	23
	b)Chemotherapy alone	7
	c) Both a and b	70
Surgery status (in percentage)	No surgery presently	49
	Surgery planned	32
	Underwent surgery	19
Height in cm (Average)	Males (n=62)	161±8.5
	Females (n=38)	157±8.1
Weight in Kg (Average)	Males (n=62)	77±21
	Females (n=38)	68±19.5
BMI (Average)	Males (n=62)	29.7
	Females (n=38)	27.6

C. Dietary Pattern of the Subjects: 92 per cent of non-vegetarians were identified during the study. The data supports the finding of Frentzel (1994) as vegetarian diets are associated with lower cancer mortality in general but also with lower incidence of cancer at specific sites as well.

D. Consumption Pattern of Cereals, Pulses, Vegetables and Fruits: 85 per cent of the subjects very rarely or never consumed parboiled rice with bran. 86 per cent of the subjects chose white rice or long grain rice for daily consumption. Burglar wheat was not at all a choice for 61 per cent of the subjects. 45 per cent of the subjects consumed Dhals daily, not whole grams (14%). 71 per cent of the subjects consumed vegetables daily and an equal per cent consumed roots and tubers 2-4 times a week. Salads were never included in the diet by 60 per cent of the subjects. The importance of fibre in the prevention of cancer was well studied and Srilakshmi (2002) says high fibre diets like salads can help in preventing cancer. Daily consumption of fruits was also not appreciable among the subjects.

E. Consumption Pattern of Milk and Milk Products: Tea (67% daily) and coffee (27% daily) were much preferred among the milk based preparations when compared to plain milk, curd and buttermilk.

Table 2: CONSUMPTION PATTERN OF NON-VEGETARIAN FOODS

Food items (n=92)	Daily or almost daily	2-4 times/ week	<2 times/week	Occasionally	Very rarely/ never
Fish	59	11	9	6	7
Chicken	11	19	21	29	5
Duck	-	-	-	7	85
Beef	9	19	14	36	14
Mutton	-	-	3	67	22
Liver	-	-	-	14	78
Other organ meats	-	-	-	7	85
Egg	14	18	29	14	17

Table 2 depicts that fish was consumed daily by 59 per cent of the non-vegetarian subjects. Chicken was preferred among other meat groups for daily consumption. But when the occasional intake was studied, consumption of mutton and beef were higher when compared to chicken. Cross and Sinha, 2004 reported that red meat increases the risk of colorectal cancer.

F. Consumption Pattern of Oils, Nuts, Prepared and Processed Foods: Coconut oil was the oil for daily preparations by 83 per cent of the subjects where as vegetable oils were preferred by only 18 per cent. 43 per cent of the subjects repeatedly used the same oil for preparation with varying frequencies in the usage. The study conducted by Slattery (1997) reports an increased of colon cancer with increasing consumption of mono saturated fatty acids among women. Consumption pattern of nuts were also studied during the study and it was observed that only minority of the subjects chose nuts for daily consumption. Pickles, chutney and pappads were included in the daily diet by fairly a good number of patients. Boeing (1991) reports that high salt intake; pickled foods, smoked fish and meat have been implicated as risk factors of stomach cancer. Savoury snacks, fried snacks and sweets were daily consumed or 2-4 times a week by 72 %, 46 % and 56 % of the subjects respectively.

G. Method of Preparation Frequently Adopted for various Food Groups:Frying was the most common method of preparation preferred by more than 70 per cent of the subjects. Dried or salted fish were liked and consumed by 62 per cent of the the non-vegetarian subjects. There were a few subjects who liked to eat smoked non-vegetarian items. Confirmation of the link between frying and colorectal cancer risk was studied, where high frying temperature was found to increase colon cancer risk almost twofold, and rectal cancer risk by 60 percent (Norat and Riboli , 2001).

H. Food Groups Included in Major Meals: One third of the subjects (33%) preferred cereal based main dish, a vegetable side dish and coffee/tea/plain milk for breakfast. In the case of noon meal, 41 per cent preferred only non-vegetarian foods with the main cereal dish. It was shocking to observe that one third of the subject were very particular about including only non-vegetarian side dish with the cereal during dinner too.

## **Conclusion**

Seventy per cent of the patients were in the age group 50-70 years. 39 per cent of the males smoked and drank alcohol. It was observed that more than half of the subjects never exercised. The average BMI of both males and females were in the Grade I Overweight category. Thus, smoking, drinking alcohol and lack of physical activity among majority of the subjects could have been causative factors for their present condition.92 per cent of the subjects were non-vegetarians. 86 per cent of the subjects chose white rice or long grain rice for daily consumption. Burglar wheat was not at all a choice for 61 per cent of the subjects. 45 per cent of the subjects consumed Dhals daily, not whole grams (14%). Consumption of salads was not at all a habit for majority of the subjects. Consumption of mutton and beef were higher when compared to chicken. Pickles, chutney and pappads were included in the daily diet by fairly a good number of patients. Savory snacks, fried snacks and sweets were daily consumed or 2-4 times a week by 72 %, 46 % and 56 % of the subjects respectively. The intakes of non-vegetarian foods were preferred by the subjects during all the meals, except breakfast. Thus lack of fibre, anti-oxidants, preference towards and excessive consumption of red meat and fatty foods were identified in the diet of selected patients in the present study also, which has direct association with the development of cancer of middle and lower GIT.

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## **Antioxidants in Fighting Cancer – Development of Antioxidant Rich Plant Food Products**

**Helen.C, Magdalene Virjini.P,**

Assistant Professors, Dept. of Human Nutrition and Nutaceuticals, Fatima College, Madurai-625 018.

### **Abstract**

The incidence of cancer has been on the rise in India over the last two decades. There have been approximately 1.7 million new cases a year. Mortality rates for cancer are much higher in India than in the West. One of the causes of cancer is excessive free radical damage in the cells that harms the DNA and results in some cells **mutating** into cancerous cells. Antioxidants get rid of free radicals. Antioxidants present in plant foods interact synergistically and prove to be beneficial in treating cancer. Hence the present study was undertaken to determine the total antioxidant activity of selected plant foods and to development antioxidant rich food products. Four antioxidant rich food mixes were prepared by the incorporation of amaranthus powder, drumstick leaves powder, carrot powder and mango powder at 5 per cent level, along with 65 per cent wheat flour, 10 per cent wheat germ, 10 per cent roasted bengal gram flour, 5 per cent soya flour and 5 per cent amla powder. They were also extruded in the form of vermicelli. The mixes were incorporated (5% level) into commonly used preparations namely idli, dosai, puttu and chapatti and the acceptability tests were carried out. Both the vermicelli and the mixes were packed in polyethylene bags and kept at room temperature and evaluated for microbial count. Raw foods, processed foods, antioxidant rich food mixes and extruded products were analyzed for their total antioxidant activity by an in vitro technique and other macro and micro nutrients by AOAC procedures. The total antioxidant activity of raw and processed foods ranged from 40.50 to 86.02 per cent being maximum in wheat germ. The antioxidant activity of vermicelli was higher compared to their respective food mixes. The findings revealed the feasibility of developing antioxidant rich food mixes and extruded products. These products were found to be acceptable and rich in nutrient content especially micronutrients. Thus it is evident from the study that the developed antioxidants rich food mixes and extruded products could be recommended as one of the preferable products to be used in the diet of cancer patients.

**Key Words:** Antioxidant, Cancer, Food Mixes.

### **Introduction**

An antioxidant is a substance that can inhibit reactions of free radicals. Antioxidants scavenge free radicals, attracting them and neutralizing their charge before they can do damage to cellular structures. For protecting cells from the effect of free radicals, an optimal supply of antioxidants is essential. Experimental and epidemiological studies indicate that consumption of grains, fruits and vegetables is related to the incidence of chronic diseases, including heart and some cancers<sup>9</sup>. Plant antioxidants include a variety of structural types with range of antioxidant activity. Phenolic acids, Flavonoids, ferulic and caffeic acid are few examples of common antioxidants present in fruits, vegetables, legumes and grains<sup>8</sup>.

Evidences from most intervention trials with single antioxidants in pharmacologic doses, however have not supported a protective effect. One reason for the ineffective clinical trials may be that the protective effects of fruits and vegetables result from a concerted action of the numerous different antioxidants present in foods i.e. antioxidants with different chemical characteristics may work in an integrated and complementary network<sup>7</sup>. To further understand the above evidences, the present study has been undertaken to determine the total antioxidant activity of plant foods and to develop antioxidant rich food products.

### **Materials and Methods**

Based on the results carried out on the total antioxidant activity of selected plant foods at the National Institute of Nutrition (1998) the food sources were selected. These include Wheat flour, Amla powder and Mango powder, Wheat germ

and Roasted Bengal gram flour and sun dried Amaranthus and Drumstick leaves and Carrots were obtained in a powdered form.

Four antioxidant rich food mixes were prepared by the incorporation of Amaranthus powder, Drumstick leaves powder, Carrot powder and Mango powder at 5 per cent level, along with 65 per cent Wheat flour, 10 per cent Wheat germ, 10 per cent Roasted Bengal gram flour, 5 per cent Soya flour and 5 per cent Amla powder. They were also extruded in the form of Vermicelli. The mixes were incorporated (5% level) into commonly used preparations namely idli, dosai, puttu and chapathi and the acceptability tests were carried out. Raw foods, processed foods, antioxidant rich food mixes and extruded products were analyzed for their total antioxidant activity by an *in vitro*<sup>4</sup> and micro nutrients by AOAC standard procedures.

## **Results and Discussion**

### **I) Total Antioxidant Activity of Selected Raw and Processed Foods**

Table 1: Total antioxidant activity of Selected Raw and Processed Foods

<b>Products</b>	<b>Total Antioxidant Activity (%)</b>
Whole wheat flour	54.48
Wheat germ	86.02
Roasted Bengal gram flour	40.50
Soya flour	46.95
Amla powder	53.76
Amaranthus (dried)	46.59
Carrot (dried)	3.40
Drumstick leaves (dried)	46.59
Mango powder	72.22

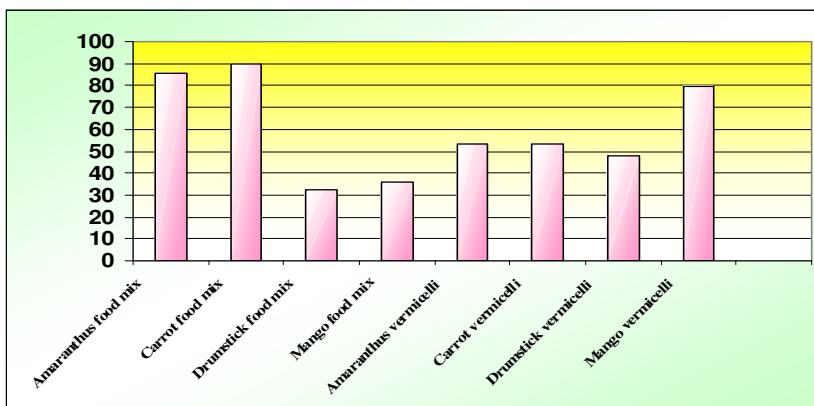
A perusal of the Table 1 reveals that the Total Antioxidant Activity of cereals namely whole Wheat flour and Wheat germ were 54.48 and 86.02 per cent respectively. The total antioxidant activity of Wheat germ was higher than that of the Whole Wheat flour. The antioxidant activity of cereals was due to the presence of water-soluble compounds like phenolic acids and flavonoids and lipid soluble derivatives like caffeic and ferulic acid esters<sup>3</sup>. It was apparent from Table I that the roasted Bengal gram flour and Soya flour contained 40.50 and 46.95 per cent of total antioxidant activity respectively. This increased total antioxidant activity in Soya flour may be due to the presence of polyphenol namely isoflavones<sup>2</sup>. Lignans present in lentils also contribute the antioxidant activity of pulses<sup>12</sup>.

From the critical examination of Table 1, it was revealed that the total antioxidant activity in dehydrated green leafy vegetables namely Thandukeerai (amaranthus gangeticus) and Drumstick leaves (Moringa oleifera) were 46.59 and 47.50 respectively. This could be due to the presence of antioxidants like beta-carotene, lutein etc<sup>5</sup>. Carrots are also considered to be a good source of beta-carotene. It was clearly evident from the results that total antioxidant activity of the dehydrated carrot was 3.40 per cent and its value was similar to the values of dehydrated green leafy vegetables.

The total antioxidant activity of Mango was found to be 72.22 per cent. This higher activity of mango is due to the presence of tannic acid, gallic acid, cinnamic acid, vanillic acid and ferulic acid<sup>10</sup>. Amla commonly known as Indian gooseberry (Phyllanthus emblica) was found to have 53.76 per cent of total antioxidant activity.

## II) Total Antioxidant Activity of Antioxidant Rich Food Products

Figure 1: Total Antioxidant Activity of Antioxidant Rich Food Products



It is evident from the above Figure that the total antioxidant activity of the food mixes ranged from 32.25 to 89.60 per cent. Among all the food mixes Amaranthus and Carrot food mixes contain higher amount of total antioxidant activity of 85.87 and 89.60 per cent respectively. This may be due to the presence of phenolic compounds such as lignans, which is present in large quantities in Carrot<sup>1</sup>.

The total antioxidant activity of four Vermicelli products was ranged from a minimum of 48.02 per cent in drumstick vermicelli to a maximum of 79.92 per cent in mango Vermicelli. But these values were high when compared with their respective food mixes. This is because of the release of phenolic compounds during thermal processing<sup>12</sup>. Amaranthus and carrot vermicelli had similar total antioxidant activity of 53.04 per cent.

## III) Micronutrient Composition of Antioxidant Rich Food Products

Vitamins:

Table 2 : Vitamin Content of Antioxidant Rich Food Products

Products	Thiamine (mg)	Riboflavin (mg)	Vitamin C (mg)	Total Carotenoid (mcg)
Amaranthus food mix	0.01	0.01	10	2016
Carrot food mix	0.02	0.03	9.0	3070
Drumstick food mix	0.03	0.04	14.0	2876
Mango food mix	0.02	0.02	9.2	4848
Amaranthus Vermicelli	0.01	0.01	10.2	2502
Carrot vermicelli	0.03	0.04	10	1185
Drumstick vermicelli	0.04	0.05	18	1096
Mango vermicelli	0.02	0.05	10	2982

Thiamine content of the food mix ranged from a minimum of 0.01mg in Amaranthus food mix to a maximum of 0.03mg in Drumstick food mix. The thiamine content of the extruded products ranged from 0.01mg to 0.04mg. The riboflavin content was also closer to that of the thiamine content. The vitamin C content of the food mix ranged from a maximum of 14mg in drumstick food mix to a minimum of 9mg in carrot food mix. Among the extruded products drumstick Vermicelli had maximum vitamin C content (18mg). Total carotenoid content of the antioxidant rich food mixes and extruded products ranged from 1096 to 4848mcg. These developed products are considered as a good source of total carotenoids.

**Table 3: Mineral Content of Antioxidant Rich Food Products**

Products	Calcium (g)	Phosphorus (g)	Iron (g)
Amaranthus food mix	95.0	314.85	10.0
Carrot food mix	82.0	337.20	11.0
Drumstick food mix	91.8	311.65	12.5
Mango food mix	80.2	314.20	11.0
Amaranthus vermicelli	98.0	310.61	11.0
Carrot vermicelli	80.0	312.0	11.5
Drumstick vermicelli	95.1	315.51	11.5
Mango vermicelli	81.2	347.3	11.0

The calcium content of antioxidant rich food mixes and extruded products were high which ranged from 91mg to 98mg. The phosphorus content ranged from a minimum of 311.65mg in drumstick food mix to a maximum of 347.3 mg in Among the four traditional recipes the acceptability trials indicated that chapathi had a maximum score, which ranged from 23.80 to 23.10. The mean score for puttlu was ranged from 23.80 to 22.20 and for dosai it ranged from 22 to 23.20. Idli incorporated with antioxidant rich food mixes was poorly acceptable because of its hard texture and colour. All the four Vermicelli were acceptable and scored similarly which ranged from 23.10 to 23.75.

Among the eight products, the food mixes and Vermicelli having drumstick powder had a high iron content of 12.5mg and 11.5mg respectively.

#### IV) Acceptability Study of Recipes Incorporated with Antioxidant Rich Food Mixes

Table 4 : Mean Scores for the Acceptability of Recipes Incorporated with Antioxidant Rich Food Mixes

Recipes	Scores for the Standard	Samples			
		Amaranthus Food mix	Carrot Food mix	Drumstick Food mix	Mango Food mix
Idli	24.70	20.10	21.12	19.50	19.23
Dosai	24.52	22.00	23.20	22.20	23.10
Chapathi	24.01	23.12	23.72	23.82	23.44
Puttu	24.40	23.32	23.81	22.21	23.15

## V) Acceptability Study of Antioxidant Rich Extruded Products

Table 5: Acceptability of Antioxidant Rich Extruded Products

Criteria	Samples			
	Amaranthus Vermicelli	Carrot Vermicelli	Drumstick Vermicelli	Mango Vermicelli
Appearance	4.5	4.6	4.6	4.3
Colour	4.5	4.6	4.6	4.4
Flavour	4.2	4.5	4.3	4.4
Texture	5.0	5.0	5.0	5.0
Taste	5.0	5.0	4.5	5.0
Total	23.2	23.7	23.6	23.1

The colour, appearance and flavour of all the antioxidant rich Vermicelli were acceptable. The taste and texture of all the four recipes were greatly acceptable. The mean scores for the acceptability of antioxidant rich extruded products ranged from 23.13 to 23.75. This clearly envisages that the vermicelli prepared from antioxidant rich food mixes is similar to the standard Vermicelli.

### Conclusion

The present study was undertaken to determine the total antioxidant activity of selected plant foods and to develop antioxidant rich food mixes and extruded products. Four antioxidant rich food mixes were prepared by the incorporation of Amaranthus powder, Drumstick leaves powder, Carrot powder and Mango powder at 5 per cent level, along with 65 per cent Wheat flour, 10 per cent Wheat germ, 10 per cent Roasted Bengal gram flour, 5 per cent Soya flour and 5 per cent Amla powder. They were also extruded in the form of Vermicelli. The mixes were incorporated (5% level) into commonly used preparations namely idli, dosai, puttu and chapathi and the acceptability tests were carried out. Raw foods, processed foods, antioxidant rich food mixes and extruded products were analyzed for their total antioxidant activity by in vitro and micro nutrients by standard AOAC procedures. The total antioxidant activity of raw and processed foods ranged from 40.50 to 86.02 per cent and found to be maximum in Wheat germ. The antioxidant activity of Vermicelli was higher compared to their respected mixes. The findings revealed the feasibility of developing antioxidant rich food mixes and extruded products and found to be acceptable and also rich in micronutrients. To conclude, the developed antioxidants rich food mixes and extruded products could be recommended as one of the preferable products to be used in the diet of cancer patients.

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## **Coconut-The Wonder Food of Kerala as a Functional Food**

**\*Sheila John , Jasmine Jenifer Arulmani DS**

\*Associate Professor &Head, Assistant Professor, Department of Home Science ,

Women's Christian College, Chennai 600006.

\*E-mail: vs.sheila@gmail.com , jas\_jenifer@yahoo.com

### **Abstract**

The name Kerala is now widely explained today as the "the land of coconuts", derived from Malayalam word "kera" which means coconut. The coconut is known as a 'wonder-food'. It is a near perfect diet, as it contains almost all the essential nutrients needed by the human body. Coconuts play a unique role in the diets of mankind because they are the source of important physiologically functional components. These physiologically functional components are found in the fat part of whole coconut, in the fat part of desiccated coconut, and in the extracted coconut oil. Since coconut oil is predominately a medium chain triglyceride oil (63%), "the biological effects of coconut oil are a consequence of the presence of these acids. Lauric acid, the major fatty acid from the fat of the coconut, has long been recognized for the unique properties that it lends to food use, which are related to its antiviral, antibacterial, and antiprotozoal functions. Now, capric acid, another of coconut's fatty acids has been added to the list of coconut's antimicrobial components. These fatty acids are found in the largest amounts only in traditional lauric fats, especially from coconut. Also, recently published research has shown that natural coconut fat in the diet leads to a normalization of body lipids, protects against alcohol damage to the liver, and improves the immune system's anti-inflammatory response. Clearly, there has been increasing recognition of health- supporting functions of the fatty acids found in coconut. Coconut oil has very potent anti-cancer properties. When cancer is chemically induced in lab animals the addition of coconut oil into their diets can completely negate the carcinogenic effects of the chemicals. Some of the nutritional and therapeutic benefits of coconut oil come from the saturated fats in the oil, such as its resistance to oxidation, long shelf life, and superior cooking properties. Some come from MCTs such as the antimicrobial effects and its unique mode of digestion and nutrient delivery. However, most of its medicinal benefits undoubtedly come from the ketones produced from the MCTs. The protective effects on the heart, brain, kidneys, colon, pancreas, and other organs, its metabolic boosting and energizing effects, and its anti-cancer, anti-diabetes, anti-Alzheimer's and other effects come principally from ketones. Therefore coconuts can now be recognized for another kind of functionality: the improvement of the health of mankind.

**Key words:** Coconut, Functional food.

## **Incorporation of Aloe Vera in Selected Recipes , Nutrient Analysis and Popularization Among Housewives**

\* **Binu Emmanuel, Hancy J. Vattakunnel**

\*Lecturer, Dept. of Clinical Nutrition and Dietetics, Alphonso College, Pala, Kerala.India

\* E-mail: binubinny 2010@gmail.com

### **Abstract**

Aloe Vera is an important medicinal plant belonging to the family Liliaceous and is widely used in pharmaceuticals, nutraceuticals and cosmaceuticals. Since Aloe Vera has many antioxidant properties, the present study was carried out with the objective of developing aloe vera incorporated recipes and its popularization among housewives. The gel of aloe vera is taken for incorporation and is incorporated in ten recipes like pudding, shake, pulao, sandwich, payasam, omelette, peda, cutlet, pancake and sweet in three variations like 20gm, 40gm and 60gm as sample A, B and C. For the assessment of organoleptic qualities of the incorporated products, a scorecard was prepared and was presented to the panel members. Based on the ANOVA test the best combination of each recipe was selected and their Vitamin A and Vitamin C content were analyzed. Costs of the products were also calculated. A group of housewives were selected and the products were popularized. When comparing the standard recipe with aloe vera incorporated recipes, the incorporated recipes are very much similar to the standard recipe in their sensory characteristics and were highly acceptable. Aloe vera incorporated pulao has got the highest score for appearance and sweet has the maximum score for flavour. Shake scored the highest for taste while pudding has got the highest score for colour and texture. Vitamin A content was found to be high in omelette and least in pudding. Vitamin C content was high in payasam and least in omelette. None of the products were statistically par to these products. Cost of the standard recipes and incorporated recipes were almost similar. The findings of the study led to the conclusion that the products were high in Vitamin A and C content and were highly acceptable.

**Key Words:** Aloe Vera, Nutrient Recipes.

### **Introduction**

Aloe, (Aloe Vera) is an important medicinal plant belonging to the family Liliaceous. Aloe is one of the most popular and widely used medicinal plants in pharmaceuticals, cosmaceuticals, and nutraceuticals. The Sanskrit synonym '*Taruni*' indicates evergreen nature of the plant as well as its property of keeping ever fresh and the Tamil synonym '*Kumari*' describes the non-fruiting tendency of the species. The plant is bitter in taste. The leaves contain barbolin and aloe emodin. Aloe Vera gel is the colourless mucilaginous gel obtained from the parenchymatous cell in the fresh leaves of aloe vera. The gel taste slightly bitter. The aloe gel contains glucose, galactose, mannose and galacturonic acid in addition to an unidentified aldopentose. Aloe Vera gel contains 0.3 percent carbohydrates and 98.5 percent water. Aloe Vera is a treasure trove of several useful ingredients such as zinc, super oxide dismutases and nutrients like Vitamin E and Vitamin C, hence serves as a good antioxidant. It also possess many medicinal properties which were found to be effective in the treatment of many disease conditions such as heart disease, cancer (anti tumor promoter, has three anti tumor agents-emodin, mannose and lectin), digestive disorders, wound healing, obesity, skin disorders, and boosting immune system.

### **Objectives**

1. To incorporate Aloe Vera in selected recipes and evaluate its acceptability.
2. To popularize the newly developed Aloe Vera based recipes among housewives.
3. To analyze the Vitamin A and Vitamin C content of the selected products.

## **Materials and Methods**

The methodology involved in the study is depicted below.

### **Selection of Aloe vera**

Aloe vera has long been used all over the world for their various medicinal properties. It is especially beneficial for the digestive system, as it can soothe the digestive tract. Aloe Vera has anti-inflammatory, anti-viral and anti-bacterial properties. It contains all essential minerals and has been suggested for using as an electrolyte replacement. Aloe Vera has antioxidant properties and possesses many medicinal values. Hence aloe vera is selected for the incorporation.

### **Selection of recipes**

Sandwich, Pulao, Omelette, Cutlet, Shake, Pudding, Peda, Sweet, Pan Cake, Payasam were some of the dishes that people like to had. These products were selected for incorporation of aloe vera, based on the criteria of ease of preparation, familiarity of the recipes etc.

### **Incorporation of Aloe Vera into selected recipes**

In order to improve the nutritional status of the people through housewives, Aloe Vera was incorporated in to the selected recipes. The latex of aloe vera is removed by cutting the stem and placed vertically in a glass. The stem is washed and gel is taken. The gel is dipped in water for 15 minutes and is taken for incorporation. Aloe Vera gel is incorporated in three variations like 20gm, 40gm and 60gm in three samples namely Sample A, Sample B and Sample C respectively.

### **Formulation of Score Card**

For the assessment of organoleptic qualities of incorporated products a scorecard was prepared. Appearance, colour, taste, texture and flavour were the major quality attributes included in the scorecard. A rating scale from mark 1-5 was chosen, in which five corresponds to the optimum for all the characters.

### **Sensory analysis of the incorporated recipes**

A panel of 10 members was selected to ascertain the sensory characteristics of the incorporated products. The scorecards were presented to the panel members and they were asked to fill up the same after evaluating the products. The best combination of each recipe was selected statistically by applying ANOVA test.

### **Nutrient analysis of the recipes**

The Vitamin A and Vitamin C content of the selected combination of aloe vera-incorporated products were analyzed. Vitamin A was analyzed by colorimetric method and Vitamin C was analyzed by dye method.

### **Cost calculation**

Cost of the ten selected variation of incorporated products was calculated to find out the affordability of the products. Cost was calculated in 100gm of each product.

## **Popularization of Aloe Vera incorporated recipe**

A group of housewives were selected as the target group for nutrition education. Nutrition education was done with the help of visual aids like charts, folder and notice. Nutrition education was aimed for explaining the importance of aloevera in maintaining good health.

### **Statistical analysis**

Mean and ANOVA of the selected ten recipes were calculated.

### **Results and Discussion**

Selection of best variation is determined on the basis of statistical analysis.

There is no significant difference between the mean score of each product when ANOVA test was conducted. Therefore the treatment with the highest mean score is selected. The table given below shows the selected variation of each recipe.

Table 1: Selected variation of each recipe

<b>Name of the product</b>	<b>Selected variation</b>
Pudding	Sample C
Shake	Sample B
Pulao	Sample C
Sandwich	Sample A
Payasam	Sample A
Omelette	Sample C
Peda	Sample C
Cutlet	Sample B
Pancake	Sample B
Sweet	Sample C

### **Mean score evaluation of organoleptic qualities**

A comparison was done between standard and aloe vera incorporated recipes with reference to appearance, colour, texture, flavour and taste. When comparing the standard recipe with aloe vera incorporated recipes, the incorporated recipes are very much similar to the standard recipe in their sensory characteristics and were highly acceptable. Aloe vera incorporated pulao has got the highest score for appearance and sweet has the maximum score for flavour. Shake scored the highest for taste while pudding has got the highest score for colour and texture.

## Nutrient analysis of selected recipes

Table 2: A and Vitamin C content of the aloe vera incorporated products

Name of the product	Vitamin A content (IU)	Vitamin C content (mg)
Pudding	494.00	31.8
Shake	660.66	40.80
Pulav	992.00	40.80
Sandwich	158.00	51.50
Payasam	745.00	61.20
Omelette	1295.00	21.47
Peda	827.00	32.47
Cutlet	997.33	40.94
Pancake	762.66	25.96
Sweet	576.00	27.25

The Vitamin A content was found to be high in omelette and least in pudding. The Vitamin C content was high in payasam and least in omelette.

## Cost calculation of incorporated recipes

Cost of the aloe vera Incorporated products were calculated considering the raw materials usual for cooking. A comparison of the cost of standard recipe and incorporated products was also done to identify the difference in cost. Cost calculation of aloe vera incorporated products and its comparison with standard recipes revealed that the aloe vera incorporated recipes were almost similar that of standard recipes. Cost of the products varies from Rs. 4 (peda) to Rs. 25 (shake).

## Popularization and nutrition education

In order to study the consumer acceptability and preferences, organoleptic evaluation of the aloe vera incorporated recipes were conducted. Popularization was also done by nutrition education.

## **Conclusion**

The search for new dishes to meet the nutritional needs of population is the need of the day. The development of such nutritious recipes adds new dimensions to overcome nutritional deficiency. Hence aloe vera was incorporated. Aloe vera incorporated pulao has got the highest score for appearance and sweet has the maximum score for flavour. Shake scored the highest for taste while pudding has got the highest score for colour and texture. The Vitamin A content was found to be high in omelette and least in pudding. The Vitamin C content was high in payasam and least in omelette. It can be concluded that the products developed were highly accepted by the panel members and target group for popularization. The study proved to be successful in imparting knowledge regarding the importance of aloe vera and its health benefits.

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## **Iron Profile of Working Women In Comparison with Housewives**

**Minu Mathews\* and Merin Abraham**

\*Lecturer, Department of Clinical Nutrition and Dietetics, Alphonsa College, Pala, Kerala, India.

\*E-mail: minuthottupuram@gmail.com

### **Abstract**

Iron is an important mineral required by our body for maintaining women's health. Being a component of haemoglobin, iron is essential for the proper bodily functions. The study "Iron Profile of Working Women in Comparison with Housewives" was done at Vakathanam panchayat in Kottayam district. A sample of 50 housewives and working women each within 30 – 50 years of age were selected. Information regarding lifestyle, morbidity, health status and dietary pattern was collected with the help of an interview schedule. Anthropometric measurements, clinical examination and estimation of haemoglobin was done to assess the nutritional status of the subjects. The BMI of the subjects revealed that 58 per cent of housewives and 60 per cent of working women had overweight. About 20 per cent of housewives and 12 per cent of working women had mild anaemia while rest of them was normal. The clinical examination showed that the subjects had pale eyes and lips, brittle nails and thin, dry, brittle hair. On comparing the nutrient intake of working woman with the RDA, it was found that the intake of energy, protein, fat, iron and vitamin C was adequate while in housewives the intake of protein and vitamin C was not adequate. Among the selected subjects, 12 per cent of working women were in the post menopausal stage while only four per cent of housewives had attained menopause. Thus it was concluded from the study that anaemia was common in housewives than working women which may be due to lack of nutrient intake and majority of them had regular menstrual cycle which leads to loss of iron in the body.

**Key Words** : Iron, women.

### **Introduction**

Iron is an essential component for the rapid proliferation and differentiation of tissues. It plays an important role in cellular processes such as synthesis of RNA and DNA, cellular respiration and electron transport chain (Conrad et al, 2002). Iron is an essential component of haemoglobin. Iron deficiency will lead to anemia which is a major problem found among adolescent girls as well as elder women. In adults, iron deficiency increases fatigue, affects physical work performance and impair cognitive function (Peterson, 2001). Women of reproductive age are more prone to iron deficiency due to their loss of blood during menstruation. A diet rich in iron can prevent this problem to a certain extent. The present study was done to compare the iron profile of working women with housewives.

### **Materials and Methods**

The area selected for the study was Vakathanam panchayath in Kottayam district. A total of 100 sample were chosen of which 50 subjects each were housewives and working women within 30 – 50 years of age were selected. A specially designed interview schedule was used for the study. Information regarding personal profile, socio-economic status, nutritional and health profile were elicited for the study. Anthropometric measurements were taken for the assessment of nutritional status. Details regarding the food consumption were found using 24 hour recall method. Estimation of haemoglobin revealed the iron profile of the subjects. Cyanmethaemoglobin method was used for the estimation of haemoglobin.

### **Results and Discussion**

The selected subjects were in the age group of 30 – 50 years. Majority of them belonged to nuclear type of family. Majority (80 per cent) of the working women were graduates while 64 per cent of the housewives had completed

their pre-degree. Seventy eight per cent of the working women worked in private sectors and salary from the job was their major source of income.

### Anthropometric Measurements of the Subjects

Table I

#### Mean height and weight of the subjects

Sl. no	Anthropometric parameters	ICMR standard value	Mean value		SD	
			Working women	Housewives	Working women	Housewives
1.	Height	165	161.58	159.24	3.42	5.76
2.	Weight	60	65.16	62.02	5.16	2.02

Anthropometric measurements shows that mean height and mean weight are higher than normal in both housewives and working women.

Table II

#### BMI of the subjects

Sl. No	BMI	Remarks	Working women		Housewives	
			No. of sample	Per cent	No. of sample	Per cent
1.	<18.5	Underweight	-	-	-	-
2.	18.5 – 24.99	Normal	18	36	17	34
3.	25.00-29.99	Overweight	30	60	29	58
4.	>30	Obese	2	4	4	8

BMI of the subjects revealed that 60 per cent of working women and 58 per cent of housewives were overweight. Obesity was found among four per cent of working women and eight per cent of housewives respectively.

### Biochemical Examination

Table III

#### Haemoglobin level of the subjects

Sl. No	Haemoglobin level	Remarks	Working women		Housewives	
			No. of sample	Per cent	No. of sample	Per cent
1.	12 – 15.5	Normal	44	88	40	80
2.	10 – 11.99	Mild anemia	6	12	10	20
3.	7 – 9.99	Moderate anemia	-	-	-	-
4.	<7	Severe anemia	-	-	-	-

Mild anemia was found among 20 percent of housewives and 12 per cent of working women respectively. None of the subjects had severe anemia.

### **Dietary Assessment of the subjects**

Table IV

Mean nutrient intake of the subjects

Sl. No	Nutrients	RDA	Working women		Housewives	
			Mean	SD	Mean	SD
1.	Energy	1900	2056.14	156.14	2143	243
2.	Protein	55	56.2	1.2	50.6	4.4
3.	Fat	20	25.4	5.4	27.2	7.2
4.	Vitamin C	40	42.21	2.21	31.8	8.2
5.	Iron	21	24.4	3.4	22.3	1.3

The mean nutrient intake among the working women was adequate when compared to RDA. The intake of protein and vitamin C was lower than the requirement in housewives while they met the requirements in case of energy, fat and iron.

### **Conclusion**

The study “Iron Profile of Working Women in comparison with Housewives” concluded that working women had a better nutritional as well as health status compared to housewives. The energy intake was found to be higher in housewives and more housewives were obese. Eventhough iron intake was adequate 20 per cent of housewives and 12 per cent of working women were mildly anemic.

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## **Formulation, Nutrient Analysis and Popularisation of Jackfruit Seed Flour Based Recipes among Housewives**

**\*Teena Kurian, \*\*Anjaly Sasikumar**

\* Lecturer, Dept. of Clinical Nutrition and Dietetics, Alphonso College, Pala, Kerala, India.

\*\*Dietitian, KIMS Hospital, Ernakulam.

\*E-mail- teenakurian@sify.com

### **Abstract**

Jackfruit (*Artocarpus heterophyllus*) is an ancient fruit that is widely consumed as a fresh fruit. The use of jackfruit bulbs and its parts has also been reported since ancient times for its therapeutic qualities. It contains useful antioxidants which prevent many human diseases like cancers, myocardial infarction, skin diseases, inflammations etc. Jackfruit seeds are rich source of B complex vitamins, fibre, potassium, fat, carbohydrates, manganese and magnesium. Hence in the present study twenty jackfruit seed flour based recipes were formulated and organoleptic evaluation was done. Six recipes were found to be the best on the basis of ANOVA. Jack shake scored highest for appearance while jack flour kheer scored highest for colour and taste. In the case of texture jack flour curd vada and jack cutlet scored highest. Jack flour mugalayi paratha, jack burfi and jack porridge scored highest for flavour. The iron and fibre content was found to highest in jack cutlet. Cost calculation of recipes were done and jack milk pudding was found to be expensive. Popularisation done among housewives proved to be good as they accepted all the recipes and they came to know about the health benefits of jack fruit seed flour. Pre and post test showed a significant difference in mean score evaluation. Using standardised jack fruit products offer consumers a way of reaping the broad spectrum of health benefits of this fruit.

**Key Words:** Jackfruit, Nutritional Recipes.

### **Introduction**

The Jack fruit (*Artocarpus heterophyllus*) is a species of tree in the mulberry family. It is a native of south East Asia and is believed to have originated in the south western rain forests of India- Kerala, coastal Karnataka and Maharashtra. The flesh of jack fruit is starchy and fibrous and is a source of dietary fibre. Two varieties of jack fruit are predominant in Kerala. Asian cuisine commonly uses this fruit as a condiment to various curries and other dishes. Jack fruit seeds are nutritious, rich in, calories, protein, fibre, fat, carbohydrates, B-complex vitamins and minerals like potassium, manganese, magnesium etc. The seed flour may be blended in wheat flour to explore the potential of low cost flour bakery and confectionery products. Some of the health benefits known due to the presence of phytonutrients ranges from anti-cancer to antihypertensive, anti-ageing, anti-ulcer, helps prevent constipation, has low water and fat absorption capacities and therefore helps prevent obesity. It may also prevent and treat tension and nervousness. Hence due to the presence of above health benefits the study was undertaken.

### **Objectives**

- To formulate jack fruit seed flour recipes
- To assess the acceptability of formulated products
- To calculate the cost of the formulated products
- To analyse the nutrient content of the selected recipes
- To popularise the recipes among housewives.

## **Materials and Methods**

Jack fruit seed flour is abundant in nutrients, is easily available, low cost and prevents various diseases like anaemia, skin diseases, cancer etc and hence it was selected for the study. The recipes were selected on the basis of local availability of ingredients. The recipes were breakfast items, sweets and snacks. Twenty recipes were formulated using jack fruit seed flour as the major ingredient. The recipes include jack coconut stuff ball, jack flour coconut mix, jack flour puttu, jack flour mugalai paratha, jack leaf cake, jack halwa, jack flour kheer, jack flour burfi, crispy roll, jack cutlet, jack sugar ball, jack shake, jack milk pudding, jack flour ring, jack flour edanappam, jack spicy chutney, jacks porridge, jack flour upuma, jack flour curd vada and jack flour rasam. A score card was prepared to assess the organoleptic qualities of the products. The major quality attributes were appearance, taste, texture, flavour and colour.

A ranking scale from 1-5 was chosen with one corresponding to the least score and five corresponding to the highest ie., poor and excellent respectively. According to Mc Dernott et al.,(1992) sensory method in which palatability is evaluated by a panel of judges is essential to every standardisation procedure because they answer all important questions of food like taste, smell, look and feel. To ascertain the sensory characteristics of the formulated products, sensory evaluation was done by a panel of ten housewives between the age group of 25-40 years from Poovaranay village. Six best products were selected statistically after sensory analysis. Nutrients like iron and fibre of these six selected products were also estimated. Cost of all the 20 products were calculated to find out the affordability of the products.

According to Srilakshmi (2005), nutrition education is the foundation for any programme intended to nutrition improvements. The selected recipes were popularised through nutrition education with the help of visual aids. A check list was given to the subjects to check their awareness regarding jack fruit seed flour. After the education and popularisation again, the same checklist was distributed among housewives to check the effectiveness of nutrition education. The right answer scored the maximum marks one and wrong answer zero. The primary data thus obtained was consolidated and subjected to statistical analysis.

## **Results and Discussion**

### **Mean score evaluation of organoleptic properties of recipes**

In the present study iron, fibre, potassium and calcium rich ingredients were used for the formulation of various products and the organoleptic study was carried out in order to study the consumer acceptability and preference. Appearance was the primary criteria, which has been looked for. Good appearance is an important pre requisite of food acceptance. The first impression of food is usually visual and a major part of our willingness to accept a food depends on its appearance. It includes optical properties, physical form and mode of presentation (Manay, 2003). From the mean score evaluation of the appearance, jack shake scored the highest with 4.8 and jack sugar ball the least with 3.9. Each food has a particular texture that we associate with it. A variety of qualities are included in texture, such as crisp, elastic, tough, gummy or stringy. When mean score of texture of recipes were evaluated, jack cutlet and jack flour curd vada scored the highest and jack flour upuma the least.

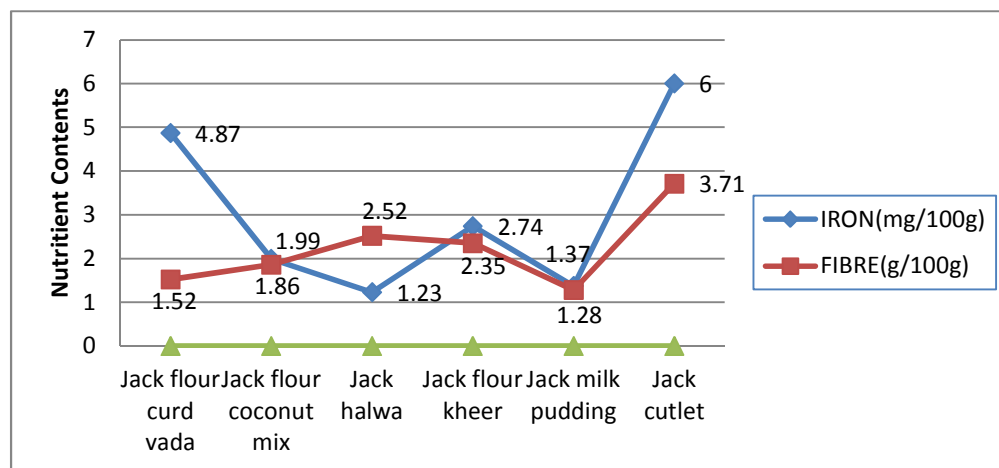
The sense of taste refers to the ability of the taste organs to perceive and recognize the four basic tastes- sweets, sour, salty and bitter. Mean score value of taste of jack flour kheer was highest with a score of 4.8. Colour is used as an index to the quality of a number of foods. In addition to giving pleasure, the colour of food is associated with other attributes. Food colour not only helps to determine quality, it can tell as many things. The mean score values of colour, revealed that jack flour kheer scored highest with a score of 4.5. Evaluation of flavor is highly subjective and depends upon the discrimination ability of the consumer as flavor includes the sense of smell as well as the taste sense as experienced by the consumers. Flavour is the sum total of the sensory impression formed, when we eat food. Flavour is the most important aspect, which decides the choice of food. When the mean score values of flavor were evaluated, it was found that jack flour mugalayi paratha, jack flour burfi and jack porridge scored same with a score of 4.5.

### Selection of Best products

Based on the scores obtained from sensory evaluation and statistical analysis using ANOVA six best products were selected. The selected products were jack flour coconut mix, jack halwa, jack flour kheer, jack cutlet, jack milk pudding and jack flour curd vada.

### Nutrient Analysis of the selected products

Iron and fibre content of the six selected products are depicted in figure 1.



**Figure 1:** Iron and Fibre content of selected products

### Nutritive Value Calculation of the Selected Products

The protein, calcium, phosphorous and potassium content of the selected six products were calculated and the nutritive value is furnished in Table 1.

**Table 1: Nutritive Value of Selected Products**

Sl. No	Name of products	Protein/100 g	Calcium/100g	Phosphorous/ 100 g	Potassium / 100g
1	Jack flour curd vada	6.44	64.15	101.15	216.3
2	Jack flour coconut mix	5.97	41.3	99.6	199.6
3	Jack halwa	5.3	12.3	79.6	196.6
4	Jack flour kheer	6.52	50.6	113.2	198.6
5	Jack milk pudding	5.61	13.3	87.6	210.6
6	Jack cutlet	6.29	12.84	122.5	220.7

### **Cost Calculation of the Selected Products**

The expense of Jack milk pudding was the highest with Rs.15.30 per 100 gm and Jack flour ring cost only Rs.6 per 100 g. The rest of the products ranged between Rs.8 to 12.00.

### **Effect of Popularization and Nutrition education**

<b>Number of subjects</b>	<b>Mean Score of Pre test</b>	<b>Mean Score of Post test</b>	<b>Paired 't' value</b>
15	48	65	2.5**

Significant at 1 per cent level  $P < 0.01$

The patients tasted the products and they participated in the program with genuine interest. Pre and post test evaluation showed a high significant difference ( $P < 0.01$ ).

### **Conclusion**

Jack fruit seed flour is a rich source of macro and micronutrients. Consumption of Jack fruit seeds decreases the risk of cancer, skin ailments, hypertension etc. Out of the twenty recipes formulated, six products were selected to be the best. Iron and fibre analysis among the selected items showed that jack cutlet had the highest above said nutrients. Pre and post test evaluation showed a significant difference ( $P < 0.01$ ).

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## **Reproductive Health Risk Factors for Breast Cancer in Women**

**K.Tirumala, G. Sudhakar, \*R. K Anuradha**

\*Associate Professor, Department of Home Science, S.V.University, Tirupati.

\*E- mail: tirumalasree.2011@gmail.com

### **Abstract**

Breast cancer incidence rates are increasing worldwide. In India, it is the most common cancer among women in many regions and has overtaken cervical cancer. The continuous rising breast cancer incidence has created an urgent need to develop strategies for prevention. Breast cancer is the most common cancer in females worldwide, and the second leading cause of cancer deaths in women. The incidence is on the rise in India, and breast cancer is the second most common malignancy in Indian women. Every year approximately 1 million new cases of female breast cancer are diagnosed worldwide, most of which occurs in developed countries<sup>5</sup>. Breast cancer is the most common cancer in females accounting for 20% of all female cancers. Breast cancer is the leading cause of female cancer death. Breast cancer is caused by repeated exposure of breast cells to circulating ovarian hormones. Reproductive and hormonal factors contribute most to development of breast cancer. Risk of breast cancer increases in successive generations of people moving from low-risk areas to high-risk regions proving that changes in reproductive behaviour and lifestyle are more important than hereditary factors in the development of breast cancer. Breast cancer is second only to lung cancer in its rate of occurrence in women. There are about 150,000 to 175,000 cases yearly and about 45,000 deaths. The rate increases with age; a woman who lives to age 85 has about a 1 in 9 chance of developing breast cancer. Overall the cumulative risk of developing breast cancer is 10.2%; the risk of dying from the disease is about 3.6%. Much of the risk is after age 75. Breast Cancer occurs a decade earlier in Indian Women as compared with the women of developed countries and is a leading cause of mortality in developing countries like India so raising awareness about the screening procedure and treatment of Breast cancer can help reducing mortality.

**Key Words:** Breast Cancer, Incidence, Treatment.

### **Introduction**

Breast cancer can be defined as a cancerous growth that inhabits the tissues in the breast. In this type of cancer, the cells in the breast region grow abnormally and in an uncontrolled way. Though breast cancer is mostly found in women, in rare cases it is also found in men. In the U.S. alone one out of every eight women has this disease. While the majority of new breast cancers are diagnosed as a result of an abnormality seen on a mammogram, a lump or change in consistency of the breast tissue felt with the fingertips can also be a warning sign of the disease. Heightened awareness of breast cancer risk in the past decades has led to an increase in the number of women getting mammograms. Breast cancer is the most common cause of death in women between the ages of 45 and 55. Male breast cancer accounts for about 1% of all cancer deaths in men.

Breast cancer can occur at any age, but it is most common in women over the age of 60. Most breast cancer are found when they are invasive. This means the cancers have grown beyond the duct or lobule, where they begin, into other breast tissue or spread to other parts of the body. Breast cancer that spreads out of the breast may spread to lymph nodes in the armpit nearest the breast affected by cancer (axillary lymph nodes) or to other parts of the body such as the bones, lungs and liver.

### **Symptoms of Breast Cancer**

There are several symptoms of breast cancer. Women need to be aware of these so that an early diagnosis can be made. Early detection increases the rate of recovery. Some of the symptoms of breast cancer are:

Increasing swellings or lumps in the breast or in the armpit. Though this may also be due to hormonal changes, it is important to see your physician for a breast exam.

Changes in the size and shape of the mature breast, especially if it is prominently noticed in one breast.  
Fluid, not milk, leaking from the nipple, especially in older women.  
Noticeable changes occurring in the size and shape of the nipple or a nipple that does not easily return to its normal shape.

## **Causes of Breast Cancer**

Risk is highest if the affected relative developed breast cancer at a young age, had cancer in both breasts, or if she is a close relative. First-degree relatives, (mother, sister, daughter) are most important in estimating risk. Several second-degree relatives (grandmother, aunt) with breast cancer may also increase risk. Breast cancer in a male increases the risk for all his close female relatives. Having relatives with both breast and ovarian cancer also increases a woman's risk of developing breast cancer.

There is great interest in genes linked to breast cancer. About 5%-10% of breast cancers are believed to be hereditary as a result of mutations, or changes, in certain genes that are passed along in families. BRCA1 and BRCA2 are abnormal genes that, when inherited, markedly increase the risk of breast cancer to a lifetime risk estimated between 40% and 85%. Women with these abnormal genes also have an increased likelihood of developing ovarian cancer. Women who have the BRCA1 gene tend to develop breast cancer at an early age.

## **Some other probable causes and risk factors are:**

Advancing age  
Excessive exposure to radioactive rays  
Hereditary genes or family history  
Late childbearing  
The use of hormone replacement therapy  
Early onset of a menstrual cycle and an early menopause  
Men or women working in chemical factories

Women's health care needs have long been overlooked by a patriarchal society. There is no doubt that health screening has the potential to alert women and their care providers to life threatening diseases, allowing for early intervention and improved health outcomes. A better understanding of women's health care needs is required to provide a balance between biological knowledge and quality of life. Reproductive health care for women includes cervical cancer screening (Pap tests), sexually transmitted infection (STI) screening and treatment, family planning, contraceptive counselling, and breast exams.

## **Types of Breast Cancer**

There are primarily two types of breast cancer to be found in most women. These types of breast cancer are named after the parts of the breast in which they start. They are:

### **Ductal Carcinoma Breast Cancer**

It starts in the cells which line the breast's ducts, beneath the nipple and areola. The ducts supply milk to the nipple. Between 85% and 90% of all breast cancers are ductal. If the cancer is DCIS (ductal carcinoma in situ), it is well contained, not invasive, and can be very successfully treated. Usually removed during a lumpectomy, if the tumor margins are clear of cancer, follow-up treatment may include radiation. If ductal cancer has broken into nearby breast tissue (invasive cancer) then a mastectomy may be needed, and your physician may also recommend chemotherapy.

### **Lobular Carcinoma Breast Cancer**

It begins in the lobes or glands which produce milk in the breast. The lobes are located deeper inside the breast, under the ducts. About 8% of breast cancers are lobular. If the cancer is LCIS (lobular carcinoma in situ) that means the cancer is limited within the lobe and has not spread. It may be removed during a lumpectomy, if the tumor margins are clear of cancer, and follow-up treatment may include radiation. If lobular cancer has spread into nearby breast tissue (invasive cancer) then a mastectomy and chemotherapy may be recommended. One of the rarest forms of breast cancer is named for its appearance.

## **Inflammatory Breast Cancer**

It is the least common, but most aggressive of breast cancers, taking the form of sheets instead of lumps. The breast may feel warm, and be red and swollen. It can also feel tender or itchy. It can start in the soft tissues of the breast, just under the skin, or it can appear in the skin. Unlike ductal and lobular cancers, it is treated first with chemotherapy and then with surgery. When caught early, inflammatory breast cancer can be a manageable disease and survival rates are increasing. But because there are usually no lumps the cancer often isn't detected until it has progressed.

## **Paget's Disease**

Paget's Disease of the nipple/areola often looks like a skin rash, or rough skin. It resembles eczema, and can be itchy. The itching and scabs (if scratched) are signs that cancer may be under the surface of the skin, and is breaking through. Paget's is usually treated with a mastectomy, because the cancer has by then invaded the nipple, areola, and the milk ducts.

## **Risk Factors and Incidence**

Risk factors for cervical cancer include a higher number of sexual partners, lower age at first intercourse, as well as the sexual behaviour of a woman's partner. Associated risk factors include smoking, a higher number of live births, deficient diets, HIV infection, and long term (more than 12 years) use of oral contraceptive pills [OCPs]. Risk factors increase a person's chances of developing a disease. Nicotine metabolites can be found in the cervical mucus of women who smoke, potentially supporting the theory that cigarette smoking has a direct carcinogenic action on the cervix.

## **Methods of Early Detection**

Breast self examination-Recommended to do monthly. Ages 20 and above.

Clinical breast exams-performed by a health care worker, yearly with doctor or nurse.

Mammogram- x-ray of the breast used to look for abnormal growths, yearly ages 40+ up.

## **Risk factors of breast cancer**

The risk factors for cancer are profoundly associated with socio-economic status; they are higher in low social economic status while cancer survival is lower in the poor than in those in higher social settings. The risk factors for cancer can be broadly categorized into four types namely: behavioural risk factors, biological risk factors, environmental risk factors and genetic risk factors.

### **A) Behavioural risk factors**

Behavioural risk factors include; tobacco use, harmful use of alcohol, unhealthy diet and physical inactivity.

### **B) Biological factors**

Biological risk factors include overweight, obesity, age, sex of the individual and their genetic/hereditary make up.

#### **A) Age**

1:8 women under 45 have been diagnosed with breast cancer. Higher rates in women over 55 2:3.

Not having health care and regular checkups can Delay early detection for Breast cancer

Smoking Cigarettes Increases risk of cancer

One women is diagnosed with breast Cancer every two minutes, And one Women will die of breast cancer every 13 minutes in the United States

#### **B) Obesity:**

“A recent study found that women who gained 55 pounds or more after Age 18 had Almost a 50 percent greater risk of breast Cancer compared to those who maintained their weight”.

Women have higher rates of breast cancer to men.

1:3 ratio for women

1:1,000 in men

**C) Genetics**

Caused by mutations in genes BRAC1 and BRAC2

**D) Ethnicity**

Black Women have highest mortality Rates with battling with breast cancer. It has been attributed to these women having more aggressive cancer (Center of Disease Control).

### 3. Genetic risk factors

**Race:** Breast cancer is diagnosed more often in Caucasian women than women of other races.

**Family History and Genetic Factors:** If your mother, sister, father or child has been diagnosed with breast or ovarian cancer, you have a higher risk of being diagnosed with breast cancer in the future. Your risk increases if your relative was diagnosed before the age of 50.

risk of being diagnosed with breast cancer in the other breast in the future.

**Menstrual and Reproductive History:** Early menstruation (before age 12), late menopause (after 55), having your first child at an older age, or never having given birth can also increase your risk for breast cancer.

**Certain Genome Changes:** Mutations in certain genes, such as BRCA1 and BRCA2, can increase your risk for breast cancer. Individuals with these gene mutations can pass the gene mutation onto their children.

**Dense Breast Tissue:** Having dense breast tissue can increase your risk for breast cancer and make lumps harder to detect. Several states have passed laws requiring physicians to disclose to women if their mammogram indicates that they have dense breasts so that they are aware of this risk. Be sure to ask your physician if you have dense breasts and what the implications of having dense breasts are.

### 4. Environmental and Lifestyle Risk Factors

#### Chemicals

In cosmetics can increase Risk for breast cancer. Phthalates and Parabens are linked to causing cancer. The risk of cancer increases with the amount of alcohol consumed

**Lack of Physical Activity:** A sedentary lifestyle with little physical activity can increase your risk for breast cancer.

**Poor Diet:** A diet high in saturated fat and lacking fruits and vegetables can increase your risk for breast cancer.

**Being Overweight or Obese:** Being overweight or obese can increase your risk for breast cancer. Your risk is increased if you have already gone through menopause.

**Drinking Alcohol:** Frequent consumption of alcohol can increase your risk for breast cancer. The more alcohol you consume, the greater the risk.

**Radiation to the Chest:** Having radiation therapy to the chest before the age of 30 can increase your risk for breast cancer.

**Combined Hormone Replacement Therapy (HRT):** Taking combined hormone replacement therapy, as prescribed for menopause, can increase your risk for breast cancer and increases the risk that the cancer will be detected at a more advanced stage.

#### Ways to Reduce Risk of Cancer

Increasing Physical activity - at least 30 minutes 3x/week, Limit Alcohol intake to 1 glass a day, Avoiding tobacco products, avoid hormone Replacement therapy after menopause. Try natural Remedies like estrogen, managing stress through deep breathing 10 Times each day, meditation, acupuncture and massage, decreasing processed food.

#### Breast cancer awareness

Breast cancer awareness is an effort to raise awareness and reduce the stigma of breast cancer through education on symptoms and treatment. Supporters hope that greater knowledge will lead to earlier detection of breast cancer,

which is associated with higher long-term survival rates, and that money raised for breast cancer will produce a reliable, permanent cure. Breast cancer advocates raise funds and lobby for better care, more knowledge, and more patient empowerment. They may conduct educational campaigns or provide free or low-cost services. Breast cancer culture, sometimes called pink ribbon culture, is the cultural outgrowth of breast cancer advocacy, the social movement that supports it, and the larger women's health movement.

## **Treatment for breast cancer**

### **Screening mammography**

Screening mammography is used to detect breast cancer early, when you are well and have no obvious breast symptoms. Screening mammograms can detect breast cancers that are too small to be felt by you or your doctor. Mammograms taken at different times can later be compared to show changes in breast tissue over time.

### **Diagnosis of Breast Cancer**

Breast changes are investigated through a series of tests organised by doctor or specialist. Most breast changes are diagnosed as benign (non-cancerous). If your tests show that you may have cancer, your doctor will refer you to a specialist who will advise you about treatment options.

**a. Physical examination**-breast and armpits are examined

**b. Diagnostic mammogram**-an x-ray of the breast tissue

**c. Ultrasound** – a device that uses sound waves to scan the breast

**If further tests are required, one or more procedures may be used, including**

**d. Fine needle aspiration** – a very narrow needle is used to withdraw cells from the testing area

**e. Core biopsy** – a larger needle is used to take a tissue sample for testing

**f. Open biopsy** – surgery is performed under general anaesthetic to remove the whole area for testing

**g. Hormone tests** – if a cancer is found, it can be checked for special markers called hormone receptors to see if it will respond to hormone treatment

**h. Ductogram or discharge test** – this is for breast cancers that are causing a discharge from the nipple other tests may include blood tests, bone scans and chest x-rays.

### **Radiotherapy**

Using x-ray (radiation) to kill any remaining cancer cells. Women who have breast conserving surgery often have a course of radiotherapy. Side effects can include a short – term reddening of the skin, which looks like sunburn, or longer thickening of skin.

### **Chemotherapy**

Cancer killing medications are given intravenously (directly into a vein). Chemotherapy can be offered to women with early breast cancer as an extra treatment to surgery, radiotherapy or both. Chemotherapy has side effects that will depend on the type of medication you have, but can include nausea, vomiting and hair loss.

### **Hormone treatments**

Many breast cancers are influenced by the sex hormones oestrogen and progesterone. Hormone treatment can reduce the chances of breast cancer developing again.

### **Biological therapies (also called immunotherapies)**

Strengthen the immune system to fight cancer. Several types of biological therapies are now used to treat breast cancer.

### **Complementary and alternative therapies**

When used alongside your conventional cancer treatment, some of these therapies can make you feel better and improve quality of life. Others may not be so helpful and in some case may be harmful.

## **Strategies of Breast Cancer in World Wide**

The crude breast cancer cases in urban Indian women is 25-30 and the age adjusted rate is 30-35 new cases per 1,00,000 women per year. Breast cancer is increasing - the average increase over a 30 year period in Mumbai was 11

per cent per decade Breast cancer is increasing both in young (11per cent per decade) and old women (16per cent per decade) There are an estimated 1,00,000-1,25,000 new breast cancer cases in India every year. The number of breast cancer cases in India is estimated to double by 2025. The age adjusted incidence of cervix cancer in urban India is 15-20 new cases per 1,00,000 women per year. The incidence of cervix cancer is 1.5 to 2 times higher in rural women. Overall it remains the commonest cancer in Indian women. Cancer of cervix is decreasing in urban women at the rate of 18per cent per decade. Ovarian cancer incidence has remained stable in the past few decades. (Cancer statistics in Indian women, 2012).

## **Risk Reduction**

For women at average risk, the emphasis is on regular screening and healthy lifestyle choices (e.g., low-fat diet, regular exercise, breastfeeding). Women at increased risk for breast cancer are advised to consider additional risk reduction strategies in consultation with their health care providers.

### **A) Physical activity**

Regular physical exercise has been shown to provide some protection against breast cancer, especially in postmenopausal women. The reduction in risk for physically active women compared with women who are least active may be as much as 25%.

### **B) Diet**

A diet that is rich in vegetables, fruit, poultry, fish, and low-fat dairy products has been associated with a lower risk of breast cancer in some studies. There is also some evidence that soy-rich diets may reduce risk. Overall, however, the influence of dietary factors on breast cancer risk remains inconclusive.

### **C) Breastfeeding**

The risk reducing effect of breastfeeding has been shown in multiple studies, especially if the breast-feeding lasts 1½ to 2 years. For every year of breastfeeding, the reduction in relative risk has been estimated at approximately 4%.

## **Conclusion**

Breast cancer incidence rates are increasing worldwide. Breast cancer is caused by repeated exposure of breast cells to circulating ovarian hormones. Breast cancer incidence rates are increasing worldwide. In India, it is the most common cancer among women in many regions and has overtaken cervix cancer. The continuing rise in breast cancer incidence has created an urgent need to develop strategies for prevention. Breast cancer occurs decades earlier in Indian women compared to western women and is a leading cause of mortality among women in developing countries such as India, as most of them are diagnosed in late stages because of ignorance about detection of breast cancer in initial stages simply by self-breast examination. So raising awareness about the procedure and screening for high risk women so that it can be diagnosed in the initial stages and thus reduces mortality.

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## **Nutrition in Cancer**

**G.Sudhakar, K . Tirumala, \*R. K Anuradha**

\*Associate Professor, Department of Home Science, S.V.University, Tirupati.

\*E- mail: sudhakargoda@gmail.com

### **Abstract**

The main objective was to evaluate the epidemiological evidence on diet and cancer and generate public health recommendations. Review of published studies, concentrating on recent systematic reviews, meta-analyses and large prospective studies literature was collected. Overweight/obesity enhances the risk for cancers of the oesophagus, colorectum, breast, endometrium and kidney. Consumption of alcohol leads to cancers of the oral cavity, pharynx, oesophagus and liver and breast. Consumption of alcohol intake should not exceed 2 units/d. Aflatoxin is food toxins which causes liver cancer, exposure to aflatoxin in foods should be minimized. Salted fish increases the risk for nasopharyngeal cancer, if consumed during childhood. Intake of fruits and vegetables reduce the risk for cancers and at least 400 g/d of total fruits and vegetables should be consumed. Preserved meat and salt preserved foods probably increases the risk for colorectal cancer and stomach cancer respectively. Consumption of preserved foods should be avoided. Avoid intake of hot drinks and foods because it probably increase the risk for cancers of the oral cavity, pharynx and oesophagus. Regular physical activity, the main determinant of energy expenditure reduces the risk for colorectal cancer and probably reduces the risk for breast cancer.

**Key Words:** Cancer, Nutrition Reviews.

## **Oxidative Stress and Antioxidant – The Link to Cancer**

**\*Krishnasree V and Stephy Das**

Dept of Home Science, Kerala Agricultural University, College of Agriculture Vellayani, Trivandrum, Kerala.

\* E- mail: krishna.sree372@gmail.com, [Stephydaskalapura@gmail.com](mailto:Stephydaskalapura@gmail.com)

### **Abstract**

One of the paradoxes of life on this planet is that the molecule that sustains aerobic life, oxygen, is not only essential for energy metabolism and respiration, but it has been implicated in many diseases and degenerative conditions. Cancer is one such degenerative global epidemic. According to WHO, death from cancer is expected to increase up to 104% worldwide by 2020. There is no curable treatment for majority of the malignancies, where all therapeutic regimes produce varying side effects, including hematological toxicity. Hence, scientists of this century are more in favor of natural ways to take care of this disease imbibing the utilization of natural products like antioxidants from nature. This brings hope of improved treatment for human tumors by means of these natural products that inhibit tumor cell growth and metastasis, as well as those that induce apoptosis.

**Key Words:** Oxidative stress, Cancer, Antioxidant.

### **Introduction**

The events of world war second led directly to the birth of free radical biochemistry. These short lived free radicals with half lives implicated in the etiology of large number of major diseases. They can adversely alter many crucial biological molecules leading to loss of form and function. Such undesirable changes in the body can lead to diseased conditions (Afzal *et al.*, 2012). Reactive oxygen species (ROS) are physiological products of aerobic metabolism and are used by organisms for a variety of tasks such as signaling, metabolizing xenobiotics, initiating apoptosis and stimulation of antioxidants and repair processes and hence, its production in the animal cell is inevitable. Normally, there is an equilibrium between a free radical / reactive oxygen species formation and endogenous antioxidant defense mechanisms, but if the balance is disturbed, it can produce oxidative stress (Pani *et al.*, 2000).

From the above, one can appreciate that the balance between the cellular oxidation and free radical production is most important in maintaining homeostasis and preventing cellular damage and death. Increased oxidative damage can result not only from more oxidative stress, but also from failure to repair or replace damaged biomolecules. Oxidative stress can result from a decrease in antioxidant levels, e.g. mutations decreasing the levels of Mn-SOD, depletion of dietary antioxidants and other essential dietary constituents (e.g. copper, iron, zinc, and magnesium) (Halliwell and Gutteridge, 2006).

Free radicals steal electrons from cells, DNA, enzymes and cell membranes and affect their structure and composition. Cells are damaged and cannot function normally. Enzymes can't act as catalysts for cellular reactions. Changing DNA is always a bad sign. Compromising the integrity of cellular membranes leaves them vulnerable to the attacks by viruses, bacteria and other invaders. Free radicals are not just by products of cellular processes. They can be introduced into our bodies from other places. Foreign substances like cigarette smoke, radiation, drinking alcohol, air and water pollution or ingesting artificial products can lead to higher levels of free radicals in the body. Certain gases and even sunlight can affect the free radical levels in our bodies. Free radicals and ROS are found to be involved in a number of pathological processes such as cancer, diabetes mellitus, neurodegenerative diseases such as Alzheimer and Parkinson diseases, inflammation and rheumatic arthritis (www.natural-holistic-health.com).

### **Reactive oxygen species (ROS) and DNA damage**

DNA is a major target of free radical damage. The types of damages induced are many and include strand breaks (single or double strand breaks), various forms of base damage yielding products such as 8-hydroxyguanosine, thymine glycol or damage to deoxyribose sugar as well as DNA protein cross links. These damages can result in mutations that are heritable changes in the DNA that can yield cancer in somatic cells or fetal malformations in the germ cells. The involvement of free radicals with tumor suppressor genes and proto-oncogenes suggest their role in development of different human cancers (Halliwell and Aruoma, 1993).

## **Cancer and oxidative stress**

The development of cancer in human body is a complex process including cellular and molecular changes mediated by diverse endogenous and exogenous stimuli. It is well established that oxidative DNA damage is responsible for cancer development (Alano *et al.*, 2010). Cancer initiation and promotion are associated with chromosomal defects and oncogene activation induced by free radicals. A common form of damage is the formation of hydroxylated bases of DNA, which are considered an important event in chemical carcinogenesis (Alexandre *et al.*, 2007). This adduct formation interferes with normal cell growth by causing genetic mutations and altering normal gene transcription. Oxidative DNA damage also produces a multiplicity of modifications in the DNA structure including base and sugar lesions, strand breaks, DNA-protein cross-links and base-free sites (Funes *et al.*, 2007). The highly significant correlation between consumption of fats and death rates from Leukemia and breast, ovary, rectum cancers among elderly people may be reflection of greater lipid peroxidation (Tward *et al.*, 2006).

## **Irony in cancer therapy**

No matter what type of cancer is treated, cancer treatment using anticancer drugs and radiation creates a state of oxidative stress in the body, and active oxygen triggers apoptosis via p53 and cytochrome release from mitochondria (Bertelsen *et al.*, 2009). Radiation therapy was recognized as a potential cause of secondary cancer. The major cancers developed in a long run after radiation therapy are leukemia and solid tumors including lung cancer, thyroid cancer, bone sarcoma and stomach cancer. The risk of these diseases after radiation depends on a number of factors such as amount of radiation that reached the active organ, radiation dose rate and how much of organ was exposed to radiation (Chaturvedi *et al.*, 2007). Chemotherapy does not always work, and even when it is useful, it may not completely destroy the cancer. The chemo agents kill cells that rapidly divide under normal circumstances like cells in bone marrow, digestive tract and hair follicles. Certain type of chemo drugs called alkylating agents (mechlorethamine, chlorambucil), cisplatin, topoisomerase II inhibitors and anthracyclines are most often linked to the risk of acute myelogenous leukemia (AML) (Bostrom and Soloway, 2007).

Chemotherapy-radiotherapy is not confined exclusively to malignant cell populations; thus, normal tissues may also be affected by the therapy and may contribute to specific nutritional problems. Impaired nutrition due to anorexia, mucositis, nausea, vomiting, and diarrhea may be dependent upon the specific chemotherapeutic agent, dose, or schedule utilized. Similar side effects from radiation therapy depend upon the dose, fractionation, and volume irradiated. When combined modality treatment is given the nutritional consequences may be magnified (Berk *et al.*, 1972). A major concern for anti-cancer drugs is their potential toxicity. Considerable efforts were exerted to identify naturally occurring compounds, or their principle active compounds, with potential to complement existing cancer therapeutic modalities (Hemminki *et al.*, 2008).

## **Antioxidants**

Antioxidants are the molecules that have an extra electron to share with the roaming free radicals, come to rescue when the body is affected by the damage caused due to excess of free radicals. The nature of antioxidants is to neutralize free radicals in the body. In their presence, they latch onto free radicals so they do not steal electrons from other vital places (www.natural-holistic-health.com). There are several different kinds of antioxidants like phytochemicals, anthocyanins, carotenoids and trace minerals which can be found in the foods. Many *in vitro* studies have shown that dietary antioxidants, such as vitamin C (ascorbic acid), vitamin E ( $\alpha$ -tocopherol),  $\beta$  carotene and flavonoids, act as effective antioxidants in biological systems such as plasma, lipoproteins, and cultured cells. Vitamin C effectively inhibits lipid and protein oxidation in human plasma exposed to various physiologically relevant types of oxidative stress, such as activated polymorphonuclear leukocytes, reagent or myeloperoxidase-derived hypochlorous acid, cigarette smoke or redox-active iron or copper. Vitamin E, the most abundant lipid-soluble antioxidant in human lipoproteins and tissues acts as a chain-breaking antioxidant against lipid peroxidation (Packer *et al.*, 2002).  $\beta$ -carotene, lycopene, lutein and other carotenoids and oxy-carotenoids are efficient singlet oxygen quenchers and, thus important in protecting the eye and skin against UV-induced oxidative damage (Mayne, 2003).

## Antioxidant defense against cancer

Antioxidant defense against cancer is composed of several lines and this antioxidant defense system is broadly classified into two categories based on their function.

1. Antioxidant defense system against oxidative stress

2. Antioxidant system against the cancer cell cycle

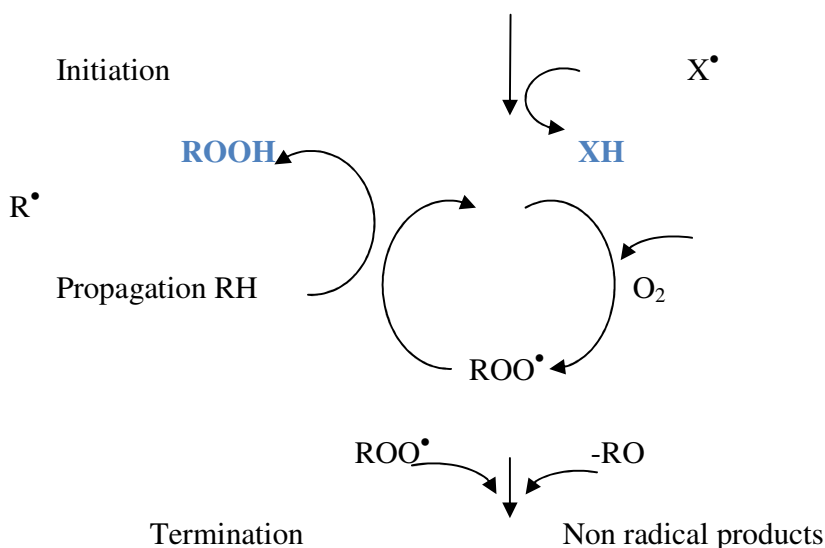
In antioxidant defense system against oxidative stress they work as Preventive antioxidants which suppress formation of free radicals, radical scavenging antioxidants which suppress chain initiation and breaking chain propagation reactions, Repair and *de novo* antioxidants.

An efficient way to delay oxidation is scavenging by antioxidants of the free radicals generated in the propagation phase or during the break down of the hydro peroxides, i.e., scavenging of either the peroxy radicals or the alkoxy radicals. The critical level needed of such primary antioxidants to be effective in a given product corresponds to the concentration necessary to inhibit all chain reactions started by the initiation process. As long as the concentration of the antioxidants is above this critical concentration, the total number of radicals is kept at a constant low level, a time period which is defined as the induction period. During the induction period the antioxidant is gradually depleted and when the critical concentration is reached, radicals will escape from reaction with the antioxidant, and the concentration of hydro peroxides will increase. The high level of hydroperoxides will further increase the concentration of radicals, and the remaining antioxidant will be used up completely. With all the antioxidants consumed, the oxidative process will accelerate, and the increase in the production of secondary oxidation products will lead to a progressing deterioration of the product (Madsen *et al.*, 1997).

### Preventive

Antioxidant enzymes like superoxide dismutase, catalase and glutathione peroxidase prevent oxidation by reducing the rate of chain initiation. They can also prevent oxidation by stabilizing transition metal radicals such as copper and iron (Chakraborty *et al.*, 2009).

RH



**Fig. 1 Lipid peroxidation process** (Madsen *et al.*, 1997)

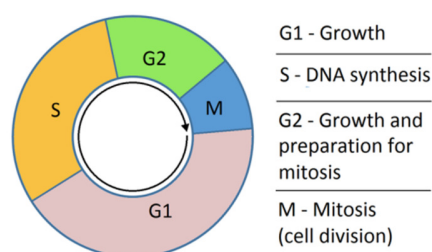
In antioxidant defense system against cancer cell cycle they work as

- A stimulant for TNF- $\alpha$
- Inhibit cell proliferation
- Activate intrinsic pathway
- Inhibits oxidative stresses by-products
- Arrest cell cycle

Initiation of apoptosis pathway is the major mechanism through which the above mentioned activities are carried out by any antioxidants in foods. Cancer cell death involving the degradation of cellular constituents by a group of cysteine proteases called caspase which are activated either through intrinsic pathway or extrinsic pathway (Fernandez-cabezudo *et al.*, 2013). In intrinsic pathway the antioxidants helps in permeabilisation of mitochondria and release of cytochrome C in to cytoplasm which forms a multi protein complex known as apoptosome that initiates activation of caspase cascade through caspase 9 (Vonlow *et al.*, 2007).

Extrinsic pathway is stimulated by the initiation of death receptors on the plasma membrane such as tumor necrosis factor I and when ligands bind to these receptors, the death inducing signaling complex is formed leading to activation of caspase cascade through caspase 8 (Jin *et al.*, 2010). Certain antioxidants (flavonoids) in higher amounts block the cell cycle in the G1 phase (Indran *et al.*, 2009).

**Fig. 2 Cancer cell cycle**



## **Conclusion**

Considerable laboratory evidence from chemical, cell culture, and animal studies indicates that antioxidants may slow or possibly prevent the development of cancer. However, information from recent clinical trials is less clear. In recent years, large-scale randomized clinical trials reached inconsistent conclusions. Several studies also state that supplemental antioxidants cannot decreased the risks of cancers and even play an inverse role because the antioxidant may not be involved in metabolism or may be a pro-oxidant in vivo. Hence, further studies are required to identify conditions of an antioxidant converting in to a pro-oxidant and the pathway of an antioxidant being a metabolic component. Additionally, long term investigations on large scale cohorts are required in order to clarify which type of cancer is suitable for antioxidant therapy and how antioxidant intake can really maintain health.

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## Oral Cancer: Causes, Symptoms, Diagnosis and Treatment

**Dr. S.Selsa**

Assistant Professor, Dept of Home Science, Sree Narayana College for Women, Kollam

\*E-mail : Selsadeepu@gmail.com

### Introduction

India has one of the highest rates of oral cancer in the world. More than 80,000 new cases are reported every year across the country. The NCRP study reported 35,000 cases of oral cancer in Madhya Pradesh alone, equivalent to four times the national average of around 13 cases per 100,000 people—and almost eight times the world's. Oral cancer is a major problem in the Indian subcontinent where it ranks among the top three types of cancer in the country. Age-adjusted rates of oral cancer in India is high, that is, 20 per 100,000 population and accounts for over 30% of all cancers in the country.

Cancer is defined as the uncontrollable growth of cells that invade our body and cause damage to surrounding tissue. Cancer begins in cells, the building blocks that make up tissues and tissues make up the organs of the body. Normal cells grow and divide to form new cells as the body needs them. When normal cells grow old or get damaged, they die, and new cells take their place. Sometimes, this process goes wrong and new cells keep forming when the body doesn't need them, and old or damaged cells don't die as they should. The extra cells that are buildup often forms a mass of tissue called a growth or tumor. Oral cancer appears as a growth or sore in the mouth that does not go away. Oral cancers begin in the tongue or in the floor of the mouth and are squamous cell carcinomas. They begin on the surface layer of the mouth and lips and if left untreated can spread to other parts of your body. Oral cancer includes cancers of the lips, cheeks, tongue, floor of the mouth, hard and soft palate, sinuses and throat (pharynx). It may originate in any of the tissues of the mouth or may be a result of metastasis from a different part of the body. If not diagnosed and treated early, they can be life threatening. Men are twice as likely to get oral cancer as a women and the risk increases with age. People with oral cancer are more likely to develop cancer of the larynx, esophagus, or lung. India accounts for 86% of the world's oral cancer cases, says the study conducted by the National Institute of Public Health in February 2011.

**Precancerous (pre-malignant) lesions** are those lesions, which precede the development of full-blown cancer. These lesions are changes in skin or lining of the mouth that are not cancer but could trigger it. Common precancerous conditions that occur in the mouth are Leukoplakia, Erythroplakia and Oral Submucous fibrosis. Only 25 percent of leukoplakias develop into cancer. However, 70 percent of erythroplakias are found to be cancerous when a biopsy is performed. Leukoplakia - a condition characterized by a whitish patch that develops inside the mouth or throat. Erythroplakia - a condition characterized by a red, raised patch that develops inside the mouth.

### **Different types of oral cancer**

Oral tumors can develop anywhere in the oral cavity and oropharynx. Some tumors are benign (noncancerous), some may be precancerous (a condition that may become cancerous), while others may be cancerous. Different types of oral cancer may develop in different areas of the mouth and throat.

#### **Benign tumors:**

- are rarely a threat to life
- can be removed and usually don't grow back
- don't invade the tissues around them
- don't spread to other parts of the body

#### **Malignant tumors(pre-cancerous):**

- may be a threat to life
- can grow back after they are removed
- can invade and damage nearby tissues and organs
- can spread to other parts of the body

Almost all oral cancers begin in the flat cells (squamous cells) that cover the surfaces of the mouth, tongue, and lips. These cancers are called squamous cell carcinomas. Oral cancer cells can spread by breaking away from the original tumor. They enter blood vessels or lymph vessels, which branch into all the tissues of the body. The cancer cells often appear first in nearby lymph nodes in the neck. The cancer cells may attach to other tissues and grow to form new tumors that may damage those tissues. The spread of cancer is called metastasis.

There are many forms of benign (noncancerous) tumors that can appear in the oral cavity or oropharynx (in addition to other sites in/on the body). **Odontogenic tumors** are tumors in the jaw that start in the tooth-forming tissues. **Rhabdomyoma** is a striated-muscle tumor that may appear on the tongue, pharynx, uterus, vagina, or heart. Some benign tumors disappear on their own. Others may have to be removed surgically. Most benign tumors do not recur. Although there are several types of malignant oral cancers, more than 90 percent of all diagnosed oral cancers are squamous cell carcinoma.

**Squamous cell carcinoma**, also known as squamous cell cancer, is a type of cancer that originates in the squamous cell layer in the lining of the oral cavity and oropharynx. In the early stages, this cancer is present only in the lining layer of cells (called carcinoma in situ). When the cancer spreads beyond the lining, it is called invasive squamous cell cancer.

**Verrucous carcinoma**, also considered a type of squamous cell carcinoma, this low-grade cancer rarely metastasizes (spreads to distant sites). **In minor salivary gland cancers**, the lining of the oral cavity and oropharynx contains numerous salivary glands. Sometimes cancer will originate in a salivary gland. Treatment depends on the type and location of the salivary gland cancer, as well as the extent of spreading. According to the ACS (American cancer society), salivary gland cancers are rare.

### **Risk factor (causes) Four “S” to cancer- Sepsis, Spices, Smoking, and Spirit**

A risk factor is anything that may increase a person's chance of developing a disease. It may be an activity, such as smoking, diet, family history, or many other things. Different diseases, including cancers, have different risk factors. Oral cancer affects those from the lower socioeconomic strata of society due to a higher exposure to risk factors such as the use of tobacco. Illiteracy and lack of awareness regarding the risk factors and consequences of oral cancer may worsen the situation.

**Tobacco** : (Smoking) Use of tobacco accounts for most oral cancers. Longer the duration of use of , the higher is the risk. The risk is even higher for tobacco users who drink alcohol heavily. In fact, three out of four oral cancers occur in people who use alcohol, tobacco, or both alcohol and tobacco. Tobacco contains around 4,000 chemical constituents among which more than two dozen are known carcinogens (cancer causing chemicals). It is the single biggest culprit in the development of almost all pre-cancerous lesions.

**Alcohol** (Spirit): Oral cancers are about six times more common in drinkers than in nondrinkers. Alcohol is known to irritate the lining inside the mouth or gums to a certain extent. People who drink alcohol are more likely to develop oral cancer than people who don't drink. The risk increases with the amount of alcohol that a person consumes. The risk increases even more if the person both drinks alcohol and uses tobacco.

**Sun**: Prolonged exposure to ultraviolet radiation from the sun can cause lip cancer.

**Chronic irritation**: Chronic irritation to the lining of the mouth, due to poorly fitting dentures , rough teeth, or other reasons, may increase a person's risk for oral cancer

**A personal history of head and neck cancer**: People who have had head and neck cancer are at increased risk of developing another primary head and neck cancer.

**Lack of fruits and vegetables in diet (Spicy)**: Cancer is the eventual outcome of the interaction between genetic factors and environmental exposures. Nutrition and diet, as environmental factors and determinants of growth and body composition can contribute to the risk of some human cancers such as oral cancer. Use of excess spicy food can also cause cancer.

**Human papilloma virus (HPV) infection: (HPV 16 and HPV 18)** (Sepsis) : HPV usually causes warts and has been linked to cervical, vaginal, and penile cancers. HPV also increases the risk for oral cancers. These viruses are passed from person to person through sexual contact.

**Poor oral health (periodontitis):** Chronic periodontitis and cancer have association with each other.

**Betel nut use:** Betel nut use is most common in Asia, where millions chew the product. The risk increases even more if the person also drinks alcohol, eats spicy food and use tobacco.

**Toothpaste:** Nicotine in adulterated toothpastes can have the same ill effects as that in tobacco products like cigarettes and paan products.

## Symptoms

- Swellings/thickenings, lumps or bumps, rough spots/crusts/or eroded areas on the lips, gums, or other areas inside the mouth
- The development of velvety white, red, or speckled (white and red) patches in the mouth
- Unexplained bleeding in the mouth
- Unexplained numbness, loss of feeling, or pain/tenderness in any area of the face, mouth, or neck
- Persistent sores on the face, neck, or mouth that bleed easily and do not heal within 2 weeks
- A soreness or feeling that something is caught in the back of the throat
- Difficulty chewing or swallowing, speaking, or moving the jaw or tongue
- Hoarseness, chronic sore throat, or change in voice
- Ear pain without hearing loss
- A change in the way your teeth or dentures fit together
- Dramatic weight loss
- Loose teeth

## Diagnosis of oral cancer

Diagnosis is done by examining carefully at the roof of the mouth, back of the throat, and insides of the cheeks, on the sides and underneath the tongue,lips, floor of your mouth and lymph nodes in your neck for abnormal areas. If an abnormal area is found, a small sample of tissue may be removed. Removing tissue to look for cancer cells is called a biopsy.

## Treatment for oral cancer

### Staging:

If the biopsy shows that cancer is present, next step is to know the stage of the disease based on the size of the tumour which usually requires a lab test which includes endoscopy, dental X-rays, chest X-rays, CT scan, MRI scan or other imaging tests.

### Surgery

Surgery to remove the tumor in the mouth or throat is a common treatment for oral cancer. Sometimes the surgeon also removes lymph nodes in the neck. Other tissues in the mouth and neck may be removed as well. Patients may have surgery alone or in combination with radiation therapy. Surgery may cause tissues in your face to swell. This swelling usually goes away within a few weeks. However, removing lymph nodes can result in swelling that lasts a long time.

### Radiation therapy

Radiation therapy (also called radiotherapy) is a type of local therapy. It affects cells only in the treated area. Two types of radiation therapy is used to treat oral cancer. In external radiation therapy the radiation comes from a

machine. Patients go to the hospital or clinic once or twice a day, generally 5 days a week for several weeks. In internal radiation therapy (implant radiation) the radiation comes from radioactive material placed in seeds, needles, or thin plastic tubes put directly in the tissue. The patient stays in the hospital. The implants remain in place for several days. Almost all patients who have radiation therapy to the head and neck area develop oral side effects, so it is important to keep the mouth in good condition before cancer treatment begins. The side effects of radiation therapy depends mainly on the amount of radiation given. Some side effects in the mouth go away after radiation treatment ends, while others last a long time and a few side effects may never go away. Some of the side effects of radiation therapy are, dry mouth, tooth decay, sore throat or mouth, sore or bleeding gums, infection, delayed healing after dental care, jaw stiffness, denture problems, changes in the sense of taste and smell, changes in voice quality, changes in thyroid, skin changes in the treated area and fatigue.

### **Chemotherapy**

Chemotherapy uses anticancer drugs to kill cancer cells. It is called systemic therapy because it enters the bloodstream and can affect cancer cells throughout the body. Chemotherapy is usually given by injection. Chemotherapy and radiation therapy can cause some of the same side effects, including painful mouth and gums, dry mouth, lowered immune system, and changes in taste. Some anticancer drugs can also cause bleeding in the mouth and a deep pain that feels like a toothache.

### **Rehabilitation after oral cancer**

Rehabilitation may vary from person to person depending on the type of oral cancer treatment, and the location and extent of the cancer. Rehabilitation may include:

- **Dietary counselling** : Patients may have difficulty in eating after oral surgery, so it is always advisable to eat small meals consisting of soft, moist foods.
- **Surgery**: Some patients may benefit from reconstructive or plastic surgery to restore the bones or tissues of the mouth, returning a more normal appearance.
- **Prosthesis**: If reconstructive or plastic surgery is not an option, patients may benefit from dental or facial-part prosthesis to restore a more normal appearance. Special training may be needed to learn to use a prosthetic device.
- **Speech therapy**: If a patient experiences difficulty in speaking following oral cancer treatment, speech therapy may help the patient relearn the process.

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## **Food Habits and Cancer**

**\*Krishnendu. J.R., \*\*Nandini P .V**

\*Research Scholar, \*\* Head, Food Science and Nutrition,

Department of Home Science, College of Agriculture, Vellayani, Trivandrum, Kerala, India.

\*E- mail: jrkrishnendu@gmail.com

### **Introduction**

Cancer is now a major cause of mortality throughout the world. An estimated 10 million new cases and over 7.6 million deaths from cancer occurred in 2008 (WCRF, 2010). In developing countries, around 60 per cent of cancers of the oral cavity, pharynx and esophagus are thought to be a result of micronutrient deficiencies related to a restricted diet that is low in fruits and vegetables and animal products (Cheng et al., 2000 and Sharp et al., 2001). In normal cells, the rate of new cell growth is kept in balance with the rate at which old cells die. In cancer cells this balance is disrupted either by the loss of normal growth control or the loss of a cell's ability to undergo programmed cell death, known as apoptosis. Cancer cells originate when a cell does not replicate itself perfectly, this increases its chance of genetic mutation. These cancer cells and their offspring then multiply uncontrollably and can invade and damage nearby tissue. Cancer cells are completely "egoistic" in their behavior (WHO, 2005).

### **Major causes for cancer development**

Demographic and socioeconomic changes influence the living and working habits of populations. Economic growth, modernization, urbanization and socialization have changed the lifestyle of Indian families. The transition from a traditional to modern lifestyle, consumption of diets rich in fat and calories combined with a high level of mental stress has leads to the formation of cancers. A shift in eating habits and the adoption of a sedentary life style has led to the increasing prevalence of cancer, all across India in the last few decades (WHO, 2005). The diet or lifestyle of different populations might partly determine their rates of cancer (Verkasalo, 2000; Ceska, 2002; Zollner,1990).

According to a research paper published in the prestigious Lancet (Allen and Spencer, 2002), there is corroborative evidence that diet and lifestyle is playing a major role in the development of cancer. Significant positive associations were found between obesity and higher death rates for the following cancers: esophagus, colon and rectum, liver, gallbladder, pancreas, kidney, stomach, prostate, breast, uterus, cervix, and ovary (Calle et al., 2003).

Food preparation methods lead to the formation of cancer cells (Block et al., 2002). High heat cooking methods such as grilling, broiling, and barbecuing will also increase the risk of cancer (Hsing et al., 2002). In 2002, a Swedish study reported that many foods contain high levels of a chemical called acrylamide and is known to cause cancer by damaging DNA. Acrylamide is produced when starchy foods are heated to high temperatures, and is found in foods such as chips, crisps and some bread (www.cancerresearchhuk.org). Large amounts of salt-cured and salt-pickled foods have been related to stomach, colon and bladder cancers. Sodium and potassium nitrates used in salting, pickling, and curing processes and this nitrates can be converted into nitrite, which can form potential carcinogens nitrosamines (Riboli, 2003).

High dietary total fat and saturated fat related to increased risk of breast, colon, endometrial and prostate cancer (Wu et al., 2004). A Medline search in February 2003 uncovered 26 reports of human studies investigating the link between diet and colon or colorectal cancer. Of the 26 reports, 21 of them reported a significant positive relationship between red meat and colon or colorectal cancer (Bingham et al., 2002). There is also consistent evidence that consuming drinks and foods at a very high temperature increases the risk of mouth, colon and alimentary canal cancers (Sharp et al., 2001). Reheated and use of rancid oils also contain free radicals and all those have carcinogenic effect (Cheng et al., 2000). Cumming et al. (1992) reported that excess consumption of betel nut by a particular population and this may leads to development of various type of cancers in the future life. Some pesticides may be carcinogenic at extremely high doses, however they are safe at the levels permitted on fruits and vegetables (Holmes et al., 2004). WCRF (2010) reported that food additives, colours and preservatives used for food processing and preservation are at higher level leads to carcinogenic effects on health. Alcohol is associated with increased risk of mouth, esophageal and breast cancer. Mouth and esophageal cancer are especially increased if alcohol is

combined with smoking (Slattery et al., 2004). Excess alcohol consumption leads to liver cirrhosis and leads to liver cancer ( Miller, 2001) .

## **Management of cancer**

Substances present in vegetables and fruit may help to protect against cancer due to presence of substances like dithiolthiones, isothiocyanates, indole-3-carbinol, allium compounds, isoflavones, protease inhibitors, saponins, phytosterols, inositol hexaphosphate, vitamins, minerals, limonene, lutein, beta carotene, lycopene, flavonoids, and dietary fiber (Kristia and John, 1996). Antioxidants stop free radical oxidation which may help to prevent cell and tissue damage that can promote cancer. Fiber-rich diets may protect against colon cancer. In intestine bile can be converted into potential cancer causing substances. Soluble fibers can bind bile acids and increase their excretion. Insoluble fibers absorb water making a larger, softer stool which can dilute potential cancer causing substances. Foods high in fiber are typically lower in fat, which may also help to protect against colon cancer by reducing bile acid production (Holmes et al., 2004).

Several prospective cohort studies have found associations between high intake of lycopene and reduced incidence of prostate cancer, (Giovannucci et al., 2002). A study conducted by Tsai et al. (2000) demonstrated that a whey protein isolate had an enhancing effect on the cytotoxicity of baicalein, a potential anticancer drug, when applied to a human cell line. Whey contains enzymes that catalyze detoxification compounds and fasten to mutagens and carcinogens, facilitating their elimination from the body. Induction of apoptosis in tumor cells and the regulation of growth factors involved in cell differentiation. A balanced ratio of omega 3 and omega 6 fats and would include DHA is helpful for prevention of cancer development. Flax seed as a source of phytoestrogens , Omega 3 fats (alpha-linolenic acid, EPA, DHA) have been shown in animal studies to be protect from cancer. The recently reported study showed that people who an 80g portion of fish a day reduced their bowel cancer risk by a third compared to people who ate less than that in a week, fish oils are especially rich in polyunsaturated omega-3 fatty acids (Hall, 2008). Healthier cooking methods include roasting, broiling, poaching, steaming, stewing, braising and microwaving reduce the risk of cancer formation (Block et al., 2002).

Red wine is a good source of polyphenols grape skin and seeds contain a phytochemical named resveratrol that has an ability to prevent free radical oxidation in body and avoid the formation of cancer cells (Beresford et al., 2001). Dark chocolate contains good amount of polyphenols and it will help in potentially capable of exercising beneficial effects on cancers (Calle et al., 2003). In general, soy is a good source of protein and low in saturated fat. Soy contains isoflavones, which are compounds very like the hormone estrogen (Holmes et al., 2004). Researchers have investigated green tea as a potential protectant against cancer. Green tea contains polyphenols, chemicals that act as powerful antioxidants. The most comprehensive of these studies supports an inverse association of green tea and stomach cancer, esophageal cancer and pancreatic cancer (Joan, 2009). Green tea contains high levels of a group of chemicals called catechins. Because of the way it is prepared, green tea contains 3-10 times more catechins than black tea. Laboratory studies on cells have shown that catechins could block the growth of cancers. They prevent DNA damage by mopping up free radicals, blocking the growth of tumour cells and stopping the activation of cancer-causing chemicals (Joan, 2009). Curcumin, an active ingredient in turmeric, is an antioxidant. Laboratory studies have also shown that curcumin interferes with several important molecular pathways involved in cancer development, growth, and spread. Researchers have reported that curcumin inhibited the formation of cancer-causing enzymes in rodents (Dorant, 1993).

## **Conclusion**

About one third of cancers have generally been thought to be related to dietary factors. More recent evidence suggests that this number may be too high. Among the diet-related factors, overweight and obesity convincingly increases the risks of several common cancers. After tobacco, overweight and obesity appears to be the most important avoidable cause of cancer. Avoidance of overweight is the most important strategy for cancer prevention and also included a well balanced diet. A well balanced diet should include all the food groups in the food pyramid in the right amounts. Prevention of cancer will be the greatest public health challenge of the 21<sup>st</sup> century.

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## **Creating Awareness on Natural Prescriptions to Reduce the Risk of Breast Cancer among selected Obese Females**

**\*Soorya M.Kottaram,**

Lecturer, Dept of Clinical Nutrition and Dietetics, Women's Study Centre, St.Teresa's College, Ernakulam.

\*E- mail: surya\_kottaramyahoo.co.in

### **Abstract**

Cancer is a multi factorial, multistage and multi mechanistic disease in which a host cell is transformed normal to malignant cells. Breast cancer is a common cancer among females; about 9% of new cases in India are of breast cancer. The dietary habits of the individuals promote the development of breast cancer, especially high fat and low fibre intake. There is a possible link between weight and breast cancer risk, being overweight significantly increases the risk of breast cancer. The excess body fat tends to produce oestrogen hormone. Oestrogen stimulates the breast tissues to increase cell division. That sometime results cancer due to error in cell division. A high fat diet increases oestradiol production by 30%.Oestradiol causes the cells to divide more often and more rapidly creating thousands of new cells. The weight gained early in adulthood does the greatest damage to the breast. Many risk factors such as high fat, high calorie diet or lack of exercise may all exert their risk primarily through building excess body fat which act as a high oestrogen production factory. The diet low in total and saturated fat, high in plant foods especially green and yellow vegetables, citrus fruits, soy products and fibre diets are associated with a low risk of many of the major cancers especially breast cancer. Breast self examination is the best method to find out breast cancer as early as possible. Women are unaware about the severity of this disease condition. Thus creating awareness on breast cancer was considered to be the best method for the prevention of this life threatening disease. Keeping this in mind the study assessed the risk of breast cancer and conducted an awareness programme named "*Natural prescriptions to reduce the risk of breast cancer*" among selected obese females. The objectives of the study were the assessment of risk of developing breast cancer using formulated risk assessment tool, confirmation of the breast cancer risk through biochemical analysis, conducted an awareness programme .Totally 100 adult females within the age group of 35 to 55 years who lead sedentary lifestyle were selected. From these obese samples were screened by assessing BMI. Screened obese samples (42) were categorized under different grades of obesity such as Grade 1, Grade II and Grade III. Graded obese samples were assessed for the risk of breast cancer with risk assessment tool. On the basis of the review of previous literature and consultation with an expert oncologist, a risk assessment tool was formulated. Risk assessment tool included the scored risk factors such as age at menarche, age at first delivery, age at menopause, personal habits and chance for mutation. Based on total score attained through risk assessment tool the breast cancer risk of selected subjects was categorized under very low risk, low risk, moderate risk, high risk and very high risk group. Based on the result of risk assessment tool, sub samples for Biochemical analysis were selected from each category of risk. The study revealed that the selected obese females had low and moderate risk for Breast cancer. It was also proved that the relationship between BMI fat intake, serum oestradiol, and serum triglyceride levels with breast cancer risk was positive and significant. Majority of the selected obese females had a vague idea about breast cancer before education. So the awareness programme created significant knowledge regarding breast cancer and its natural preventive measures.

**Key Words:** Breast Cancer, Obesity, Risk assessment tool, Awareness programme.

### **Introduction**

Cancer is a multifactorial, multistage and multi mechanistic disease in which a host cell is transformed normal to malignant cells. Breast cancer is a common cancer among females; about 9% of new cases in India are of breast cancer. The dietary habits of the individuals promote the development of breast cancer, especially high fat and low fibre intake. There is a possible link between weight and breast cancer risk, being overweight significantly increases the risk of breast cancer. The excess body fat tends to produce oestrogen hormone. Oestrogen stimulates

the breast tissues to increase cell division. That sometime results cancer due to error in cell division. A high fat diet increases oestradiol production by 30%. Oestradiol causes the cells to divide more often and more rapidly creating thousands of new cells. The weight gained early in adulthood does the greatest damage to the breast. Many risk factors such as high fat, high calorie diet or lack of exercise may all exert their risk primarily through building excess body fat which act as a high oestrogen production factory. The diet low in total and saturated fat, high in plant foods especially green and yellow vegetables, citrus fruits, soy products and fibre diets are associated with a low risk of many of the major cancers especially breast cancer. Breast self examination is the best method to find out breast cancer as early as possible. Women are unaware about the severity of this disease condition. Thus creating awareness on breast cancer is considered to be the best method for the prevention of this life threatening disease.

## **Objectives**

- To assess the percentage of selected women whom were under the risk of developing breast cancer using formulated risk assessment tool and confirm the risk through biochemical analysis.
- To create an awareness on natural prescriptions to reduce the risk of developing breast cancer by using an education kit developed by the investigator.

## **Materials and Methods**

The methodology pertaining to the present study was discussed under the following headings:

### **1. Assessment of Risk on developing breast cancer**

1.1 Identifying the major causes of breast cancer- The major causes of breast cancer were determined from all available sources such as consultation with an expert oncologist, dieticians, magazines, and other related study materials and also from internet sources. Important causes of breast cancer were analyzed directly by interviewing the breast cancer patients those who are willing.

1.2 Formulation of Risk Assessment Tool: Risk assessment tool included the scored risk factors such as age , age at menarche, age at first delivery, age at menopause, family history, body weight, fat intake , environmental factors, personal habits and chance for mutation.

1.3 Assessing the risk among selected obese females using the formulated risk assessment tool: The percentage of obese women under risk of developing breast cancer was studied through risk assessment tool. The detailed information pertaining to this was collected as follows,

Totally 100 adult females, within the age group of 35 to 55 years who lead sedentary life style were selected from Erode District for the present study. From these 42 obese females were categorized under different grades of obesity. Graded obese samples were assessed for risk assessment using risk assessment tool. Based on total score resulted through assessment, the risk of breast cancer among selected subjects was categorized under very low risk, low risk, moderate risk, high risk and very high risk group. For confirming the risk, biochemical tests like serum estradiol and triglyceride level of selected samples from each risk groups were done.

### **2. Creating Awareness on Breast Cancer**

The most important reason for the high prevalence of breast cancer is the women's ignorance about it. Most of the breast cancer risks were avoidable. In the present study, an awareness programme on breast cancer named '*Natural Prescriptions to reduce the risk of Breast Cancer*' was conducted for the selected obese females. A Microsoft power point presentation was used for educating the selected obese subjects.

### **3. Evaluation of the impact of the awareness programme on breast cancer knowledge**

The evaluation of the awareness programme was assessed through designed proforma. The proforma was distributed to the samples before and after the awareness programme.

## **Results and Discussion**

### **1. Assessment of the percentage of Obese Females among Selected Samples**

Among the 100 selected females, anthropometric levels showed that 42% were obese of which 23% were Grade I obese, 15% were grade II obese and 4% were grade III obese.

### **2. Risk Assessment of the Selected Obese Samples**

#### **2.1 Age profile of the selected samples**

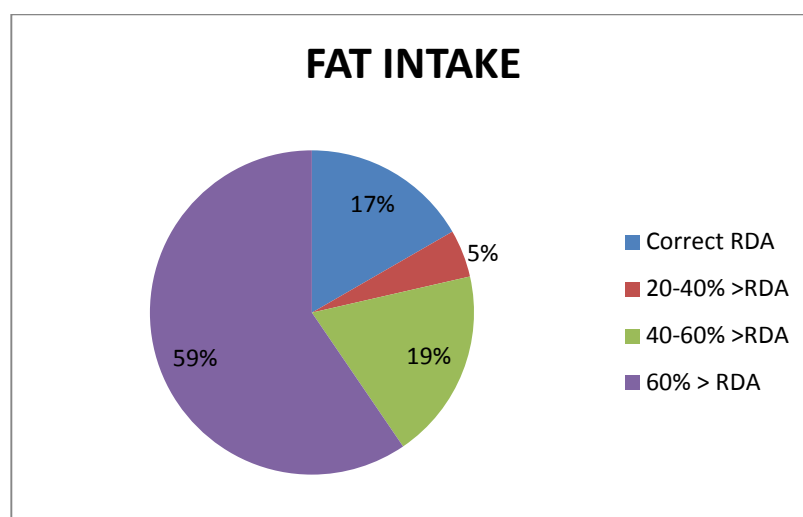
It was revealed that 26.19% of the selected samples were within the age group of 35-40 years, 21.43% were within the age group of 40-45 years and 33.33% were in 45-50 years. Only 19.05% were above the age of 50 years. 42.86% of the selected women were started menstruation between the age of 11-13 years, 33.33% in the age of 13-15 years and 19.05% only after 15 years of age. Women who start menstruating early in life have an increased risk of developing breast cancer. Considering the age at first delivery 40.48% within the age group of 25-30 years and 38.1% gave birth to first child in the age group of 20-25 years. Nearly 20% females gave birth to first child after the age of 30 years. The high risk of breast cancer for women who have their first child after the age of 30 is about twice than those who have their first child before the age of 20. Among the selected females only 11 females had reached their menopause. 16.67% attained their menopause in the age of 45-50 years. The remaining 9.52% attained, within 50-55 years of age. Women who have a natural menopause after the age of 55 are twice as likely to develop breast cancer as women who experience the menopause after the age of 45.

#### **2.2 Family History of Various types of Cancer**

33.33% of the selected samples had no history of any type of cancer. The percentages of samples that had one close relative, two close relatives and three close relatives with cancer were 35.71%, 21.43%, 9.52% respectively. If one of the parent or three close relatives had breast cancer, they have a 50% chance for breast cancer.

#### **2.3. Fat Intake**

Majority (59.52%) took 60% more fat than RDA. Nearly 20% had taken more than 40% fat of the RDA.



Cholesterol is the main precursor of estrogen hormone in the female body. The high fat intakes triple the chance for breast cancer. 40% above intake of fat increase the breast cancer risk up to 50%.

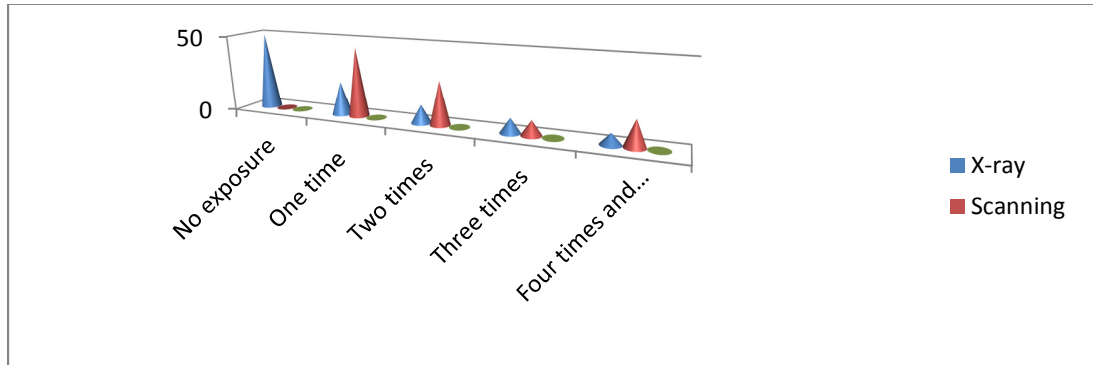
#### 2.4. Environmental Factors

Environmental Factors		%
Types of Residential area	Town	33.33
	Semi town	28.57
	Village	38.1
Industries in nearby residential area	Yes	21.43
	No	78.57
Chance for Industrial Pollution	Yes	19.05
	No	80.95
Nature of working place	Office work	90.48
	Others	9.52
Chance for radiation in working place	Yes	-
	No	100

#### 2.5 Habit of using oral contraceptives

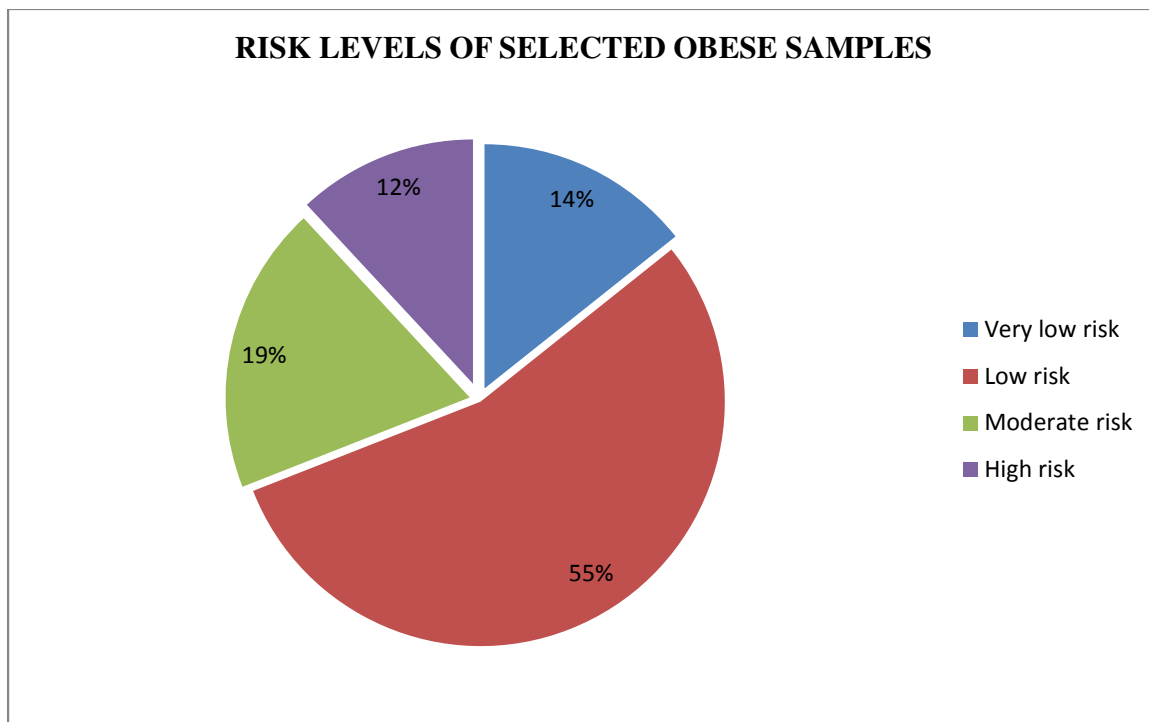
Nearly 30% had the habit of using oral contraceptives. Among them 26.19% had started using this between the ages of 35-40. Among the users 16.67% were taking this for 1-2 years and 14.29% had been consuming it for 2-4 years. Only one person had been using it for more than four years.

## 2.6 Chance for gene mutation



## 2.7. Risk Levels of Selected Samples

A risk assessment scale was formulated for women by allotting scores to all the factors, so that the total score of 50 was obtained.



## 2.8. Biochemical profile of the selected samples

SERUM LEVELS	VERY LOW MEAN ± SD	LOW MEAN ± SD	MODERATE MEAN ± SD	HIGH MEAN ± SD
Serum Estradiol (pg/ml)	30.2 ± 37.84	57.895 ± 18.11	95.2 ± 42.58	65.45 ± 55.55
Serum triglyceride (mg/dl)	140 ± 3.26	147.9 ± 15.88	114 ± 33.87	145.05 ± 19.24

For confirming the risk, biochemical tests like serum estradiol and triglyceride level of selected samples from each risk groups were tested.

### 3. Creating Awareness on Breast Cancer

In the present study, an awareness programme on breast cancer named “*Natural Prescription to reduce the risk of Breast Cancer*” was conducted for the selected obese females. A micro soft power point presentation was used for educating the selected obese samples. The details about definition, developmental stages, types, risk factors, symptoms, diagnosis, treatment and natural preventive measures were informed to the subjects using LCD projector and lecture method.

### 4. Evaluation of the impact of the awareness programme on breast cancer knowledge

The knowledge about breast cancer of the selected samples was assessed through specially designed proforma. The proforma consist of 30 questions about the disease. The answer to each question was scored and knowledge was rated based on the total score. The usefulness of the awareness programme was assessed by distributing the proforma before and after the education before the programme most of them had a vague knowledge regarding this disease. The result of the knowledge assessment after the programme showed that all the samples attending the programme got excellent information about breast cancer. All of them revealed excellent knowledge rating after the programme. So the awareness programme became helpful and successful one with the willingness and co-operation of the participants.

### Conclusion

The present study pointed out that most of the selected obese females had low and moderate risk of breast cancer. It was also proved that relationship of BMI, fat intake, serum estradiol and serum triglyceride level with breast cancer risk was positive and significant. Majority of the samples had a vague idea about this disease before education. Thus creating awareness on breast cancer was considered to be the best method for the prevention of the occurrence of this life threatening disease.

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## **Formulation of a Home Enteral Nutrition (HEN) for Cancer Patients**

**Manju George, \*Dr. Betty Rani Isaac**

\*Associate Professor, Department of Home Science, St. Teresas College, Ernakulam, Kerala, India.

\*E- mail: bettyranijose@yahoo.co.in

### **Abstract**

Home enteral tube feeding is a better technique due to its beneficial effects such as more economical, consideration of individual nutrients based on personal requirements compared to commercial products. Patients with head and neck cancer are at high risk for malnutrition due to dysphagia from the tumor and treatment. Despite difficulty with oral intake, these patients usually have a normal stomach and lower gastrointestinal tract. Enteral nutrition support via percutaneous endoscopic gastrostomy (PEG) administered to the patient helps to prevent weight loss, dehydration, nutrient deficiencies, treatment interruptions, and hospitalizations. It also improves quality of life. On the basis of balanced diet for Indian adults by ICMR, a home enteral feed was formulated. Nutrient analysis, functional quality as well as microbial safety of the formula were assessed. The procedure for the preparation was based on five food group system was simple and feasible for local production. On comparing HEN with commercial formula showed Hen was more nutrient dense and less viscous. The results on storage stability using microbial assay and moisture analysis showed that the formulated mix can be prepared in bulk and stored safely for 14 days in air tight containers at household storage conditions.

**Key Words:** HEN, Nutrition Support.

## **Rising prevalence of cancer among women in Kerala**

**Jansamma Kurian**

Asst. Professor, Department of Mathematics, St. Joseph's College for Women, Alappuzha, Kerala, India.  
\*E- mail: jansammakurian @rediffmail.com

### **Introduction**

Health indicators of Kerala State such as infant mortality rate (14/ 1000 live births) and life expectancy at birth (71 yr for men and 76 yr for women) are far ahead of the Indian averages and closer to the developed countries. Kerala has roughly 35,000 new cancer cases every year based on the cancer registry data. A total of 100,000 cancer patients are in prevalence annually in the state. Though the rate of cancer occurrence in Kerala is much lower compared to western countries, the large population will give rise to a large number of cancers. Studies have shown that 70 – 90% of cancers are environmental.

### **Male-female cancer ratio reversed in the past 30 years in the State**

The incidence of cancer among women has risen and the male to female ratio of cancer patients in the State has reversed in the last 30 years. Even the average age of women at diagnosis of cancer is five years less than that of males. As per the data, from the consolidated report of 30 years from the Hospital-based cancer registry of the Regional Cancer Centre, Thiruvananthapuram, the male to female ratio in 1997 was 1.14, in 2011, this had become 1.00, Breast and thyroid cancer are found to have been more prevalent among women. Though the cancer of uterine cervix has declined in the last 30 years, the number of breast cancer cases have shot up alarmingly, especially among youngsters. A total of 28.1 per cent of all cancer cases reported among women in the hospital were breast cancer, A striking trend that happened over the years is the increase of leukaemia cases among both men and women

### **Type of Cancers**

#### **Breast Cancer**

A large number of factors are identified as risk factors for breast cancer. Late age at first pregnancy greater than 30 years, single child, late age at menopause etc are some of them. A high fat diet is also identified as a risk factor. Physical activity is found to be protective for breast cancer. The sudden changes towards affluent life styles have reduced the physical activities to a minimum and increased the consumption of diets rich in fat. High fat diets during the pubertal age and obesity in the post menopausal age are risk factors for breast cancer.

#### **Thyroid cancer**

The increase in thyroid cancer among women, with an increase of 195 per cent in the 15 to 34 year group and a 289 per cent increase in the 35 to 64 year age group over the past 30 years is something that needs detailed investigation.

#### **Cervical Cancer**

Early age at first intercourse, multiple sexual partners, poor sexual hygiene, repeated child birth are some of the reproductive risk factors for cervical cancer. Improvements in the living standards of women has resulted in a reduction in the incidents of cervical cancer. Regular cervical cytology examination (pap smear) by all women who have initiated sexual activity can prevent the occurrence of cervical cancer.

### **Cancer of the head and neck**

The main risk factor for these cancers is tobacco and alcohol. A diet rich in green and yellow vegetables has been shown to offer protection against oral cancer. Avoidance of tobacco and alcohol is the most important preventive action against mouth, throat and lung cancers.

### **Cancer of the stomach**

Japanese had the highest rate of stomach cancer of the world and the rates in Japanese migrants have dropped to very low levels as that of Americans when they migrated to the United States. This is clear evidence of the dietary pattern and risk of stomach cancer.

### **Cancer of the large intestine**

Heavy consumption of red meat can lead to risk of colon cancer. White meat such as that of poultry do not have this risk. There is an international correlation in between the occurrence of large bowel cancer and consumption of red meat. In South India there is a trend towards increasing consumption of red meat and this can lead to increased risk for large bowel cancer.

### **How to Prevent Cancer**

Cancer risk is related to genes and exposure to several environmental toxins. While certain risks are un-changeable (genes), some lifestyle factors if modified may help prevent the occurrence of cancer. Another important measure for prevention of cancer is by knowing one's own body and being aware of any changes to detect a possible cancer as early as possible. A healthy lifestyle can lower the risk of certain cancers.

### **Measures to prevent Cancers**

#### **Eating a healthy and balanced diet**

There is a lot of research on what raises cancer risk and what reduces it, however, no single food or supplement can prevent cancer from developing. Overall, research shows a link between eating certain groups of foods and a reduction in cancer risk. Healthy diet includes plenty of fruit and vegetables (at least 5 portions a day), plenty of bread, rice, potatoes, pasta and other foods with carbohydrates and especially those with fiber. Eating enough fiber reduces the risk of bowel cancer. Fibre-rich foods include wholegrain pasta, bread, breakfast cereals and rice. Pulses, fruit and vegetables are also good sources of fiber.

There should be some meat, fish, eggs, beans and other non-dairy sources of protein as well as some milk and dairy foods in diet. Although meat is good source of protein, vitamins and minerals, such as iron and zinc, there is evidence that too much of red processed meat can be bad as it may raise risk of bowel cancer. Red meat includes beef, pork and lamb and processed meat includes bacon, sausages, salami and ham. Diet should contain only small amounts of foods and drinks high in fat or sugars. Diet should be high in foods with antioxidants.

#### **Maintaining a healthy and normal body weight**

High body weight, obesity and being overweight raises the risk of several cancers including bowel cancer, pancreas cancer, esophagus cancer, kidney cancer and breast cancer.

#### **Stopping smoking completely**

90% of lung cancer cases are related to smoking. It is the single most important preventable factor in prevention of lung cancer. The earlier smoking is stopped the better it is.

### **Consuming less alcohol**

Excessive alcohol consumption is linked to oral cancer, cancer of the voice box (larynx) or pharynx (back of the mouth), bowel cancer (especially in men), liver cancer and breast cancer (in women). Women shouldn't regularly drink more than 2-3 units of alcohol a day, and men shouldn't regularly drink more than 3-4 units a day.

### **Preventing prolonged exposure of bare skin to the sun**

Skin cancers are common among Caucasians who are exposed to the sun's ultraviolet rays for long durations of time.

### **Prevention of sexually transmitted disease by using safe sex measures**

This can prevent transmission of Hepatitis C and Human Papilloma Virus (HPV). The former is responsible for liver cancers while the latter for cervical cancers.

### **Prevention of exposure to environmental factors**

Work place safety among those who work with radiation and with asbestos is important. Exposure to radiation and chemicals like benzene may cause leukemias while exposure to asbestos fibers may lead to lung cancers like mesothelioma.

### **Screening**

Cancer screening is an attempt to detect unsuspected cancers in an asymptomatic population. These are applied to healthy individuals usually after a certain age. Screening for cancer can lead to earlier diagnosis in specific cases. Early diagnosis may lead to extended life.

Best examples of benefits due to screening include screening for breast cancer by mammograms, for colon cancers through fecal occult blood testing and colonoscopy and for cervical cancers through regular Pap smears for cervical cytology.

### **Genetic testing**

Genetic testing for high-risk individuals is already available for certain cancer-related genetic mutations. Some cancers are typified by certain genetic features. This includes examples like BRCA1 and BRCA2 genes for breast ovarian and pancreatic cancers MLH1, MSH2, MSH6, PMS1, PMS2 for colon, uterus, small bowel, stomach and urinary tract cancers.

### **Conclusion**

In 1982, cervical cancer accounted for 28.8 per cent of cancers in women, by 2011, it had declined to 8.2 per cent. However, breast cancer rates went up by 2011, accounting for 28.1 per cent of the cancers in women, becoming the leading site of cancer. Lung and hematological cancers were on the rise among both male and female. In 1982, if 70 per cent of the cancer cases in men were tobacco-related, the figure had declined to 23 per cent in 2011. The proportional decline of tobacco-related cancers together was 39 per cent in both genders. Among males 50% of cancers in the mouth, throat and lungs are caused by Tobacco and alcohol habits. Among women tobacco related cancers are 15%.

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## **Formulation of Foods as Preventive Nutrition: A Nutrition Education Programme**

**\*Ani Thomas Thottan, Jisha A. Prabha\*\***

\* Lecturer, St. Teresa's College, Ernakulam.

\*\*Research Scholar, Dept. of Home Science, St. Teresa's College, Ernakulam.

\*E- mail: anithomasthottan@gmail.com,prabha.jisha@gmail.com

### **Abstract**

Antioxidants are chemicals that interact with and neutralize free radicals, thus preventing them from causing damage. Antioxidants are also known as "free radical scavengers." Free radicals are highly reactive and have the potential to cause damage to cells, that may lead to cancer. Free radicals are formed naturally in the body. In addition, some environmental toxins may contain high levels of free radicals. Antioxidants are chemicals that block the activity of free radicals. Some antioxidants are made naturally by the body. Others can only be obtained from external (exogenous) sources, including the diet and dietary supplements. The most prominent representatives of dietary antioxidants are selenium, vitamin C, tocopherols, carotenoids and flavanoids. The present study was aimed to impart awareness among house wives about the role of antioxidant rich foods in preventive nutrition. Twenty antioxidant rich products were developed and the best nine products were selected statistically by considering their organoleptic qualities. Vitamin A and vitamin C content were analysed biochemically. Cost was calculated and the products were popularized among housewives. The study concluded that the developed products were rich in antioxidants like vitamin A and C and were highly accepted by the panel members.

**Key Words:** Formulation, Nutrition Programme.

### **Introduction**

The word antioxidant means "against oxidation." According to Tsang (2009), antioxidants are substances or nutrients in our foods which can prevent or slow the oxidative damage to our body. Antioxidants are intimately involved in the prevention of cellular damage - the common pathway for cancer, aging, syndrome X, burnout syndrome and a variety of diseases. According to Kravchenko J, et al., (2009) diet and obesity contribute to 30-35% of cancer death along with other factors. Antioxidants are the body's premier resource for protection against the diverse free radical and other oxidative stressors to which it invariably becomes exposed. A number of the vitamins, minerals and compounds in food have antioxidant properties. Vitamins A, C and E are among the most well known, as are beta-carotene, lycopene and selenium. Antioxidants benefit your health by cleaning free radicals out of your bloodstream. They are believed to help prevent disease by fighting free radicals, substances that harm the body when left unchecked (Vivekananthan, 2003).

One of the causes of cancer is excessive free radical damage in your cells that harms your DNA and results in some cells mutating into cancerous ones. Antioxidants get rid of free radicals. Every chemical and toxin in your body causes damage similar to free radical and carcinogenic ones cause even more. Lynne Eldridge MD (2012) describes Free Radicals (FR) as highly reactive molecules that are produced in the body naturally as a by product of metabolism (oxidation) and by exposure to toxins in the environment (tobacco, smoke, UV light etc). Hence free radicals are atoms or groups of atoms with an odd (unpaired) number of electrons and can be formed when oxygen interacts with certain molecules. Any free radical involving oxygen can be referred to as reactive oxygen species (ROS). When free radicals steal an electron from a surrounding compound or molecule a new free radical is formed in its place. Once formed these highly reactive radicals can start a chain reaction, like dominoes. Cells may function poorly or die if this occurs. FR production is unavoidable, therefore a comprehensive antioxidants defense system is present within the body to counter act FR and their products and keep FR in check, which is essential for healthy life. The action of dietary antioxidants may include chain breaking, scavenging and chelating. When under stress, the need for nutrients is much greater. The most important dietary antioxidants include: vitamin E, vitamin C, vitamin A, carotenoids, selenium, zinc, methionine, lipoic acid, phenolic compounds and flavanoids.

Increasing evidence gathered in both experimental and clinical trials suggest that oxidative stress resulting from the production of free radicals and impaired antioxidant defences has been one of the leading causes of long term complications of chronic diseases. This has lead to an increased interest in finding therapeutic means to improve health conditions through prophylactic properties of functional foods. Functional foods are an emerging field in nutrition and dietetics due to their increasing popularity with health-consciousness. The purpose of the study was to bring out the good side of antioxidants to benefit mankind.

### **Objectives**

- To formulate antioxidant rich recipes
- To evaluate the acceptability of the products
- To analyse the nutrient contents in the formulated products
- To provide nutritional education on antioxidants

### **Materials and Methods**

Antioxidants are naturally present in our body however it is not enough to neutralize free radicals that are pumped into one's body due to the present eating habits consisting of fried and fast foods. Antioxidants are a potential solution or prevention to most of the metabolic diseases, allergic conditions and cancer. The selected food stuffs for the study were coloured fruits and vegetables, roots and tubers, organ meats, spices, herbs, rice bran and its oil. All recipes selected were foods mostly savoured by children and youngsters and easy to be prepared by their mothers. Most recipes were prepared with minimum cooking or are baked and hence free radical production is least. In case of frying, rice bran oil is used. Twenty recipes were formulated in different variations by trial and error method and its acceptability was tested by ten panel members using the score card with a five point hedonic scale. The products were evaluated on the basis of quality attributes like appearance, texture, taste, colour and flavour. Products which got comparatively higher scores of acceptability were selected for popularization and nutrient analysis. Costs of the 20 formulated products (per 150 gm) were calculated to find out the affordability of the products. Vitamin A content of the selected recipes were analysed by colorimetric method and vitamin C by titration method. Popularisation was conducted among young housewives, since housewives are the homemakers and the best decision makers about food in a family. The study was concentrated on young housewives as they are vigilant about the family's health and ready to try anything that is good for the family. Education was done using charts and folders to make the lessons more attractive and useful.

### **Results and Discussion**

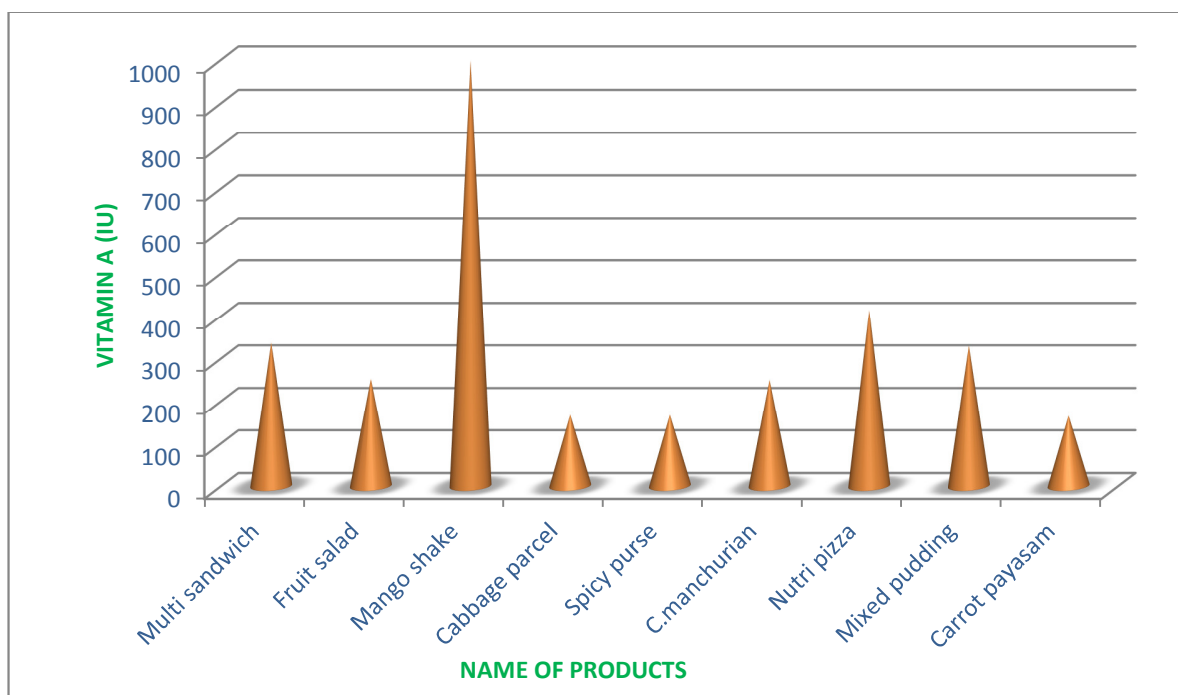
#### **1. Acceptability of the formulated products**

The mean scores of organoleptic qualities of products are given in the following table. Qualities namely appearance, colour, texture, flavour and taste were assessed.

**Table 1. Mean Scores for the organoleptic qualities of the products**

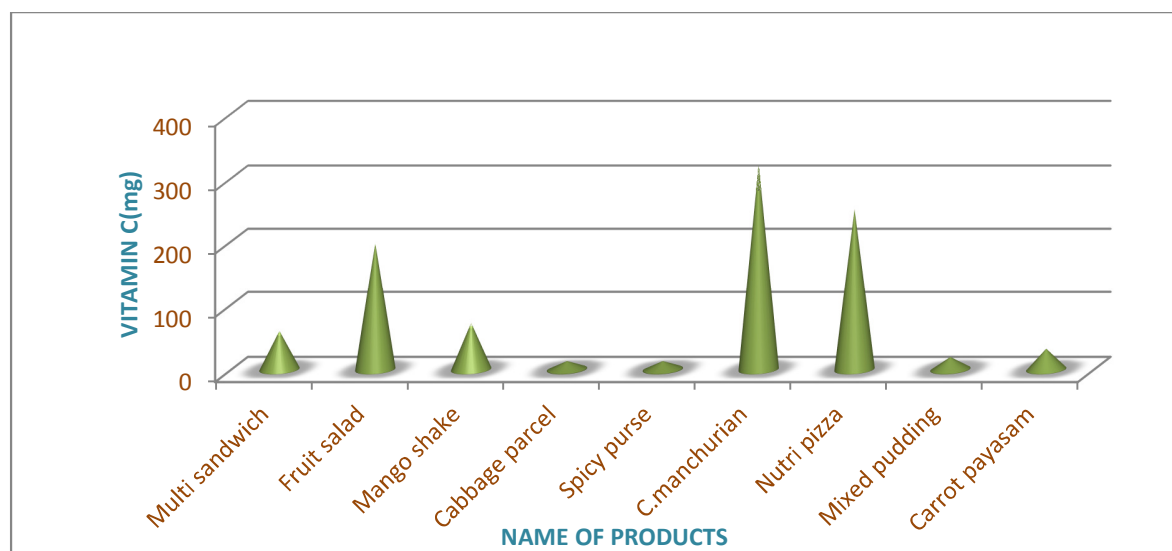
Product Name	Appearance	Colour	Texture	Flavour	Taste
Apple Pie	4	4.4	3.8	4.3	3.9
Multicolour Sandwich	4.6	4.6	3.8	4.5	5
Mixed Salad	4.4	4.5	4	3.8	4.1
Cabbage Parcel	4.9	4.3	4.5	4.3	4.4
Mixed Fruit Pudding	5	4.5	4.6	4.4	4.6
Cauliflower Cutlet	4.5	4.3	4.1	4.3	4.5
Cauliflower Manchurian	4.4	4.3	4.4	4.5	4.3
Spicy Purse	5	4.6	4.6	4.4	4.2
Carrot Pulav	4.5	4.7	4.1	4.2	4.1
Nutri Pizza	4.6	4.8	4.5	3.9	4.3
Golden Salad	4.3	4.6	3.6	4.1	3.8
Juicy Juice	4.5	4.6	4.2	4.2	4.2
Tomato Garlic Soup	4.4	4.5	3.6	4.3	4.7
Kadai Paneer	4.5	4.3	4.1	4.1	4.4
Pineapple Boat	5	4.7	4.4	4.4	4.6
Carrot Payasam	4.5	4.2	4.3	4.4	4.7
Rice Bran Sweet Ball	4.8	4.7	4.2	4.1	4.2
Mango Shake	4.3	4.5	4.5	4.3	4.5
Steamed Broccoli	4.1	4.2	4	4.1	4.3
Mint Tea	4.2	4.3	4.4	4.3	4.3

**Fig 1. Nutrient Analysis of the Selected Products**



**Vitamin A (IU/150 gm) content of the products**

The nutrient analysis was conducted to know the Vitamin A and Vitamin C contents of the selected products. The vitamin A content of the products ranged from 165 IU to 992 IU/150 gm. Mango Shake has got the highest mean value of 992 IU of vitamin A and the least score 165 IU was obtained by Carrot Payasam.



**Fig 2: Vitamin C (mg/150 gm) content of the products**

## 1. Cost Calculation

Mixed fruit pudding was found to be most expensive with Rs. 36.9/- and the least expensive was Rice bran sweet ball with Rs 2.25/-.

## 2. Popularization and Nutrition Education

Freedman (2007), states that well-designed and effectively implemented nutrition education can motivate those participating to change dietary behaviour and provide them with the knowledge and skills to make healthy food choices in the context of their lifestyles and economic resources. Popularization of the formulated recipes was done among young housewives using chart and folders. Visual aids and display of formulated products convey the importance of antioxidant rich foods, nutritional aspects and health benefits. The method of preparation of antioxidant rich recipes were discussed during the nutrition education program.

## Conclusion

The nutrition scenario in the country is not very encouraging. As a long term measure for lifestyle diseases and stress and strain diseases, intervention with locally available natural antioxidants will be a good approach which should be considered as a part of health and welfare programme. The search for new dishes to meet the nutritional need of population is the need of the day. It can be concluded that the products formulated were well accepted by the panel members and target group for popularization. The study proved successful in imparting knowledge regarding the importance of antioxidants in the present scenario.

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[www.cancerfightingstrategies.com](http://www.cancerfightingstrategies.com)

## **Nutritional Profile of HIV Positive Pregnant Women in Kalongo Town Council Agago District**

**\*Bridget Scaria, Oceng Freda Amito**

\* Lecturer, Dept. of Clinical Nutrition and Dietetics, Assumption College, Changanacherry, Kottayam, Kerala.

\*E –mail: [bridget.scaria@yahoo.co.in](mailto:bridget.scaria@yahoo.co.in)

### **Abstract**

The HIV/AIDS epidemic continues to claim millions of lives Worldwide. Uganda alone has about 2million cases out of the about 30 million in the globe, however more children are being born positive because of various reasons; some being nutritional since with weakened immunity babies are prompt to acquire the virus from their mothers. Hence the purpose of this research is to find out the nutritional profile of HIV positive mothers. A cross-sectional study was conducted among 30 pregnant women. A questionnaire was filled in finding out the ABCD analysis of the pregnant mothers. The results from the HIV Knowledge Questionnaire revealed lower Knowledge on the nutritional needs of the subjects. The sample was found to be consuming a very limited amount of energy 896kcal which was two times less than the RDA 2460kcal. The study findings demonstrate the call to address this knowledge gap among a known population vulnerable to poor nutrition. Future research is needed such that HIV/AIDS nutrition requirements awareness campaigns can be specifically tailored to the pregnant mothers within the Kalongo area context.

**Key Words:** HIV, Women, Health.

### **Introduction**

Transitions are periods of change where there are shifts in lifestyles from one stage to another. Pregnancy and the transition to parenthood mark a major developmental period with important implications for parents, for the infant–parent relationship and the infant’s development.

At a cellular level, the sero-transmission of Human Immunodeficiency Virus (HIV) is considered a biological process, whereby the virus attacks healthy immune cells leading to the fatal cascade of Acquired Immune Deficiency Syndrome (AIDS). The majority of the world’s new HIV infections occur in low- and middle-income countries, with two-thirds of the world’s HIV-infected population living in Africa. In all women, malnutrition during pregnancy increases maternal morbidity and mortality and affects birth outcomes. For the HIV-infected pregnant woman, HIV infection causes nutrient losses that increase nutritional requirements and the risk of malnutrition, which increases the risk of mother-to-child transmission (MTCT) of HIV.

When an HIV-positive woman becomes pregnant, additional nutritional considerations are warranted. Compared to routine prenatal nutritional assessment and intervention, pregnant HIV-positive women have increased needs to promote a healthy outcome (Fowles E., 2008). HIV-positive women in developing countries are particularly vulnerable to nutrient deficiencies because of likely inadequate dietary intake and potentially increased nutrient requirements associated with HIV and other infections and the nutritional demands of pregnancy. HIV infection in adults has been associated with weight loss, progressive loss of fat-free mass (FFM) and fat mass (FM), and wasting, all associated with increased morbidity and mortality risks.

In Uganda, food insecurity results from poverty, intra-regional differences, internal displacement, gender imbalances in food allocation and intra-household food distribution, and lack of knowledge. This aggravates the problem of recurring malnutrition and becomes worse with HIV patients. Hence the present study was undertaken with the following objectives were:

- To assess the anthropometric parameters, clinical parameters and nutrient intake of HIV positive pregnant women aged 15-44 years in Kalongo town council, Agago district of Uganda.
- To find out the functional status of these women.
- To find out the health status and life style pattern of the subjects.
- To find out the nutritional profile of HIV positive pregnant women.

## **Materials and Methods**

Kalongo town council found in Achoil land was selected for the study, inline of the convince of the researcher, the research was conducted in Dr. Ambrosoli Memorial Hospital in Kalongo Town council. From the above listed place with hospital consent thirty HIV positive women between the ages of 15-44years were taken as subject for this research study.

The area of Dr Ambrosoli hospital was selected by purposive sampling and voluntarily women allowed to be interviewed and body weight and height were taken, non pregnant, non lactating HIV positive women were included in the sampling. The tools for the study included Interview schedule and questionnaire. To access the overall nutritional status of the subjects, anthropometric measurement which include height, weight were measured. The subjects were screened for height and weight. They are classified as belonging to different nutritional grades. Biochemical test were done on subjects for Blood pressure. Clinical examination is commonly used for assessment of nutritional status, since it's relatively simple in community situation and does not call for sophisticated equipment and helps to ascertain the anatomical changes by naked eye.

Health is both a consequence of an individual's lifestyle and a factor determining it. To elicit information on the health status of the subjects, details regarding the stage of pregnancy were taken. Lifestyle pattern greatly influence the health status of women. The pre-structured interview schedule was used to collect details regarding the alcohol consumption.

A diet survey provides information about the dietary intake pattern of specific foods consumed and estimated nutrient intakes. Diet survey constitutes an essential part of any complete study of nutritional status of individuals or food habits, nutrient intake, source of nutrient. To preserve their health and nutritional status they require additional food to meet the extra demands for nutrients during pregnancy and those imposed on the body by the HIV infection, nutrition counselling were given.

## **Results and Discussion**

### **General background information of the subjects**

The study conducted on thirty HIV positive pregnant women revealed the following background information. Of 30 subjects selected for the study, 47 percent each belong between age of 15-24 and 25-34 years, only 6 percent fell between the ages of 35-44years. All subjected selected where Christians and came from extended family with more than two children. Since all the subjects were Farmers, they had income which amounted to less than 1000 rupees a month. 17 percent of women walked less than 1km to get to the hospital for both antenatal and collection of medication, and 33percent walked between 2-5km and 50 percent of them walked or were brought on bicycles more than 5km away.

Table 1: Stages of pregnancy

Stage of pregnancy	Frequency (n)	Percent (%)
1 <sup>st</sup> trimester	7	23
2 <sup>nd</sup> trimester	12	40
3 <sup>rd</sup> trimester	11	37

Table 1 revealed that 23 percent of women were in the 1<sup>st</sup> trimester, 40 percent in the 2<sup>nd</sup> trimester and 37 percent in the 3<sup>rd</sup> trimester.

Table 2: Stages of HIV infection

**N=30**

Stages	Frequency (n)	Percent (%)
Asymptomatic	15	50
Symptomatic	6	20
AIDS	9	30

The above table shows that 50 percent of the mothers had not yet showed symptoms of HIV, while 20 percent had started to show signs before they got on medication and 30 percent had so far got serious ill with AIDS before they started the ARV treatment. 7 percent of the mothers were HIV positive from birth while the 93 percent got the virus through sexual intercourse.

Life style pattern of these subjects revealed that majority of them won't consume alcohol with percentages showing 93percent not drinking and only 7 percent consumed alcohol. All selected subjected were non- vegetarians in their eating patterns.

### Nutritional assessment

Table 3: Body Mass Index Profile of Subjects

**N=30**

Category	1 <sup>st</sup> Trimester		2 <sup>nd</sup> Trimester		3 <sup>rd</sup> Trimester	
	N	Percent	n	Percent	N	Percent
Underweight	1	3	0	0	0	0
Normal	5	16	11	36	9	30
Overweight	1	3	1	1	2	6

Source: WHO, 2004

Table 3 revealed that one subject was underweight in the first trimester, five were normal in the first trimester, eleven in the second trimester and nine in the third trimester while for overweight one person was found in the first and second trimester then two in the third trimester. Kotler et al. (1985) conducted a prospective study on 101 HIV-positive and 106 HIV-negative women between 24 and 28 weeks gestation. The mean BMI was not different for HIV-positive (24.1, SD 2.8) and HIV-negative women (24.5, SD 4.1;  $P= 0.89$ ). At the end of pregnancy the mean weight was not statistically different between groups (HIV-positive women: 60.7 kg, SD 6.7; HIV-negative women: 63.0 kg, SD 10.2;  $P= 0.08$ ). Overall the HIV-positive women gained less weight than the HIV-negative women during pregnancy, but the slopes reflecting the rates of weight gain between groups were not significantly different ( $P= 0.058$ ).

The biochemical parameters of the subjects namely blood pressure measured and it was found the majority of the subjects had a lowered blood pressure.

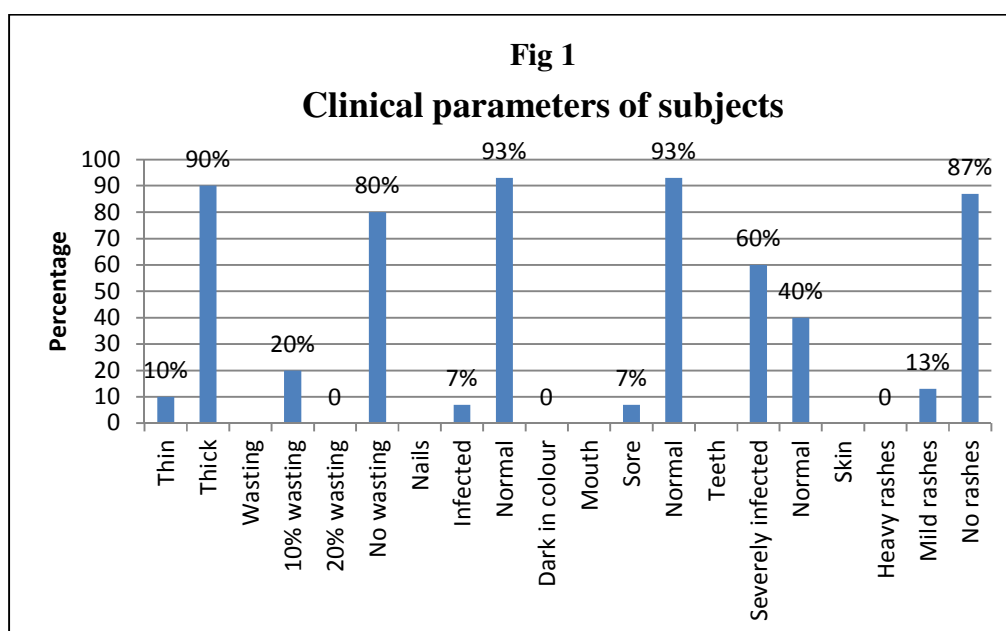


Fig1 revealed that 90percent of subjects were seen to have thick hair while 10 percent of the subjects had thin hair. There was about 10percent of wasting seen in 20 percent of the subjects however there were no subjects with 20percent wasting and 80percent of the subjects had not experienced wasting at all. There were 7 percent of subjects with infected nails and 93 percent with normal nails; however there were no subjects with dark nails. 93 percent of the subjects had no sore mouth however only 7 percent of their counterparts had sore mouth. 60percent of the subjected had infected teeth and 40 percent had no infection.13 percent of the subjects to have rashes and 87 percent without rashes and there were none with heavy rashes and this could be attributed to their being on ARV medication. It was noted that none of the mothers had any intentions to abort even after knowing they were HIV positive. All subjects were not worried that the medication they were on would affect their baby.

Table 4: Anaemia in subjects

N=30

Parameters	Frequency (n)	Percent (%)
Anaemic	13	43
Non anaemic	17	56

From the above table anaemic subjects were 43 percent and the non Anaemic were 56 percent. Eighty-three percent of the women were anaemic (haemoglobin <110 g/L), on Tanzanian supplementation study (Antelman, G, 2000) on 1064 HIV-positive pregnant women.

### Dietary Assessment

The standard RDA for HIV positive pregnant women in proteins is 55g and energy 2460Kcal (Ministry of Health, 2004) as compared to the actual values got for proteins and energy which are 896 Kcal and 50 g respectively for three days, showing that the subjects are greatly deficient in energy but relatively getting enough protein in diet.57percent of the subjects had to chew food with difficulty since they had infected teeth as seen in the clinical parameters while 43percent of their counterparts chewed food with ease. When appetite was investigated it was found that 47percent of subjects either had a normal appetite or lacked appetite while 6 percent of the remaining subjects were anorexic. It was also observed that 87percent of the subjects used pasting food as the mode of cooking while the rest of the 13 percent fried their food and

steaming; boiling and baking modes of cooking were not used. Water intake was observed as 33percent of subjects took at least 2-3 glasses a day, 40 percent took between 4-5 glasses and 27 percent drunk above 10 glasses of water a day. Then frequency of food consumption 60percent ate meals two times a day, 17 percent ate one meal a day and 23 percent ate three meals a day. 70percent of the subjects to have a daily bowel movement while 30 percent of other subjects with a bowel movement of 3 times a day.

Table 5: Nutritional Knowledge

N=30

Nutritional Knowledge	Frequency (n)	Percent (%)
Yes	11	37
No	19	63

Subjects that had received nutritional knowledge before were 37percent and those that had never had any nutritional knowledge were 63percent. Adult women with HIV/AIDS may suffer from loss of appetite, difficulty eating and poor absorption of nutrients. These compromise their nutrition and results in deteriorating health. Counselling and supporting them to take simple actions to improve their nutrition can improve their health. Attainment of good nutrition will contribute to the adoption of a positive attitude, which normally improves the quality of life for adults with HIV/AIDS.

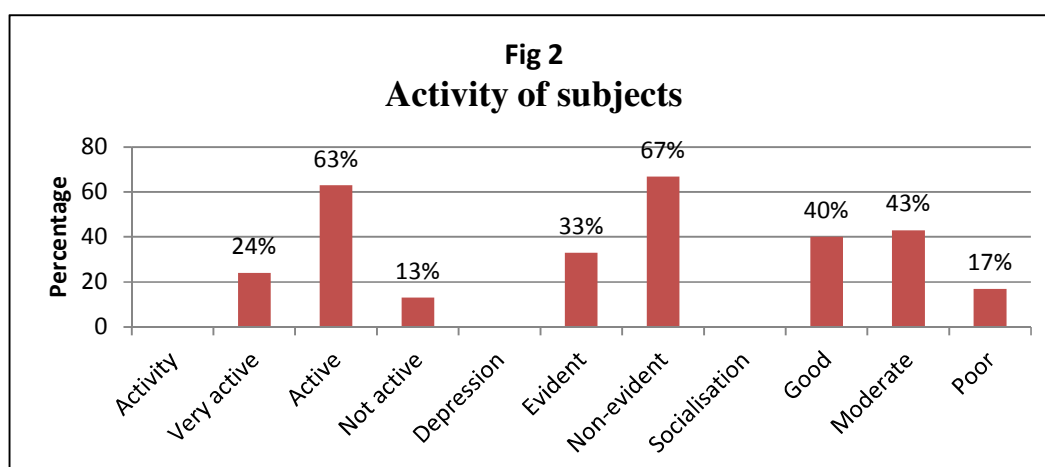


Fig 2 revealed that 67percent of women showed no signs of depression while in 33percent depression was evident. 40percent of the samples socialised freely while 43 percent moderately and 17 per cent were very poor in socialisation. It was also noted that all HIV tested subjects were getting HIV Drugs. All the subjects also get insecticide treated nets on attending Antenatal Checkups. Subjects agreed not to have been using any Herbal therapies when sick but came to the hospital.

### Limitations encountered

There was limited time available to collect data as would have been needed

There were lack of various equipment the researcher needed for getting values for some biochemical parameters like the calcium levels , Globulin, Albumin and immunoglobins.

### **Further recommendations**

Since these subjects do not have enough energy requirements, there should be an awareness program on nutritional needs and expectations given to them monthly when they come to pick their medication

Since most of the subjects were found to be infected by the virus sexually, therefore partners should be advised to test for HIV every time they intend to get pregnant.

### **References**

Kotler DP, Wang J, Pierson RN. Body composition studies in patients with the acquired immunodeficiency syndrome. *American Journal of Clinical Nutrition*, 1985, 42:1255-1265.

Antelman G et al. Nutritional factors and infectious disease contribute to anaemia among pregnant women with human immunodeficiency virus in Tanzania. *Journal of Nutrition*, 2000, 130:1950-1957.

*Glimpses of the seminar*





### **About the Editor**



**Dr BHAGYA D**, working as Assistant Professor in the Department of Home Science at St. Joseph's College for Women, Alappuzha. Her area of interest is nutrition in deficiency disease. She has an excellent academic record with 7 publications to her credit. She is the life member of NIN, IDA and several research bodies. She has guided research projects at UG and PG level. She has won the best paper publication award, 2010 by society of science and environment.