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An evaluation of cancer patients in cotton belt of Punjab

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Abstract---Hospitals play an instrumental role in the life of the individuals, and they are a crucial part of healthcare system. Healthy homes and communities are widely acknowledged as foundation stones for the progress of any nation. Basically, they ensure its economic growth as well as internal stability. World Health Organization stressed that "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". Good health and well-beings have always been a forefront agenda of national and international policy agendas. Goal 3 of Sustainable Development Goals, 2015 aims to "increase life expectancy, reduce maternal and child mortality and fight against communicable diseases". In case of non-communicable disease, there are four major disease – cardiovascular, cancers, severe respiratory diseases and diabetes.

Keywords---cancer, patients, cotton belt.

Introduction

Hospitals play an instrumental role in the life of the individuals, and they are a crucial part of healthcare system. Healthy homes and communities are widely acknowledged as foundation stones for the progress of any nation. Basically, they ensure its economic growthas well as internal stability. World Health Organization stressed that "*Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"* (World Health Organisation, 2020). An efficient and responsive service delivery of a hospital is largely influenced by its infrastructure which certainly includes physical structures, advance equipment, technologies, supporting systems and essential services (World Health Organisation, 2020). Good health and well-beings have always been a forefront agenda of national and internationalpolicy agendas. Goal 3 of Sustainable Development Goals, 2015 aims to "*increase life expectancy, reduce maternal and child mortality and fight against communicable diseases".* In case of non-communicable disease, there are four major disease – cardiovascular, cancers,

severe respiratory diseases and diabetes. In the year 2016, 18 per cent patients have probabilityof dying between the ages of 30-70 which are the productive years of the life of an individual(United Nations Organisation, *n.d.*).

Cancer poses the biggest threat to the society at the global level. It has become the second most common disease as it is responsible for maximum deaths after cardiovascular disordersin the world. Cancer has caused approximately 23 per cent and 7 per cent deaths in the U.S.A. and India respectively (National Cancer Control Programme, *n.d.).* Punjab is experiencing a rising burden of cancers as one of the most significant diseases in the NCD category. The population of the state in the age group of 35-65 is the target of this disease. It is causing considerable loss in the productive years of the life of an individual. On the one hand, masses suffer from out of pocket expenditures for the treatment and on the other hand, society suffers in the form of reduced production and productivity.

Table 1.1
Healthcare Institutions in Punjab State (2019)

Type of Institution	Number
Hospitals	99
Community Health Centres	152
Dispensaries	3,140
Primary Healthcare Centres	531
Ayurvedic and Unani Institutions	529
Homeopathic Institutions	111
Medical Institutions	18,716
Source: Statistical Abstract of Punjab, 2019	

Table 1.1 shows the Healthcare Institutions in Punjab State. It comprises hospitals (99), community health centres (152), dispensaries (3140), primary healthcare centres (531), Ayurveda and Unani institutions (529), homeopathic institutions (111) and lastly medical institutions (18716). In the context of cotton belt of Punjab State, there are primary and community health centers in selected villages of the district as shown in Table 1.2. There is civil hospital in every district.

Table 1.2
Healthcare Infrastructure in Cotton Belt of Punjab State

District	PHC	CHC	SDH	DH	Muktmantri Rahatkosh Scheme
Muktsar	ChakShere Wala Doda Dabwaka Kalan Alamwala Lambi	ChakSherewala Doda SarawanLambi	Malout Gidderbaha	Muktsar	___
Bathinda	Talwandi sabo Kothesangat kala Balianwali	Rama mandi Mor mandi Kothesangat kala	Talwandi Sabo Rampura	Bhatinda	Advanced Cancer Diagnosis Centre (Govt.)

	Nathana Gonianakalan Baja khana Bhagta bhai ka	Balianwali Nathana Goniana Baja khana Bhagta bhai ka Bhucho mandi	phul		Max super speciality (private)
Mansa	Budhlada Khiala Kalan	Budhlada Bhikhi Khiala Kalan	Sardulgarh	Mansa	____
Sangrur	Moonak Longowal Kauhrian Sherpur Fatehgarh Amargarh	Lehragaga Kauhrian Longowal Amargarh	SunamDhuri	Sangrur	Homi Bhaba Cancer Civil Hospital (govt.)
Barnala	Dhanoula Tappa Mahal Kalan	DhanoulaTappa Patti mOhar	___	Barnala	____
Faridkot	Guru Har Sahai Jand Sahib	Guru Har Sahai Matta Jaito	Kotkapura	Faridkot	Guru Gobind Singh Medical College and Hospital, Faridkot
Moga	Kot Ise Khan Daroli Bhai Dhudhike PattoHir Singh Thathi Bhai	Kot Ise Khan Daroli Bhai Dhudhike Nihal Singh Wala Bagha Purana	_____	Moga	___
Source: Punjab Health System Corporation, n.d.					

Research Methodology

Objective

The paper is based upon following objective:

- To check the nature and extent of cancer patients in cotton belt of Malwa region

Hypothesis

There is no significant association between number of cancer patients and socio-economic and demographic factors.

Sub hypothesis

- There is no significant association between the gender of cancer patient and their occupation.
- There is no significant association between the area of the cancer patients and their occupations.
- There is no association between age group and cancer mortality rate.
- There is no association between gender and mortality rate.
- There is no association between area and mortality rate.

- There is no association between occupation and mortality rate.
- There is no association between education and mortality rate.

Data Sources

The study was based on both primary and secondary data. Secondary data was collected from the internet. Data on healthcare infrastructure facilities created by State of Punjab for cancer patients are collected from Statistical Abstract of Punjab. The primary data was collected through interviews (sets of separate semi-structured questionnaires), focus group discussions, an observation checklist and visual tools. Two semi-structured questionnaires for healthcare establishments and cancer patients and an interview schedule for NGOs was prepared to address the tangible and non-tangible aspects of the study.

Sample Size

Hospitals (10) were visited which are empanelled under Mukh Mantri Rahat Kosh Scheme.The responses of 500 cancer patients of the cotton belt were documented from eight districts Barnala, Bathinda, Faridkot, Fazilika, Moga, Mansa, Muktsar and Sangrur. Respondents were chosen for each major type of cancer: urinary, bladder, lungs, kidney, breast and prostaterepresenting male and female patients. 75 patients were taken from the each large district (Sangrur Bathinda, Faridkot Mansa) and 50 each from small district (Barnala, Fazilika, Moga, Muktsar).

Table 1.3
Distribution of Sample

Category	Sub-Category	Sample Size	Sampling Technique
Healthcare Establishments	Advance Cancer Research Institute, Bhatinda	1	Respective Medical Superintendent of all hospitals after taking permission from Punjab Health Systems Corporation
	Max hospital, Bhatinda	1	
	Guru Gobind Singh Medical College and Hospital, Faridkot	1	
	Homi Bhaba Cancer Hospital, Sangrur	1	
	Rajendra Hospital, Patiala	1	
	Oswall, Ludhiana	1	
	DMC, Ludhiana	1	
	PGI, Chandigarh	1	
	Max Hospital, Mohali	1	
	Fortis Hospital, Mohali	1	
Cancer Patients	Barnala	50	Contacted directly at the respective hospitals and through ASHA workers using Snowball Sampling and Multi-stage Sampling
	Bathinda	75	
	Faridkot	75	
	Fazilika	50	
	Moga	50	
	Mansa	75	
	Muktsar	50	
	Sangrur	75	

NGOs	CankidsCan, BTI	1	Snowball Sampling
	Udham Emergency Group, Fazilika	1	
	Sewa Dal, Sangrur	1	

Application of Statistical Tools
Chi-square tests

This test aims to investigate that to what extent an observed distribution is due to chance, popularly, this test is also known as "goodness of fit". This test determines "how well the observed distribution of data fits with the distribution that is expected if the variables are independent".

Co-relation and Regression Analysis

Regression Analysis, a statistical technique, is used to evaluate the relationship between two or more variables. Correlation is widely applied to test the direction and strength of the relationship between two or more variables. The data of cancer patients was co-related with age, gender, area, education, and occupation using chi-square test and co- relation tests whereas type of cancer and district wise was calculated using ANOVA test in order to see the trend among districts.Chi-square, lambda and cramers' tests were applied to study the association and co-relation among different variables of cancer patients.

Review of literature

Dinshaw et al (2001) highlighted that the cancer is very bad for the family as well as the patients. It largely impacts their routine functioning and economic situation. The economic burden includes income loss and also the medical expenses to treat cancer. The patients also suffer from depression and other physiological impacts. Ahsan et al (2004)studied the treatment choices and economic impact of the cancer among the persons having comprehensive health insurance policies. Women with cancer suffered more and faced financial difficulties. The study evaluated the out of pocket expenses comprising direct medical, direct non-medical and indirect costs. It was found that financial impact is essentially high in persons though they have obtained comprehensive health insurance policies. It was suggested that cancer insurance policies should be designed as per the patient needs and requirements in order to reduce the financial burden of this disease.

Mols et al (2011) studied the socio-economic implications of cancer survivorship. The study was based on primary data sources of cancer patients between 1998-2007. It was found that cancer patients experiences significant changes in their professional life after cancer. Some switched to part-time jobs while others stopped working completely. The patients also experienced problems in life insurance, health insurance while obtaining home loans. Thus, occupational and financial problems have significantly affected the life of the cancer patients. Zaidi, Ansari and Khan (2012) examined the emotional burden of the deadly disease cancer and the perceptions of the cancer patients regarding financial cost of the ongoing cancer treatment at a private territory care hospital. It was mentioned that the emotional burden of cancer usually overshadowed by the financial

burden sustained by the patient and his family. It was suggested that the patients should be supported by government or voluntary agencies financially in order to deal with out of the pocket expenses.

The study of Mallath et al (2014) had found that cancer is deeply associated with the major socio-economic inequalities in the country especially in case of accessing healthcare facilities. If we don't address the socio economic inequalities, chances of survival will reduce and costs to individual and society will increase. It was suggested that there is need to relook the role of individuals and groups at all levels i.e. political leaders, the medical profession, patient organizations and the public as a whole. The root of the solution is need for political commitment and action. We have to focus on affordability, equity and universal cancer care for the whole of population. Kaur and Kaur (2020b) lamented that in the past few decades, Cancer has emerged asone of the major public health concerns of the general public and the state in particular.It is affecting the quality of life (QoL) of the individuals – professionally, physically, economically, socially as well as the life of his/her family. The research paper studied the cancer prevalence and cancer patients of Bathinda district based on various parameters, namely, gender, age, education, occupation and area. The results of the study revealed the high incidences of cancer in rural areas (87per cent) than urban areas. Male patients (29) belonged to rural area whereas female patients (22) from urban area and their association was found at the significant level (.002). High incidences were found in homemakers (45percent) and agriculture owners (36 per cent). Chi-square test showed a significant level of association (.000) between gender and occupation. It was also found that there were social, economic and cultural implications of this disease and it affects the female patient's more than male patients. It was recommended that there is need to create health awareness, and organize health check- up camps for early detection and treatment of this disease in order to create healthy communities which significantly contribute towards the progress of a nation.

Table 1.4
Cancer Prevalence in Cotton Belt of Punjab State

District	Population (2011Census)	Cancer prevalence (per lakh population)*	Cancer prevalence (per lakh)**
Barnala	5,962,94	__	229.7
Bathinda	13,888,59	125.8	284.9
Faridkot	6,180,08	134.6	__
Moga	9,922,89	88.4	264.7
Mansa	7,688,08	134.8	290.0
Muktsar	9,027,02	136.3	343.7
Sangrur	16,544,08	93.4	237.3

Down to Earth (n.d.)
***Source: Department of Health and Family Welfare, Punjab (2009)*

Table 1.4 shows the cancer prevalence in districts of cotton belt of Punjab State as per two different surveys conducted by two different organisations. As per one

survey, the highest cases were documented in Muktsar (136.3) followed by Faridkot (134.6) and Mansa districts (134.8) per one lakh population. Another survey revealed that Muktsar (343.7) district had high cancer prevalence per one lakh population followed by Mansa (290) and Bathinda (284.9). Absence of available resources for early prevention, diagnosis and treatment were listed among the major reasons for the mushrooming growth of this disease (Ali et al, 2011).

Table 1.5
Gender-Wise Distribution of Cancer Patients in the year 2017 and 2018

Districts	2017					2018				
	Total	Male		Female		Total	Male		Female	
		(No)	(%)	(No)	(%)		(No)	(%)	(No)	(%)
Barnala	238	99	42	139	58	196	72	36.7	124	63.3
Bathinda	624	267	43	357	57	552	240	43.5	312	56.5
Faridkot	278	143	51	135	49	252	116	46.0	101	54.0
Fazilika	284	138	47	146	51	187	86	46	136	54.0
Mansa	354	158	45	196	55	316	141	44.6	175	55.4
Moga	399	158	40	241	60	246	99	40.2	147	59.8
Muktsar	390	155	40	235	60	277	119	67.1	58	32.9
Sangrur	764	355	46.5	409	53.5	637	291	46	346	54.0
Total	3331	1473		1858		2663	1164		1399	
Source: Department of Health and Family Welfare, Government of Punjab (n.d.)										

It was documented in various research studies and government reports that cancer prevalencevaries among male and female patients and more cases were spotted in female population. Table 1.5 points out to the similar trend in two years – 2017 and 2018. In both years, more female patients were diagnosed with cancer. In the year 2017, the maximum cases were foundin Moga and Muktsar districts followed by Barnala and Bathinda districts. Maximum male patients were found in Faridkot and Sangrur districts. However, in the year 2018, Barnala and Muktsar had maximum female and male patients respectively.

Table 1.6
Rural-Urban Classification of Cancer Patients in year 2017 and 2018

Name of the Districts	2017					2018				
	Total	Rural		Urban		Total	Rural		Urban	
		(No.)	(%)	(No.)	(%)		(No.)	(%)	(No.)	(%)
Barnala	238	160	67.2	78	32.8	196	122	62	74	38
Bathinda	624	415	66.5	209	33.5	552	384	70	168	30
Faridkot	278	164	59.0	114	41.0	252	157	62	95	38
Fazilika	284	190	66.9	94	33.1	187	141	75	46	25
Mansa	354	278	78.5	76	21.5	316	247	78	69	22
Moga	399	292	73.2	107	26.8	246	185	75	61	25
Muktsar	390	279	71.5	111	28.5	277	186	67	91	33

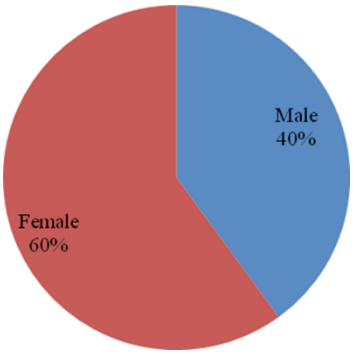
Sangrur	764	516	67.5	248	32.5	637	342	54	295	46
Total	3331	2294		1037		2663	1764		899	
Source: Department of Health and Family Welfare, Government of Punjab (n.d.)										

Table 1.6 lists the rural-urban classification of the cancer patients in the year 2017 and 2018. In both years, the cases were high among rural areas than urban areas. Mansa district carries highest cancer patients (78 %) for two consecutive years. In the year 2017 and 2018, Faridkot and Sangrur district documented majority of urban cancer patients 41 % and 46 %respectively.

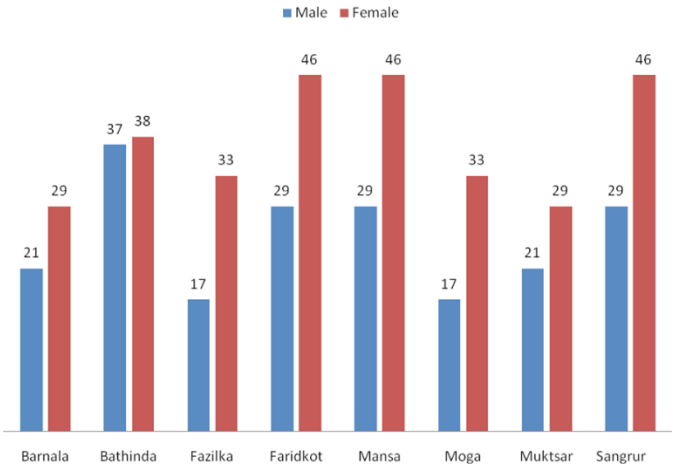
Socio-economic analysis of cancer patients

Before discussing social –economic analysis, it has been overall hypothesized that

H0: No significant relationship is observed between socio-economic and demographic factors



Graph 1.1. Gender-wise Distribution of the Cancer Patients



Graph 1.2. District-wise Distribution of Cancer Patients

Table 1.7
District-wise and Gender-wise Distribution of Cancer Patients

Gender	Barnala	Bathinda	Fazilika	Faridkot	Mansa	Moga	Mukatsar	Sangrur	Total
Male (Number)	21	37	17	29	29	17	21	29	200
%age	42	49.33	34	38.67	38.67	34	42	38.67	40
Female (Number)	29	38	33	46	46	33	29	46	300
%age	58	50.67	66	61.33	61.33	66	58	61.33	60
Total	50	75	50	75	75	50	50	75	500
Source: Primary Data									

It was documented in various research studies and government reports that cancer prevalence varies among male and female patients and more cases were found in female population. Out of the total sample, 300 (60%) constituted female patients whereas 200 (40%) were male cancer patients. Infact, similar trend was observed in each studied district of Cotton Belt of Punjab State as shown in Table 1.7, Graph 1.1 and Graph 1.2 entitled as Gender-wise distribution of Cancer Patients

Table 1.8
Gender-wise Distribution of Cancer Patients in the year 2017 and 2018

Districts	2017					2018				
	Total	Male		Female		Total	Male		Female	
		(No)	(%)	(No)	(%)		(No)	(%)	(No)	(%)
Barnala	238	99	42	139	58	196	72	36.7	124	63.3
Bathinda	624	267	43	357	57	552	240	43.5	312	56.5
Faridkot	278	143	51	135	49	252	116	46.0	101	54.0
Fazilika	284	138	47	146	51	187	86	46	136	54.0
Mansa	354	158	45	196	55	316	141	44.6	175	55.4
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Sangrur	764	355	46.5	409	53.5	637	291	46	346	54.0
Total	3331	1473		1858		2663	1164		1399	
Source: Department of Health and Family Welfare, Government of Punjab (n.d.)										

Table 1.8 points out to the similar trend in two years – 2017 and 2018. In both years, more female patients were diagnosed with cancer. In the year 2017, the maximum cases were found in Moga and Muktsar districts followed by Barnala and Bathinda districts. Maximum male patients were found in Faridkot and Sangrur districts. However, in the year 2018, Barnala and Mukatsar had maximum female and male patients respectively. It was pointed by female cancer patients during focus group discussions that various factors can be associated with the majority cancer cases among women (predominantly house-wives) can be: Lack of awareness for healthy practices; difficulty in visiting hospitals for routine health checkups'; hesitate and hard to manage expensive treatments; having less nutritional diet; cultural biasness; psychological barriers; environmental factors; and groundwater pollution.

Age-wise Distribution of the Cancer Patients

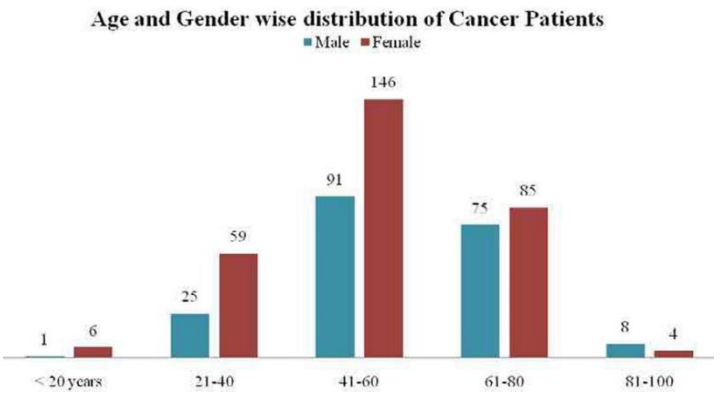
H_{01}: There is no significant relationship between age and gender of the respondents

Table 1.9
Gender and Age wise distribution of Cancer Patients

Gender		Age					Total	Pearson Chi-square (p-value)
		0-20	21-40	41-60	61-80	81-100		
Gender	Female	6	59	146	85	4	300	12.5577 (0.014)
	Male	1	25	91	75	8	200	
Total		7	84	237	160	12	500	
Percent		1.4	16.8	47.4	32	2.4	100.0	

- **p<0.05 level of significance*
- *Source: Primary Data*

Graph 1.3



So hence, it can be concluded that there is a significant relationship between numbers of male and female cancer patients and their age categories as p-value (.014) <.05.

Cancer is affecting the most productive years of the life of an individual. As the Table 1.9 and Graph 3.3 demonstrated that the majority of the cancer patients (47.4 %) were of age group 41-60 years among male and female cancer patients. The second highest cases were found in age group 61-80 followed by age group 21-40 both in male and female cancer patients.

Table 1.10
Age-wise and District-wise Distribution of Cancer Patients

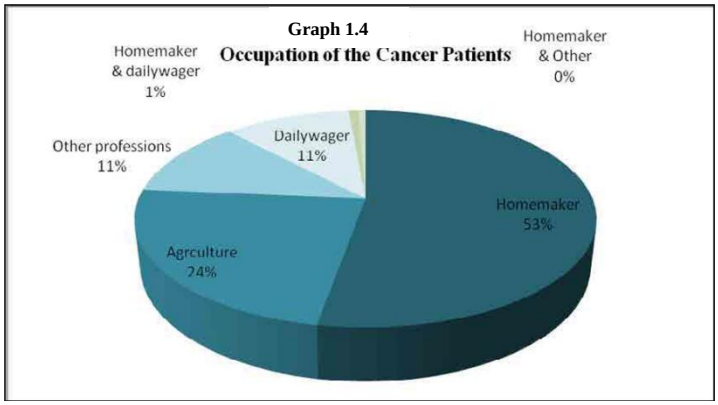
Age	Barnala	Bathinda	Fazilka	Faridkot	Mansa	Moga	Muktsar	Sangrur	Total
> 20 years (Number)	1	2	0	1	0	1	1	1	7
(Percentage)	2	2.67	0	1.33	0	2	2	1.33	1.4
20-40 Years	10	8	11	16	9	11	9	10	84

(Number)									
(Percentage)	20	10.67	22	21.33	12	22	18	13.33	16.8
41-60 years (Number)	20	32	27	31	43	25	24	35	237
(Percentage)	40	42.67	54	41.33	57.33	50	48	46.67	47.4
61-80 Years (Number)	16	30	10	26	23	13	13	29	160
(Percentage)	32	40	20	34.67	30.67	26	26	38.67	32
81-100 Years (Number)	3	3	2	1	0	0	3	0	12
(Percentage)	6	4	4	1.33	0	0	6	0	2.4
Total	50	75	50	75	75	50	50	75	500
Source: Primary Data									

Similarly, Table 1.10 presented the district and age wise distribution of cancer patients. In all the studied districts of cotton belt of Punjab State, similar trend was observed – majority of the cancer patients were between 41-60 years followed by 61-80 age-group.

Occupation-wise Distribution of Cancer Patients

H_{02}: There is no significant relationship between the gender of cancer patient and their occupation



The primary dataset pointed out that majority of cancer patients were homemakers (53%) and agriculture (24%), daily wagers (11%) and persons having other (students, businessman, private and government jobs) profession had less numbers as shown in Pie chart 3.4 .

Table 1.11
Occupation-wise and Gender-wise Distribution of Cancer Patients

Occupation-wise distribution of sample	Total population (numbers)	Gender		Total (%)	Chi-squareTest
		Male (numbers)	Female (numbers)		
Homemaker	264	7	257	52.8	x^2 Value=3.677 df=5 p value = .000
Agriculture	118	113	5	23.6	
Other Professions	58	34	24	11.6	
Daily wager	53	46	7	10.6	
Homemaker & Daily Wager	4	0	4	.8	
Homemaker & Others	3	0	3	.6	
Total	500	300	100	100	

- **p<0.05 level of significance*
- *Source: Primary Data*

The chi-square test showed that gender and occupation of the cancer patients were related at the significant level as p-value (.000) <.05. A couple of reasons were identified for this relationship as explained below:

Possible Reasons for Gender and Occupation Association

- **Pesticides and Ground-water pollution:** Excessive use of pesticides and ground water pollution had resulted in the rapid increase in cancer incidences in the selected study area. It was documented in various research studies that heavy metals such as Cd, Cr, Se, Hg were present in the drinking water. Higher amount of heptachlor, ethion and chlorophyrofos pesticides were found to be present in the drinking water, vegetables and blood in Talwandi Sabo block of Bathindadistrict. The largest number of cancer among male patients was farmers, therefore, heavy exposure to pesticides and polluted ground water can be significantly related with them.
- **Effects of Green Revolution:** The reverberations of the success of green revolution have been impacted by various concerns outstretched by the specialists such as environmental degradation; rural-urban migration; loss of bio-diversity; petering outof productivity; and water issues like water logging, water overuse and changes in salinity. (Singh, 2008).
- **Gender bias:** There have been significant evidences of bias against women. Yim and Mahalingam (2006) stressed that there has been strong relationship between masculinity and its ecological context. The nutritional status of women was significantly less in Punjab State and this can be associated with more vulnerable situation of women cancer patients. Moreover, they were also involved in various agricultural activities to assist their husband and children. Hence, mobility issue to visit hospital for follow-up treatment; payment of huge bills for treatment; less nutritional diet; exposure to agricultural activities; ground water pollution were certainly related with maximum cancer cases among house-wives.
- **Smoke from Kitchen:** The smoke emitted from the kitchen is also one of the leading

factors for escalating cancer ailment amongst home makers. Singh (2008) documented that cancer ailment amongst females is attributed to their vulnerability of biomass fuel.

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