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FACTORS RESPONSIBLE FOR CANCER IN BATHINDA: SOCIO-ECONOMIC IMPACTS

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Abstract: *Cancer is widely spread in Bathinda district of Punjab. Over usage of pesticides in agricultural practices, concentration of uranium in water and use of tobacco and alcohol etc. are considered as important factors of it in this region. Cancer has a lot of socio-economic impact on the people of Bathinda district. Moreover, care cost of cancer is higher and it put negative impact not only over the patient but also on his/ her family members with negatively implication on credits. This impact can be seen more over the lowest and middle income group family. It has also impact on the people's ability to work which are further responsible for poverty. Therefore this present study is an attempt towards this. The study will try to find out the factors responsible and impacts of this disease on economy of different categories of Bathinda residents. By this, it will make an access the economic burden of cancer for different categories of people with various social and economic factors.*

Key Words: *Cancer, Pesticides, Cotton, Uranium, Bathinda.*

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INTRODUCTION

Cancer is a non communicable disease which can be widely spread all over the world. The National Cancer Institute describes cancer as "a term for disease in which abnormal cells". According to National Cancer Institute "Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems"[1].

According to World Cancer Research Fund International (2008) there were an estimated 12.7 million cancer cases all over the world. The number is expected to rise to 21 million by 2030. The study found that lung cancer, female breast cancer, colorectal and stomach cancer accounts for more than 40% of all cases. World Health Organization (2008) estimates that tobacco use is most important risk factor that has been responsible for cancer and it accounts for 22% of global cancer cases in one hand and 71% of global lung cancer deaths in another hand. It also predicts that cancer deaths would increase from 7.6 million in 2008 to 11.4 million in 2030 (Table 1).

Table 1: Global Mortality due to Cancer (2008-2030)

Year	Morality rate
2008	7.6 million
2015	9 million
2030	11.4 million

Source: WHO, 2012

The International Agency for Research on Cancer (2012) estimated that in 2012, there were 1015000 cancer cases in India, out of these about 6, 83,000 people has indirectly died due to cancer, representing about 8.3% of all cancer deaths of the world[2]. World Health Organization (2008) projected that the percentage number of cancer deaths in India will increase from 8% in 2005 to 11.9% in 2030. As per estimates of National Cancer Registry Programme (2010) there will be 9, 79,786 new cancer cases in India in 2010 and it is estimated to be raised to 11, 48,757 in 2020[3]. The numbers of cancer cases related with tobacco in males are predicted that it will increase from 1,90,244 in 2010 to 2,25,241 in

[1] http://www.cancer.gov/cancertopics/cancerlibrary/what-is-cancer
[2] http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx
[3] http://www.ncrpindia.org/ALL_NCRP_REPORTS/TREND_REPORT_1982_2010/ALL_CONTENT/ALL_PDF/Trends_Over_Time_For_All_Sites.pdf

2020. Maximum number of cancer cases has been found in Delhi, Bangalore, Mumbai, Chennai and Bhopal (Table 2).

Table 2: Numbers of Cancer Cases in Different Cities of India

City	Number of Cancer cases
Delhi	31156
Mumbai	27519
Bangalore	13359
Chennai	12903
Bhopal	3003

Source: National Cancer Registry, 2004

1.1 **Cancer in Bathinda-** Cancer is widespread mainly in cotton belt of Punjab known as the home of India's green revolution. A survey conducted by Health department (2005) explores that cancer is mostly found in four districts of Punjab namely Mansa, Mukstar, Faridkot and Bathinda, out of these more number of cancer cases are found in Bathinda district. Table 3 shows that Bathinda is having 59 patient per lakh while Mansa, Mukatsar and Faridkot has 57, 55 and 28 per lakh respectively.

Table 3: Number of Cancer Patients

Serial No.	District	Population	No. of Cancer Patients	No. of Cancer Patients/Lakh
1	Mukstar	8,27,906	453	54.7
2	Bathinda	12,00,736	711	59.2
3	Faridkot	5,85,500	164	28
4	Mansa	7,31,535	420	57

Source: Heath Department (Punjab) June, 2005[4]

“Bathinda district health authorities have conducted a door-to-door survey of the cancer patients, dead or alive both, in the district in December 2009 for the period from the year 2001 to 2009. The survey identified a total of 2,733 (1,090 males and 1,643 females) cancer cases in the district. Out of these, there were over 2,200 patients alive at that time. These patients had been suffering from various types of cancer related to organs/parts of the body, including breast, cervix, uterus, liver, mouth, stomach, brain etc. After that, no such survey has been conducted so far.”(Mann, Door-to-door campaign for detection of cancer to begin

[4] “Cancer Control Programme in Punjab”, Health Department Punjab, June 2005, Available at http://www.pbnrhm.org/docs/cancer_control_prog.pdf

in district on 1 dec 2012).[5] The numbers of cancer deaths higher in Talwandi Sabo (Bathinda) than other parts of Punjab that is probably due to over use of pesticides, tobacco and alcohol. Moreover, presence of heavy metals such as arsenic, uranium are found at low level in the water of Talwandi Sabo are responsible for more deaths due to cancer in Talwandi Sabo (Department of Community Medicine 2007).

FACTORS RESPONSIBLE FOR CANCER IN BATHINDA

There are a variety of factors such as over use of pesticides, tobacco & alcohol and presence of uranium & arsenic in water have been responsible for high rate of cancer cases in Punjab.

Crop Pattern and use of Pesticides and Fertilizers – The pattern of crop cultivation have a greater impact on the numbers of cancer cases in Punjab. The numbers of cancer cases has been higher in Talwandi Sabo areas of Bathinda because due to geographical reasons there are more areas under the cotton cultivation than paddy cultivation. The large amount of pesticides on the cotton crops is sprayed than paddy and a big part of pesticides are dissolved in air that has entered in food chains of human beings (Singh 2008). Apart from these, reckless spraying of pesticides on cotton crops is responsible for contamination of soil and ground water in the region. Moreover, some substances of insecticides such as aldrin, heptachlor and endosulfan were detected in blood sample of the farmers of Talwandi Sabo. The DNA has damaged in 36% of the farmers of Talwandi Sabo and the worst affected farmers were cotton, paddy and Wheat growers from 210 samples collected soon after a day of intensive spraying (Kaur 2011). Moreover, use of amount of pesticides has been higher in Punjab in respect of India that was 400kg per hectare in Punjab than the 150kg on every hectare land of India.

“We are paying the price for unregulated Green Revolution. Farmers are caught in cesspool of toxicity, result of excessive and unregulated uses of pesticides and chemical fertilizers, which have contaminated the ground water and urban people live off the prosperity generated by crops, the farmers are left to deal with byproduct of cancer, which originates from spraying containing acephate, diuron etc. The latest data from the health department puts the number of patients in Malwa region is 120-125 per lakh against 71, which is national average”(Dutt 2007).

[5] “Door-to-door campaign for detection of cancer to begin in district on Dec 1.” *The Tribune,*6 November 2012*,* Available at http://www.tribuneindia.com/2012/20121107/battrib.htm#3

Presence of uranium is other major responsible factor for cancer. It was responsible for many diseases like cancer, increased defective birth rate or abnormalities among the children, early graying of hair etc. in Punjab. The uranium is entered into human body through surface and ground water pathway and contamination of foodstuffs through soil-plant transfer and lastly it entered into human body through the food chain. The Southwest areas of Punjab are badly affected areas from the uranium. Uranium poisoning in Punjab was first founded by South African Board Clinical Metak Toxicologist Carin Smit by taking samples of hair and urine of 149/53 children, who affected with birth abnormalities including physical deformities and mental disorder. These samples were shipped to micro trace mineral lab Germany. Surprisingly high level of uranium were found in 88% of the sample and in the case of one children the level were more than 60 times the maximum safe limit. A study by Department of Community Medicine 2007 examined that Bathinda surface waters are contaminated with arsenic, cadmium, chromium and mercury. The waste water generated from industry is drained mostly partially or untreated in the local drains, which had led to pollution of these drains. Therefore, presence of higher amount of uranium was responsible for high rates of cancer in Punjab and in below table its concentration determined in drinking water belonging to 22 villages of Bathinda district in micro gram per liter as (Table 4).

Table 4: Amount of Uranium in 22 Villages of Bathinda District

Name of village	Average (percentage)	
Mahima Sarja	13.6	9.4
Ablu	28.2	2.1
Ramtirath Jagga	29.9	8.3
Kalalwala	13.3	.8
Giana	48.6	.8
Malkana	17.6	.6
Jajjal	31.8	.1
Tungwali	23.3	.2
Bucho Mandi	56.9	4.9
Lehra Mohabat	23.5	9.4
Rampura	9.3	.8
Nathana	14.7	
Gidder	12.9	.2
Gobindpura	35	3.6

Gehributter	35.5	8
Sangat	53.9	7
Jaisinghwala	52.7	
Multania	24.5	8.2
Baluana	35	9.5
Deon	20.8	7.9
Buladewala	28	7.9
Bathinda City	19.5	.5

Source: Singh, 2009

Uranium is released into environment through various activities such as uses of phosphate fertilizers, mining and combustion from coal & other fuels. Uranium and some other heavy metals may increase the risk of kidney damage, cancer diseases where experimental evidence suggests that respiratory and reproductive system are also affected by uranium exposure. The uranium varies from 42.8 to 0.27 µg in Budhlada (Bathinda District), while the average of uranium content from Balachak (Amritsar) to Budhlada (Bathinda) is 17.4 µg. The high content of uranium in Bathinda is due to presence of a radioactive rich granitic rock formation of Tusham hill (Bhiwani) of the neighboring state Haryana. The presence of uranium in some village of Bathinda is mentioned in table 5:

Table 5: Amount of Uranium in Different Regions of Bathinda

Sr. No.	Location	Source	Uranium concentration (µg)	Depth(Feet)
1	Budhlada	Hand pump	42.8 to 0.27	50
2	Morh	Hand pump	30.1 to 0.14	65
3	Kot Fateh	Hand pump	37.7 to 0.23	55
4	Bathinda	Hand pump	29.5 to 0.10	55

Source: Singh et al, 2009

Radiation is another factor which is responsible for cancer particular skin cancer in Bathinda. There are various sources of radiation like mobile tower and other electronic goods and depletion of Ozone layer on the other hand are also responsible for cancer in Punjab.

Tobacco and Alcohol- Usage of both tobacco and alcohol by human beings is also responsible for high rates of cancer cases in Bathinda. This might be because alcohol can act as solvent, helping chemical in tobacco to get into the cells lining to digestive system. In Bathinda heavy amount of alcohol can be used by the people and its daily uses may lower the body's ability to absorb foliate from food. Alcohol can also effect on not only the body weight but also on kidney. Apart from alcohol, tobacco is another most important factors that is responsible for

more numbers of cancer cases. According to National Cancer Registry Programme (2008), Tobacco is responsible for 30 to 50% of cancers in men and about 10-15% of cancers in women. Reddy and Gupta (2004) argued that in India, Tobacco chewing is also prevalent but it put negative impact and it has resulted in additional burden of oral cancers and oral precancerous conditions. The research found that pesticides was not culprit but the changing in the living standard of farmers are responsible for cancer like they smoked more tobacco and changed to unhealthy diets (Department of Community Medicine 2007).

Other factors- There are various another factors such as Guru Nanak Dev Thermal Power Point, National Fertilizer Plant, Petro Chemical Plant etc. and imbalance diet, physical inactivity and obesity etc. may be the other factors responsible for cancer in Bathinda. Apart from these Physical inactivity is believed to contribute to cancer risk not only through its effects on body weight but also through negative effects on immune systems and endocrine systems. Diet that is low in vegetables, fruits and whole grains and high in processed or red meats are linked with a number of cancer. A high salt diet is linked to gastric cancer responsible for cancer in Bathinda and ash from thermal power station and chemical factory contains a lot amount of uranium component which area large part of its ash mixed in the which is responsible for many other diseases and cancer in Bathinda.

SOCIO-ECONOMIC IMPACT OF CANCER

Cancer care cost has significant impact not only over the patient but also on his/ her family members. This impact can be seen highly on the lowest and middle income group family. It has also impact on the people's ability to work which are further responsible for poverty. There are very few studies have tried to find out the socio- economic impact on cancer patients of Bathinda known as cancer prone area. Cancer is very complex socio-economic situation and cancer patients has negatively implication on owns credit and access to loan, for example in cotton belt of Punjab many farmers regularly resort to heavy loan and if one person of family is affected by cancer then all family has suffered by many socio- economic problems (Singh, G. K, Azuine, R. E., & Siahpush, M. 2012). According to another study entitled “Sorrow Tale of Jajjal: The Village Cursed By Cancer” by Umendra Dutt (2007) People fear that the treatment cost shall be very high once the cancer is declared and they don't go for checkup of cancer, as they think that the family members shall become worried about the expanses. If we talk about the case of financial relief provided by government of

Punjab that there are only three families got financial relief of Rs 22,500 /- each out of the 55 cancer deaths after the all assurances and declarations. In the terms of socio-economic impact of cancer the condition of Jajjal village had been very worse. In Jajjal village each cancer affected family owns debt of one to three lakh minimum and some of them were worst affected. Cancer does not make difference between have and have not and it knocking the doors after door, ruining the families, social system and economy of the people of Jajjal village. The social factor such as education has significant impact on the cancer patients. According to a study of **"**Effect of Socio-economic and Demographic Factor in Delayed Reporting and Late Stage Presentation among Patients with Breast Cancer in Major Cancer Hospital in South India" the most of cancer cases are observed in that woman who are widow, divorced and unmarried than the those who are married because married woman have a husband who serve as source of economic support and she has a option to go hospital. The same study also reveal that more educated woman has diagnosed at early stages of cancer rather than the uneducated woman, because educated woman are much aware about the risk factor of cancer rather than the illiterate woman (Stephen 2011).

EFFORTS TO CONTROL THE CANCER

No doubt cancer is widely spreading in Bathinda district of Punjab due to a number of factors such as tobacco, alcohol, pesticides and uranium etc. but surprisingly very few medical facilities are available in cancer prone district. Many Newspapers have tried to cover the health status of Bathinda as well as condition of cancer patients in Bathinda district. Ago six years in Bathinda city there was no cancer hospital, but there is a private Bansal super-specialty cancer hospital, they charge Rs. 500 just to pass the gate, and other nearest medical facility is at Ludhiana & Chandigarh that put negative impact on the economic condition of the patients. There was no government hospital in the region. Now with effort of many Non-Government Organizations the Government of Punjab set up a super-specialty cancer and cardiac care hospital Max Healthcare Institute Limited set up in April 2011 under public-private-partnership (PPP) that was more costly than the government hospital. The Punjab government has given 4.8 acres of land of the local civil hospital to the Max Healthcare at an annual rent of Rs. one for 50 years. But, details of treatment for poor cancer patients are not finalized yet. Moreover, only 50 beds had been proposed in hospital for the treatment of cancer patients. On another hand Max Healthcare would give a share of

its earning to the Punjab government to fund the treatment of poor cancer patients (Sharma 2011). Cancer among the farmers is caused by excessive uses of pesticides and due to the non-availability of cheap treatment of cancer in Bathinda. Therefore, In Bathinda nearly about 70 to 100 cancer patients daily travelled to Bikaner from Bathinda due to cheap treatment of cancer at Acharya Tulsi Regional Cancer Trust" (Goyal 2012).

Cancer patients need strong support and sympathy more than the medicine and treatment at a time when medical profession in our country is steadily being commercialized, our doctor has forgotten the art of talking to their patients. The people lost their god in the rush to money making. Cancer has bad effect on the financial condition of the people because cure of cancer requires a lot of money which are also responsible of many of suicides in Punjab. According to Government figure (2008), cancer on average has claimed 300 deaths in year in Malwa region (Mann 2012).

GOVERNMENT EFFORTS

Though there are a numbers of facilities provided by the Punjab Govt. for cancer treatment but these are not adequate. There are several direct Govt. initiatives to seek the problems of people of Bathinda and to aware the people available facilities to cancer. Punjab Government has taken many initiatives for cancer awareness mentioned below (on the basis of observation through newspaper):

1. State Govt. has installed Reverse Osmosis Systems (RO) in various villages of District.
2. On "National Cancer Awareness Day" a State level function was organized on 7th Nov. 2010 in Mansa District & "Special Cancer Awareness Campaign" was carried out from 7th Nov. to 13th Nov, 2010. Though plays/dramas, exhibition & distributing pamphlets/posters, people were made aware about symptoms, causes, prevention and treatment of cancer during this campaign.
3. In all districts hospitals of Punjab state, "Mass cancer screening & awareness camps" were organized for cancer detection & awareness camps on 26th March, 2011.
4. "Mass cancer screening camps" were held at Civil Hospital Ludhiana and Badal in the month of December, 2011.
5. Department of Agriculture is doing some efforts to control the use the pesticides in this region and state. Declining trend of pesticides consumption has been observed from 5975 Metric tons to 5690 Metric tons from 2006-07 to 2010-11. A major reason

of this decline is the introduction of B.T Cotton in the state during the year 2006-07. The number of pesticides sprays has been reduced.

6. Cancer Mass Awareness & Early Detection Campaign in Punjab has been directed by State Govt. and pilot phase of this campaign in Oct, 2012 launched by Hon'ble Chief Minister Punjab at Faridkot district.
7. State Govt. under Financial Assistance Illness fund has provided financial support to poor cancer patients.
8. Under the Cancer Raahat Kosh Society Punjab Govt. has given Rs. 50.00 crores for treatment of all cancer patients to those except Govt. employees and those having health insurance cover. An amount of up to Rs.1.50 lakhs is made available for treatment of every cancer patient. About Rs. 53.55 crores have been accorded to hospitals for treatment of 4987 Cancer patients.
9. The State Government has executed an agreement with Max Health Care to set up Super Specialty Hospital for Cancer & Trauma Care in the premises of Civil Hospital SAS Nagar (Mohali) and in the premises of Civil Hospital, Bathinda a Super Specialty Cancer & Cardiac Hospital has been set up.

CONCLUSION

Several studies have found various factors responsible for cancer in Bathinda region. Over usage of pesticides in agricultural practices, concentration of uranium in water and use of tobacco & alcohol etc. are considered as responsible factors of cancer in this region. Guru Nanak Dev Thermal Power Point, National Fertilizer Plant, Petro Chemical Plant etc. and imbalance diet, physical inactivity and obesity etc. may be the other factors responsible for cancer in Bathinda, but very few studies have tried to find out the socio- economic impact on cancer patients of Bathinda known as cancer prone area. Impact Cancer care cost has significant impact not only over the patient but also on his/ her family members. The cancer care cost has impact on patient and his/her family members mainly in the lowest and middle income groups. Though there are a numbers of facilities provided by the Punjab government for cancer treatment but these are not adequate. Government should increase the facilities to cure the cancer in all parts of the region and should make people aware about such facilities.

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REFERENCES

1. Department of Community Medicine. (2007). *An Epidemiological Study of Cancer Cases Reported from Village of Talwandi Sabo Block.* Department of Community Medicine. Chandigarh: Post Graduate Institute of Medical Education & Research.<http://umen dradutt.blogspot.in/2007/09/final-report-of-pgimer-epidemiological.html>. Accessed 2012 Novmeber 15.
2. Dutt, U. (2007). Sorrow Tale of Jajjal: The Village Cursed by Cancer. <http://www. countercurrents.org/en-dutt140207.htm> Accessed 2012 November 18.
3. Goyal, S. (2012, March). Cancer -prone dist fifth on relief recipients. *The Tribune,* <http://www.tribuneindia.com/2012/20121107/battrib.htm#3>. Accessed 2012 November 15.
4. Kaur, R. S. (2011). Evaluation of DNA Damage in Agricultural Worker Exposed to Pesticides Using Simple Cell Gel Electrophoresis Assay. *Indian Journal of Human Genetics, 17*(3), 179-187.
5. Mann, M. (2012, November). Door-to-door campaign for detection of cancer to begin in district on Dec 1. *The Tribune*, <http://www.tribuneindia.com/2012/20121107/battrib.htm#3>. Accessed 2012 November 12.
6. Mann, M. (2012, September). Cancer Patients Need Counselling:Expert Says Sufferers need Support to Fight the Disease. *The Tribune*, <http://www.tribuneindia.com/2012/2012 1107/battrib.htm#3>. Accessed 2012 November 10.
7. National Cancer Registry (2012). *National Cancer Control Programme.* New Delhi: Govt. of India. <http://pbhealth.gov.in/Cancer%20Control%20Programme.pdf>. Accessed 2012 November 10.

8. National Cancer Registry Programme (2004). *POPULATION AND CANCER INCIDENCE.* National Cancer Control Programme 2012. New Delhi: Govt. of India, <http://www.icmr.nic.in/ncrp/report_pop2001-04/Chapter%2001-05%20Pages%201%20 to%2053.pdf >. Accessed 2012 November 12.
9. National Cancer Registry Programme (2008). Population Based Cancer Registries 2004-05. Bangalore, India: National Cancer Registry Programme. < http://ncrpindia.org/Report NE_2005_06/pbcr2004_05/PreliminaryPages_PBCR2004_2005.pdf>.
10. Reddy, K. S., & Gupta, P. C. (2004). *Tobacco Control in India*. New Delhi: Ministry of Health & Family Welfare.
11. Sharma, V. (2011). Cancer Bathinda's dubious distinction. *The Hindu*, <http://www.thehindu.com/todays-paper/tp-national/article2427870.ece>. Accessed 2012 November 10.
12. Singh, B.P. (2008). Cancer Deaths in Agricultural Heartland: A Study in Malwa Region of Indian Punjab. Ph.D/ Doctoral, International Institute for Geo –Information Science and Earth Observation Enschede, Netherland.
13. Singh, G. K, Azuine, R. E., & Siahpush, M. (2012). Global Inequalities in Cervical Cancer Incidence and Mortality are linked to Deprivation, Low Socioeconomic Status, and Human Development. *International Journal of MCH and AIDS,* 1(1). 17-30.
14. Singh, H. J, Singh Joga, Singh Suriender & Bajwa, B.S (2009). Uranium Concentration in Drinking Water Samples Using the SSNTDs. *Indian Journal of Physics, 83*(7), 1039-1044.
15. Singh, S. (2009). *The Presence of Uranium in Excess in Bathinda Water can be one of reason of High Cancer Deaths In District.* < https://docs.google.com/viewer?a=v&q=cache:749 JF8LJOK4J:hindi.indiawaterportal.org/sites/hindi.indiawaterportal.org/files/The%2520Presence%2520of%2520Uranium%2520in%2520Excess%2520in%2520Bathinda%2520Waters%2520can%2520be%2520one%2520of%2520the%2520Reason>. Accessed 2012 November 5.

16. Stephen, J. M. (2011). TheSocio- Economic Burden of Cancer in Member Countries of the Association of Southeast Asian Nations(ASEAN). *Asian Pacific Journal of Cancer Prevention, 13*: 407-409.
17. WHO (2008). WHO Report on the global Tobacco epidemic, 2008, Geneva: World Health Organization.
18. WHO (2012). *World Health Report.* Geneva: World Health Organization.
19. World Cancer Research Fund International. (2008). *General World Cancer Statistics.* <http://www.wcrf.org/cancer_statistics/index.php> Accessed 2012 November 24.