

## ORIGINAL ARTICLE

**Epidemiology of Different Types of Cancer in District Dera Ghazi Khan, Pakistan**SAIRA BANO<sup>1</sup>, MUHAMMAD SHERAZ<sup>2</sup>, HAIBA KAUL<sup>2</sup>, KHUZEEMA TANVEER<sup>3</sup>, ZEENAT ZAFAR<sup>4</sup>, SHEIKH MUHAMMAD AZAM<sup>5</sup>, SHUMAILA ARIF<sup>6</sup>, SHOAIB HASSAN<sup>1</sup>, MM KHAN<sup>7</sup><sup>1</sup>Institute of Zoology, Bahauddin Zakariya University Multan, Punjab Pakistan.<sup>2</sup>Department of Animal Breeding and Genetics, University of Veterinary and Animal Sciences, Lahore, Pakistan<sup>3</sup>Institute of Microbiology, Faculty of Veterinary Science, University of agriculture, Faisalabad, Pakistan<sup>4</sup>Nishre Medical University, Multan, Punjab Pakistan<sup>5</sup>Department of Zoology, Division of Science and Technology, University of Education Lahore, Pakistan<sup>6</sup>Shaukat Khanum Memorial Cancer Hospital and Research Centre, Lahore, Pakistan<sup>7</sup>Professor of Community Medicine NM&DC SargodhaCorrespondence to: Muhammad Sheraz, Email: [sheraz.qaisrani@gmail.com](mailto:sheraz.qaisrani@gmail.com), Cell: 0092-3440653530, ORCID: 0000-0001-7998-9891**ABSTRACT****Aim:** Cancer incidence are rising but its prevalence in District Dera Ghazi is not available on government or private level. Therefore, it is difficult to deal with cancer about its statistics and specific type prevalence. Our study was aimed to find the prevalence of cancer in various tehsils of Dera Ghazi Khan District, along with its trend from 2015 to 2021.**Method:** This was a cross-sectional study, conducted on cancer prevalence in three tehsils of Dera Ghazi Khan includes; DG Khan, Taunsa and Tribal area. A self-made questionnaire was used to assess the cancer prevalence in the form of; gender discrimination, prominent cancer types, number of death per year, number of cancer cases in various tehsils and number of live cancer patients and individuals survived.**Results:** Total 817 cancer patients were included in this study, 415 belong to Tribal area tehsil. Total 350 female cancer patients were reported in this study, 173 were affected by breast cancer and mostly of them belong to urban area. Breast, blood, liver, throat and stomach cancers were most prevalent in district. Highest proportion of cancer affected individuals were aged between 25 to 65 years. Cancer death rate was found to be in increasing order from 2015 (68) to 2020 (116). 2021 was recorded with 109 deaths. 157 cancer patients were under treatment and only 18 patients could have recovered from cancer in last 5 years.**Conclusion:** Cancer was highly prevalent in DG Khan especially in tribal area. Reason for high cancer prevalence might be presence of radioactive elements in environment, illiteracy and unavailability of cancer treatment and early diagnose center in DG Khan District.**Keywords:** Liver Cancer; Epidemiology; DG Khan; Breast Cancer; Colorectal Cancer**INTRODUCTION**International Agency for Research on Cancer (IARC) estimated 19.3 million cancer cases and 10 million deaths by cancer, globally in just 2020. Torre et al.<sup>1</sup> stats that the highest proportion of cancer effected patients belong to developing countries. According to report conducted by WHO, 173,937 cases of cancer were reported in Pakistan in 2018 with 118,442 deaths in same year. Highest incidence of cancer cases is reported in less developed areas like South Punjab, Balochistan and Interior Sindh.Bray et al. (2012) predicted that global cancer prevalence will increase in future and may reach to 21.7 million cases and 13 million deaths till 2030<sup>2</sup>. This increase in cancer prevalence is estimated by human lifestyle, cousin marriage and exposure to radioactivity<sup>3-4</sup>. The most common cancers that are caused by these factors include; breast, lungs, intestine, blood, brain and colorectal cancers. The assessment of cancer prevalence through incidence and survival data is the most common method throughout the world and such studies have been conducted to assess the cancer prevalence in various countries such as; Australia, Europe, America and United Kingdom<sup>5-7</sup>.The estimation of cancer incidence, survival and mortality is stated to be the first step toward control and prevention<sup>8</sup>. Cancer prevalence can be simply defined as the number of individuals effected with cancer within a specific time in a particular area. The prevalence studies are considered as important supplementary studies in cancer control, treatment and screening<sup>9</sup>. Additionally, such studies also reveal the dynamics of cancer in a specified population whether that disease is increasing, decreasing or stable condition<sup>10</sup>. Therefore, this study is designed to estimate the prevalence rate of major cancers in DG Khan, using data collected from local government and private hospitals as well as direct interview of affected or their relatives from 2015 to August 2021. Data was collected for survival, died and under treatment persons along with their type of cancer, age, gender and area. Our results will help to find area with higher cancer prevalence rate along with type of cancer and age of patients. This can help in prevention and

control of cancer and also establish best possible health facilities in area with higher prevalence rate.

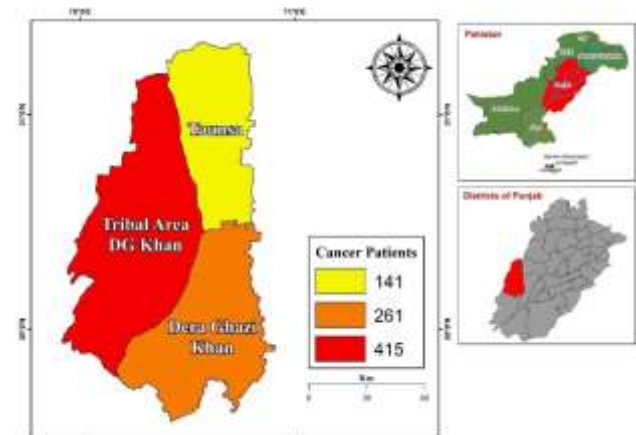
**METHODOLOGY****Study Design:** This was a cross-sectional study, carried out on the cancer prevalence in Dera Ghazi Khan (DG Khan) from 2015 to 2021. The surveillance system uses both the active and passive forms of data collection, from various local based public and private hospitals and laboratories, thereby collecting detailed data on cancer from patients or their close relatives among the residents of DG Khan. Moreover, other data sources such as; medical records from patient admissions, outpatient/ emergency assessment visits, pathology/ operative reports, chemotherapy/ radiotherapy logs, radiology/ nuclear medicine reports, hospital death certificates, and triage clinics were also obtained from each patients.

Figure 1: Map of cancer prevalence in various tehsils of DG Khan District

Study area was divided into three tehsils of the district including; DG Khan, Taunsa and Tribal area as shown in Figure 1. Informed consent was obtained from the respondent before the questionnaire was filled out. There were no restrictions on the target population's age, ethnicity or location in the district.

**Participants:** Only the population diagnosed with any of the major cancer were included in this study within the period of 6 years from 2015 to 2021. The patient himself or close relative of a deceased patient was asked to complete a self-designed questionnaire in order to collect data directly. Further, the responder was also asked to sign on consent form along with the questionnaire. Diagnosed and treatment reported were also taken were possible for authentication of provided data.

**Questionnaire:** A self-constructed questionnaire having various questions specifically related to demography, cancer and treatments was used. The demographic data was mainly consisted of name, age, belonging area and tehsil etc. Further, the questions related to cancer and its treatment and stats includes; cancer location, diagnosis year and date, its status (living or dead) and if the patient is alive then whether it is undergoing treatment or completely recovered. Death year was also noticed on questionnaire for deceased patients.

**Data Analysis:** The collected Data was arranged in MS excel and screened for completeness. Only patients with complete data were selected, those with incomplete data were excluded from the study. This study examined the cancer data of 817 patients. The descriptive statistics for demographic, cancer type, and death year are shown in total numbers and percentages. We analyzed the data using Microsoft Excel 2019. ArcGIS 10.5 was used to visualize cancer prevalence in several tehsils of district Dera Ghazi Khan.

**RESULTS**

Data of total 817 cancer patients was collected from various tehsil of district DG Khan. Only the patient died after 2015, live under treatment or recovered were considered in this study. All the cancer types were included in this study. The highest number cancer cases (415) were reported from tribal area of the district. Tehsil Dera Ghazi Khan (261) was reported to be on second of the position on the basis of number of cancer cases, followed by tehsil Taunsa (141). Number of cancer patients in various gender was different in different tehsils of DG Khan. Number of cancer cases in various tehsil of district DG Khan are shown on geographical map (Figure 2).

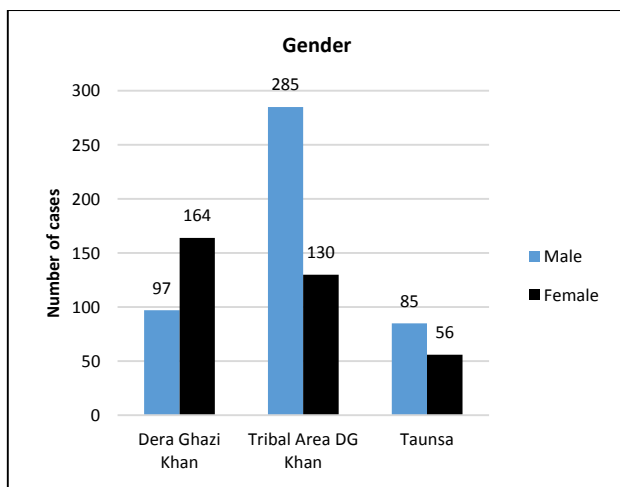


Figure 2: Cancer prevalence in different genders in various tehsils of DG Khan District

Total 285 males and 130 females were reported with cancer from tribal area tehsil. On the other hand, 164 females and 97

males were identified with cancer in tehsil DG Khan, similarly, 85 male and 56 female were reported from tehsil Taunsa. Figure 3 illustrates the number of cancer cases in different gender in various tehsils of DG Khan District.

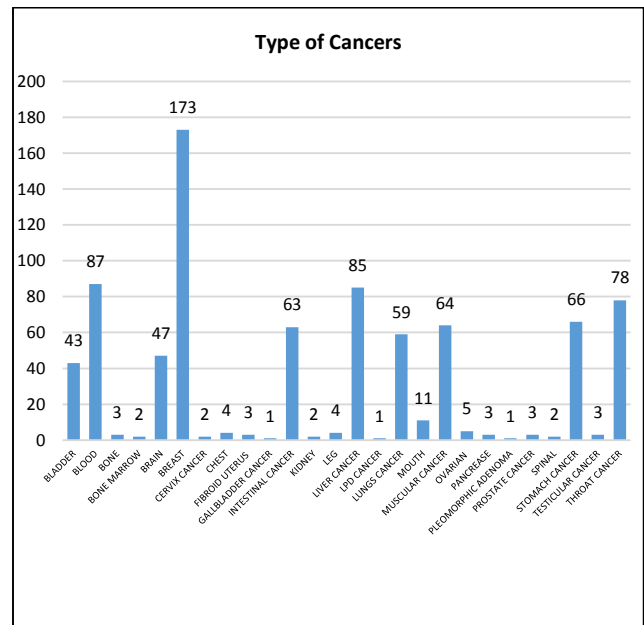


Figure 3: Prevalence of various types in DG Khan District

Data of various cancer type was also calculated. Graph below showed that the breast cancer cases were highest of total cancer types. Total 173 breast cancer cases were observed in our data and most of them were reported from urban areas of the district especially DG Khan city. Blood cancer was ranked second (87) and followed by liver (85), throat (78), muscular (64), intestine (63), stomach (66), lungs (59), brain (47) and all the rest type of cancers were in much low prevalence rate. Most of the blood, liver, intestine, lungs and throat cancers were observed in tribal area or in areas near to Suleiman Mountain. Number of various cancer cases is shown in graph below (Figure 3.3). The age groups (36-45) and (56-65) were highly affected with cancer in district DG Khan from 2015 to 2021. Lowest number of cancer patients were observed in age group greater than 75 years. Most of the cancer affected patients have age between 25 to 65 years (Figure 4).

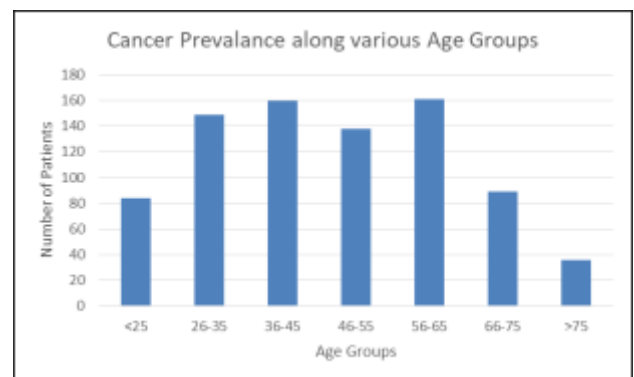


Figure 4: Cancer prevalence among various age groups

Year-wise cancer prevalence was also assessed in this research from 2015 to December 2021. Statistics showed a gradual increase in number of deaths due to cancer from 2015 to 2020 in whole district. The lowest number of deaths due to cancer were recorded for 2015 (68) and highest in 2020 (116). Total

number of death due to cancer in each were recorded as 2015 (68), 2016 (78), 2017 (81), 2018 (92), 2019 (110), 2020 (116) and 2021 (109). The number cancer affected live patients was also assessed and recorded 157 individual in whole district. There were

only 18 patients who could ever recovered from cancer from 2015 till now. Male and female affected patients with death year from each tehsil are listed in table 1.

Table 1: Number of cancer died/ live patients in various years from different tehsils of DG Khan

Year	Dera Ghazi Khan			Taunsa			Tribal Area			Grand Total
	Female	Male	Total	Female	Male	Total	Female	Male	Total	
2015	11	9	20	3	3	6	11	31	42	68
2016	13	10	23	3	9	12	14	29	43	78
2017	11	6	17	6	9	15	12	37	49	81
2018	14	7	21	4	11	15	17	39	56	92
2019	33	18	51	4	9	13	20	26	46	110
2020	24	13	37	13	6	19	17	43	60	116
2021	22	12	34	12	19	31	15	29	44	109
Live	36	22	58	11	15	26	24	49	73	157
Recovered	6	4	10	2	4	6	0	2	2	18
Grand Total	164	97	261	56	85	141	130	285	415	817

## DISCUSSION

This study was conducted to estimate the prevalence of cancer in the three Tehsils (Dera Ghazi Khan, Dera Ghazi Khan Tribal Area and Taunsa) of District Dera Ghazi Khan, Punjab, Pakistan from 2015 to 2021. Dera Ghazi Khan (D.G Khan) is sandwich district of Punjab, Pakistan that have direct borders with KPK, Balochistan and indirect with Sindh, having diverse traditions with 2,872,201 population (senses 2017). Most of its sub-tribes belong to Bloch tribe. Furthermore, DG Khan also have diverse geographical aspects from Indus River, arid land to Suleman mountain range. DG Khan is one of those district that is expected to be highly effect with cancer. According to public, this higher prevalence of cancer is might be due to radiations (uranium). Many studies have reported the presence of radioactive elements like Urinium in Suleman mountain region of DG Khan <sup>11</sup>. There might also be some genetic factor involved in higher prevalence rate of cancer as most of the Bloch tribes have only cousin marriage trend. However, there is no international cancer registry in country that could give a clear picture of cancer statistics.

Most of the local population have mindset that DG Khan District have highest cancer prevalence than most of the other district of Pakistan, reasons of this high prevalence are radioactive elements in Suleiman Mountain range. This cross-sectional study was based on objectives to find the area with highest number of cancer cases in district, gender based discrimination and also year-wise death prevalence in each tehsil. Results of our study revealed that Tehsil Tribal Area is the most affected of all the tehsils of DG Khan District. High land of Suleiman Mountain range is called tribal area in DG Khan, this land has many natural reservoirs including natural gas, oil and also radioactive elements including uranium <sup>11</sup>. The higher prevalence rate of cancer in tribal area tehsil might be due to these natural radioactive elements<sup>12</sup>. However, a higher proportion of these affected individuals were male (285 out of 415).

Most of the tribal area affected individuals have throat, blood, intestinal, liver and lung cancer but less number of breast cancer there. The highest number of breast cancer were recorded in urban areas especially DG Khan and Taunsa city. Similar results with higher proportion of breast cancer in city areas were reported in many studies<sup>13-14</sup>. Overall, results of our study suggested higher prevalence of breast, throat, intestine, liver, lungs and brain cancer in whole study area. However, the prevalence of other cancer types was observed in less number. Elevation in breast cancer is due to obesity, less physical activity, decline in breast feeding and changing lifestyle as well <sup>15</sup>. There are some studies in Punjab, Pakistan whose results were different from our study as they suggested much higher prevalence of prostate cancer that is not much prevalent in our study<sup>16</sup>. Ali et al. also reported that prevalence of cervical cancer was found lesser as in our study cervix cancer and uterus cancer patients were found at very low count number<sup>17</sup>.

Most of the population living in DG Khan District belong to Baloch tribe and they mostly prefer to cousin marriage especially,

Tribal Area. Different cancers have different inheritance pattern, however, many of them have direct or indirect genetic background. Cancers with recessive inheritance pattern resulted in higher prevalence rate and cousin marriage boost up the prevalence of such cancers <sup>18</sup>. Higher cancer prevalence in DG Khan District might also be result of cousin marriage. Cancer prevalence in male to female was different in various tehsils, Tribal area have 285 males and 130 females, DG Khan have 164 females and 97 male, and Taunsa have 85 male and 56 female patients. Most of population belong to tribal area tehsil or other rural areas of district are poor and less educated. There is no diagnose or cancer treatment center in DG Khan District. On the other hand, it's diagnose and treatment is so expensive for poor in Pakistan so they never even visit to any cancer specialist for proper treatment. Poverty and unavailability of cancer diagnose center might be the reason of low cancer diagnosed cases in Tribal Area and Taunsa tehsil. Higher number of cancer affected patients were young as recorded in results with age between 25 to 65 years. Chlebowskiet al. reported the increase of cancer prevalence with age after adolescence due to overweight, alcohol consumption and inactivity<sup>19</sup>. In another study, hormone therapy in female to increase their reproductive phase was also associated with cancer prevalence<sup>20</sup>.

Cancer data was collected for last 5 years in three tehsils of District DG Khan to find the increasing or decreasing order of cancer incidence. Our results suggested that there is an increasing order of cancer incidence from 2015 to 2021. In 2015, only 68 cancer patients were died and in 2020, the highest number of deaths (116) were recorded in our data. However, in 2021, 109 individuals were died of cancer. Total number of live cancer patients in whole district in December 2021 was 157. There are only 18 individuals who could recovered from cancer from 2015 till now. Poverty and illiteracy might be the best reason of less survival rate as suggested by a study conducted in Europe, the less educated and poor cancer patients have poor chance for survival<sup>21</sup>.

## CONCLUSION

Our study highlight the prevalence rate of cancer in various tehsils of district DG Khan (DG Khan, Taunsa and Tribal area) Punjab, Pakistan. Tribal area is the tehsil that is most affected by cancer in DG Khan with lowest population of total inhabitant. Blood, throat, liver, lungs and intestine cancer are the common types of cancer in Tribal area tehsil. Moreover, most of the cancer affected individuals have age between 25 to 65 years. Overall, breast cancer is the highest among cancer type of DG Khan that is most prevalent in urban area. Our results support the perception of local inhabitant that radioactive elements present in Solomon Mountain Range are the main cause of cancer. Cousin marriage may also have supportive role in cancer prevalence. Most of inhabitant of area are poor and illiterate and couldn't bear expensive cancer treatment. Therefore, only a negligible number of patients could

survive from cancer. There is no cancer hospital or even diagnose center in this area, Government need to start cancer screening practice here. This study can be the first step toward large scale study along with the start of cancer database.

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