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Research Article

**RISK FACTORS OF VARIOUS MALIGNANCIES AND
RELATIVE FREQUENCIES: A CROSS SECTIONAL STUDY**¹Dr. Muhammad Mehran, ²Dr Sana Munir, ³Dr. Hassaan Sajid¹POF Hospital Wah Cantt, ²BVH Bahawalpur, ³Holy Family Hospital**Article Received:** October 2020**Accepted:** November 2020**Published:** December 2020**Abstract:**

Objectives: The existing study aims to explore the relative frequencies of various malignancies and the common risk factors predisposing to malignancies.

Methods: The study was conducted for 2 months i.e. from August to September 2019, at Jinnah Hospital, Lahore. This was a cross sectional study in which the participants were selected through non-probability purposive sampling technique and the criteria of selection was being diagnosed with any malignancy either in present or past. The Participants were interviewed via questionnaire which was translated into local language by the researchers themselves. A sample size of 171 was calculated with help of WHO S.Size software. The data was collected and complied with the help of SPSS 17.

Results: Malignancy was most usually associated with Breast in 65 (38%), colon in 17 (9.9%), uterus in 14 (8.18%) and lung and skin in 9 (5.26%) patients that our results showed. The most commonly affected age group was 31-60 years with 111(64.91%) patients of our sample. The risk factors most commonly encountered in the history of these patients were passive smoking in 80 (46.78%), family history in 35 (20.46%), living in industrial area in 22 (12.86%), exposure to industrial chemicals and waste in 16 (9.31%), excessive skin exposure in 14 (8.1%) and exposure to radioactive radiations in 3 (1.75%) participants. In addition to these results, bladder Ca was found to have a significant association with chemical industry and 44.61 % of the Breast CA patients had positive family history.

Conclusion: Regarding early diagnosis of malignancies the above results lead us to conclude that more research is needed in this area for the proper guidance of population. Further researches in exploring the significant relations of specific risk factors to certain malignancies must be conducted, so that, the population is aware of the risk factors that need to be investigated.

Keywords: Cancer, Malignancy, Relative frequency.

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INTRODUCTION:

A term used when we refer to a disease with cells that proliferate escaping the normal control mechanisms of cell division and also these cells can invade the surrounding tissues is called Cancer. However, this term cancer is used alternatively with malignancy, which in fact is the term when a cancer makes its secondaries to proliferate in tissues/ organs other than the primary organs by spreading through the blood or lymphatic systems.¹ Worldwide, one of the established and leading causes of mortality and morbidity is cancer, as approximately 14 million new cases were reported in a study conducted in 2012 and in 2015 around 8.8 million deaths were reported to be caused by cancer, assigning it the second rank among the most common causes of mortality worldwide.³

GLOBOCAN 2012 presented following data for incidence, mortality and prevalence for 5 age groups (0–14, 15–44, 45–54, 55–64 and 65 and over) and sex for all countries of the world. There were 14.1 million new cases and 8.2 million cancer deaths in 2012 worldwide. This project illustrated following figures of various malignancies in descending order of their incidence for both genders: Lung (13.0 %), breast (11.9%), colorectal (9.7%), prostate (7.8%), stomach (6.8%), liver (5.6%), cervix uteri (3.8%) esophagus (3.2%), bladder (3.1) and other or non-specified cancers (35.3%).² As far as local prevalence of cancer in our country is concerned, a country wide study conducted by the above-mentioned project depicted that the most prevalent cancers in Pakistan include breast, lip and oral cavity, cervix uteri, colorectal and bladder, respectively. The cancers responsible for the highest incidence in both the genders (total = 148,041) in Pakistani population includes breast (n = 34038, 23%), lip and oral cavity (n = 12761, 8.6%), lung (n = 6800, 4.6%), non-Hodgkin lymphoma (n = 5964, 4%) and colorectal (n = 5335, 3.6%), respectively. Whereas, the cancers responsible for the highest deaths (total = 101,113) in Pakistani population includes breast (n = 16232, 16.1%), lip and oral cavity (n = 7266, 7.2%), lung (n = 6013, 5.9%), esophagus (n = 4748, 4.7%) and non-Hodgkin lymphoma (n = 4374, 4.3%), respectively.⁴

Some similar results have been produced by a study conducted at centers affiliated with Jinnah Hospital and showed the following geographical distribution of cancer in Pakistan i.e. out of 6,587 malignant cancers Punjab 3,564 (54.11%), Khyber Pakhtunkhwa 1,526(23.17), Sindh 222(3.37%), F.A.T.A 242 (3.67), Baluchistan 119 (1.81), Federal Capital 65 (0.99) Gilgit-Baltistan 14(0.21) Azad

Jammu & Kashmir 66(1.00) and Afghanistan 769 (11.67).⁵ Regarding the risk factors predisposing the population to development of cancer, growing older, tobacco, sunlight, ionizing radiation, certain chemicals and other substances, some viruses and bacteria, certain hormones, family history of cancer, Alcohol, Poor diet, lack of physical activity, or being overweight.⁶

In our study we aim to determine the relative frequencies of various malignancies in the local area as there has been no study that provides such a data regarding this locality and as well as to spread awareness among people by knowing the risk factors that appear to be associated with different malignancies. The exploration of risk factors leading to develop a malignancy is also one of the objectives of our study. Through our study we have also tried to find out any association between a specific risk factor and a specific malignancy. As we gather from the past studies that the cancer incidence is rising every year, it is essential to create awareness in public to avoid such risk factors and this might help us bringing down the escalated levels of cancer prevalence and incidence. Our study gives a snapshot of the current situation of cancer prevalence in our targeted area and will help people to take an early notice of their conditions that might predispose them to develop a malignancy in the upcoming times.

MATERIALS AND METHODS:

The following study was approved by the institutional review board by presenting a research proposal before it was conducted and an ethical review statement was also shown to the review board where I mentioned that I will abide by the declaration of the World Medical Association (WMA) made at Helsinki (2008), regarding the ethical principles of medical research involving human subjects and Patient's health and safety would be our priority. It also stated that all the procedures shall be explained to the subjects clearly and shall be kept sterile and painless and the confidentiality of the information shall be maintained. This Cross-sectional study was conducted at Jinnah hospital and Inmol Hospital, Lahore. These centers are claimed to be the leading centers in Pakistan dealing with diagnosis as well as treatment of various malignancies.

The duration of this study was of 2 months from August to September 2019. The sample size was estimated using WHO S-Size software by using formula of Estimation of Population Proportion with specified Relative Precision at confidence level 95% and anticipated population proportion of 90% with relative precision 5%. The minimum sample size was

171. The Non-probability purposive sampling technique was applied for choosing the participants. Inclusion criteria comprised of the patients with any diagnosed malignancy presenting in Jinnah Hospital or Inmol Hospital, Lahore, for follow up or booked for surgery. The Exclusion criteria was based on people who denied to participate in the study and people who have a tumor but it's not malignant. Prior to data collection, permission was taken from administration of Jinnah Hospital and Inmol Hospital to interview their patients. Patients who fulfilled the inclusion criteria were interviewed. The selection of study settings was based on authors' convenience where it was easy for author and subjects to interact and no discrimination among age or ethnic groups was sought. A total of 100 patients were recruited from SKMHL and 71 patients from Inmol Hospital depending on the preference of subjects willing to take the interview.

SPSS computer software version 17 was used for entry, compiling and analysis of data. For quantitative variables, mean and standard deviation was calculated. For qualitative variables, frequency and percentage distribution tables were generated. For qualitative variables chi -square test and for quantitative variables t or z test was applied. P value of 0.05 was taken as significant.

A detailed semi structured questionnaire was devised by the researchers to collect data from the respondents. After explaining the purpose of study to the participants, written informed consent was obtained from all the respondents and face to face interview was conducted and close ended questions were asked. The questionnaire was developed in the light of previous researches that have marked some common risk factors and was also cross checked by our supervisor. While interviewing the patients, questions were translated into local language by the researchers. The participants were asked about the presenting complain, the investigations and various treatment modes that they went through. All the data was collected by the researchers themselves.

We categorized the risk factors into different groups e.g. use of recreational drugs including alcohol abuse and smoking, family history, exposure to any risk factor at workplace and many others. After this categorization we also sought if a specific factor is seen to occur more frequently in development of a certain organ malignancy or not. All of this process led us to find out the most prevalent malignancies among the population and the most common risk factors that should be taken as an alarming sign for the near development of a malignancy. In addition to these some of the risk factors have proven to be significantly correlated to a specific malignancy as well. Finally, the study was concluded by making the commonest risk factors obvious to the readers and planning some new ideas to spread the awareness regarding early diagnosis or early screening of malignancies.

RESULTS:

Table 1 shows that out of 171 patients, 65 are affected by the malignancy of breast which makes the largest proportion of the participants i.e. 38 % and out of these affected by the breast malignancy 3 (4.6%) were males whereas the remaining 62 patients (95.4%) were females.

The second most common reported malignancy came out to be of colon with a total of 17 patients (9.9%) including 12 men and 5 females. The next most common malignancy was reported with uterus affecting 14 (8.18%) patients out of the total sample. The next rank was occupied by the malignancies of lungs and skin equally with a total of 9 (5.26%) patients affected by each. Many other organs were seen to be affected by malignancy with smaller. The above results were compiled by putting the relative frequencies of various malignancies against the gender of the patients so that in addition to the relative frequencies we can also have an idea about the type of malignancy that is more common in one or the other femininit.

Table. 1 organ affected by malignancy * sex of the patient Cross tabulation

	sex of the patient		Total
	a	b	
ADRENAL GLAND	1	0	1
BLADDER	2	1	3
BONE	4	2	6
BRAIN	2	0	2
BREAST	3	62	65
COLON	12	5	17
ESOPHAGUS	3	3	6
FOLLICULAR DENDRITIC SARCOMA	1	0	1
KIDNEY	1	0	1
LARYNX	3	1	4
LEUKEMIA	3	1	4
LIPOSARCOMA	0	1	1
LIVER	1	1	2
LUNG	7	2	9
LYMPHOMA	1	2	3
NEUROFIBROMA	1	0	1
NEUROFIBROSARCOMA	1	0	1
ORAL CAVITY	1	0	1
OVARY	0	3	3
PANCREAS	1	0	1
PHARYNX	3	0	3
SARCOMA	1	0	1
SKIN	5	4	9
STOMACH	1	1	2
TESTES	2	0	2
THYROID	5	2	7
URETHRA	0	1	1
UTERUS	0	14	14
Total	65	106	171

Frequency. The relative frequencies of occurrence of each of the individual malignancies have been illustrated in the table 1.1.

The second table (2) was compiled by taking the age of the patients who presented with malignancy against the organ of malignancy with the intention to explore any relationship between the age and the development of any specific or a malignancy generally. Our results have shown that people within the age group of 31-60 years with 111 patients (64.91%) out of 171 belonging to this age group. The people with the age above 60 years of age made the second most common group of age affected by malignancies with 32 (18.71%) participants out of

171. The people with the age group of 16- 30 years made third most common for having malignancy with 24 (14.03%) and the least affected group was the one with age below 15 years comprising of only 4 (2.34%) patients out of the sample of 171 participants. Thus, we can suspect the increasing age to be a factor predisposing a person to malignancy. The separate analysis of the age group most affected by a specific malignancy has also been portrayed in table 2.

Table 2 :organ affected by malignancy * Age of patient Cross tabulation

organ affected by malignancy	Age of patient				Total
	a	b	c	d	
ADRENAL GLAND	0	0	1	0	1
BLADDER	0	0	3	0	3
BONE	1	2	2	1	6
BRAIN	0	0	2	0	2
BREAST	0	8	50	7	65
COLON	0	1	10	6	17
ESOPHAGUS	0	0	5	1	6
FOLLICULAR DENDRITIC SARCOMA	0	1	0	0	1
KIDNEY	0	0	1	0	1
LARYNX	1	0	2	1	4
LEUKEMIA	1	0	3	0	4
LIPOSARCOMA	0	0	0	1	1
LIVER	0	1	1	0	2
LUNG	0	0	5	4	9
LYMPHOMA	1	2	0	0	3
NEUROFIBROMA	0	0	1	0	1
NEUROFIBROSARC OMA	0	0	1	0	1
ORAL CAVITY	0	0	1	0	1
OVARY	0	1	1	1	3
PANCREAS	0	0	1	0	1
PHARYNX	0	0	1	2	3
SARCOMA	0	0	1	0	1
SKIN	0	2	6	1	9
STOMACH	0	0	1	1	2
TESTES	0	1	1	0	2
THYROID	0	2	4	1	7
URETHRA	0	0	0	1	1
UTERUS	0	3	7	4	14
Total	4	24	111	32	171

Where

a = <15 years b= 16-30 years c= 31-60 years d= >60 years

Table 3 has revealed some interesting results regarding the risk factors predispose a person to malignancy. Our results have shown smoking tobacco passively to be the most commonly encountered among those factors. Out of a total sample of 171 there were 80 (46.78%) participants who had a positive history of smoking tobacco. This

number was higher than those participants who smoked themselves which was only 44 (25.73%). The next common risk factor was having a positive family history for a certain cancer with 35 (20.46 %) out of 171 in this sample. To our surprise, a good deal of participants had a history of living in an industrial area who developed a malignancy i.e. 22

(12.86 %) participants. Excessive exposure to sun, exposure to industrial chemicals and exposure to radioactive radiations were present as a risk factor in

history of 14(8.1%), 16(9.31%) and 3(1.75%) participants with diagnosed malignancy.

Table 3: Common Risk Factors for Malignancies

Organ OF malignancy	Family History	History of passive Smoking	People living in Industrial Area	Sun Exposure	Industrial Exposure	Exposure to Radiations
ADRENAL GLAND	0	1	1	0	0	0
BLADDER	0	3	0	1	1	1
BONE	1	2	2	0	0	0
BRAIN	0	2	0	0	0	0
BREAST	13	29	7	3	5	1
COLON	8	8	1	1	1	0
ESOPHAGUS	0	1	1	0	1	0
FOLLICULAR DENDRITIC Sarcoma	1	1	0	0	0	0
KIDNEY	0	1	0	0	0	0
LARYNX	0	1	1	1	0	0
LEUKEMIA	1	1	1	2	0	0
LIPOSARCOMA	0	1	0	0	0	0
LIVER	0	1	2	0	2	0
LUNG	2	6	0	0	1	0
LYMPHOMA	0	1	0	0	0	0
NEUROFIBROMA	0	0	0	0	1	0
NEUROFIBROSARCOMA	0	0	1	1	1	0
ORAL CAVITY	0	0	0	0	0	0
OVARY	2	1	0	0	0	0
PANCREAS	0	0	0	0	0	0
PHARYNX	1	1	2	0	1	0
SARCOMA	0	1	0	0	0	0
SKIN	0	6	0	3	0	0
STOMACH	0	1	0	1	0	0
TESTES	0	1	1	0	0	0
THYROID	2	3	1	0	1	1
URETHRA	1	1	0	0	0	0
UTERUS	3	6	1	1	1	0
TOTAL	35/171 (20.46%)	80/171 (46.7%)	22/171 (12.86%)	14/171 (8.1%)	16/171 (9.35%)	3/171 (1.75%)
% In Gender	M =14(8.1%) F =21(12.2%)	M =31(18.12%) F =49(28.65%)	M =13(7.6%) F =9(5.26%)	M =8(4.67%) F =6(3.5%)	M =9(5.2%) F =7(4.0%)	M =2(1.2%) F =1(0.6%)

In this context we found that 1 out of 3 (33.33%) people with bladder cancer had a history of being working in a chemical industry, 29 out of 65 (44.61%) of the patients with breast cancer had a positive family history. 29 (44.61%) out of 65 patients with breast cancer had history of passive smoking. We got only 1 oral cancer and that 1 patient had history of smoking, alcohol intake and eating

“Pan”. These were some interesting statistics that are not much prevalent but significantly related with a specific malignancy. In addition to the above-mentioned risk factors, through our collected data, we were able to get some interesting figures related to some specific risk factors in being predisposing factor to a definite malignancy.

DISCUSSION:

The dominance of malignancy is mounting every year at a fine pace. This calls for an effort to make the people aware of this medical condition and its consequences if not detected and treated at time.

It has been shown very clearly in our study that breast malignancy is by far the most common type of malignancy in this locality and it is almost exclusive in the female gender. This is supported by the results of American Cancer society report published in 2013, which states breast cancer to be the most frequent malignancy to be diagnosed in women and the second most common cause of their death after lung cancer. ⁷ however, unlike our study which shows breast cancer to be the most common malignancy among our population, and lung cancer to be at fourth rank, the report on latest cancer data published by WHO in 2018 reveals lung cancer to be the most prevalent as well as the leading cause of death in both males and females. Yet, this report claims breast cancer to be the most frequent malignancy to be diagnosed. ⁸ We can expect the discrepancy in our result due to the same reason that mostly the lung cancer goes to death without even being diagnosed and making the breast cancer to be the commonest in the sample. Since much awareness has been created among females for its prevalence, it has increased in its diagnosing percentage.

These are pretty much the statistics as depicted by our results. Colorectal carcinoma is much more prevalent in the males according to our study and this goes in accordance with a study conducted in 2018 in UK. The referenced study has also mentioned Colorectal CA to be diagnosed commonly through screening process. Colorectal carcinoma is ranked the second most common cancer in our results; however, it is ranked second most common in females and third in the men in the annual report prepared by the agency of WHO in 2018.

It is quite possible that the previous low numbers of this malignancy were merely due to lack of diagnosis. A study conducted in India in 2018 has also declared PAP smear to be very useful tool in screening for early cervical cancers. Uterus has occupied the position of third most common cancer in our study, however it has been not documented as a member of most common cancer group previously but the statistics change rapidly and it might be emerging and it has been well documented that the cervical cancer went completely undiagnosed in the past due to lack of awareness and few taboos. This cancer has come into notice largely after the emergence of PAP smear that has helped a lot in the screening of

cervical cancer. Next come the Skin and Lung cancer that were diagnosed in equal number of the participants out of the sample. Lung cancer has been declared as the first and second most common cancer in males and females and the leading cause of death in both genders as per the report published by WHO in 2018.

A slight distinction from our result can be due to a number of reasons including lack of early diagnosis, early death, environmental change, increase in diagnostic modalities for other cancer etc. and many more. There is much more room for researches to come in this regard. However, the list of most common malignancies according to our study is pretty much similar to the one published by WHO in 2018. Thus, our results are in accordance with the previous data and the new results shown need to be explored further for public awareness especially regarding the most common cancer both by incidence and transience rate.

The age group with the range of 31-60 was illustrated to have the highest prevalence of cancer. These results are also supported by the reports issued yearly by WHO which report above 60 and 65 years of age to be the most vulnerable group. This gathers the fact the older you grow the higher are the chances for developing malignancies. The little difference in our study or the age group above 60 years not being the most frequent with malignancy is probably due to the lack of palliative care in our country and an early death of the cancer victims and thus decreasing a lower prevalence among this group. However, it is quite prominent in ours as well as previous study that old is a risk factor itself for developing carcinoma. Many previous studies have declared smoking a well-known risk factor for developing malignancy and so is the case with our report that has shown even passive smoking is a great deal of a risk factor for predisposing to malignancies. Oral cancer, as we found, showed strong association (p value <0.5) has also been associated with pan eating previously in a study. Our results when compiled revealed that it is mostly the older population being ostentatious by malignancies.

CONCLUSION:

Our study has brought on face the most common malignancies in our locality as well as the possible risk factors that might have been the underlying cause. The rate of cancer has been escalating every year for the last few decades. In short, the population needs education about how to avoid these risk factors and how to predict an early diagnosis of a malignancy. The most common malignancies must be

explored through further research work to establish all the possible risk factors and the methods that may help reduce the growing numbers of these malignancies.

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