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Distribution and Prevalence of Cancer in Churu District, Rajasthan: A Community-Based Cross-Sectional Study

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ABSTRACT

BACKGROUD: - A powerful enemy in the field of global health, cancer has a lasting impact on all countries. In India cancer burden is raising in both incidence and mortality rates. Community based epidemiological data are very less in Rajasthan.

AIMS AND OBJECTIVE: Conduct Survey to identify Distribution and Prevalence of Cancer in Churu District, Rajasthan and provide baseline data for future comparisons.

METHODOLOGY- Total 30 Clusters were selected by Simple Random Sampling (SRS) method. After decided the clusters, we have made a small team and start planning to survey by selecting regions (cluster).We start door-to-door survey to know the prevalence of this illness in selected clusters.

RESULTS:- Percentage prevalence was found 0.090%(90 in 1 lakh),Among them 25.58% were found with oral cancer, 13.95%,blood cancer, Breast cancer in 11.62% 9.3% were Lung cancer, 6.9% were uterus, bones and cervical cancer, intestinal and colorectum in 4.65% and 2.3% hepatocellular. Age- 41.8%cases were more than 60 years old, males 55.82% and female 44.18%, 4.6% with family history, and 90.69% were Hindu, 86.04% married. 37.20 % were Labour, 65.11% were vegetarians, and 34.88% were consumed tobacco+ smoking+ alcohol.

CONCLUSION:-Finding the reason for the rising prevalence, raising awareness, and implementing preventative measures, such as cutting back on alcohol and tobacco use and minimizing exposure to pesticides and early detection, diagnosis, and treatment methods that are appropriate for this situation all require a concerted effort.

Keywords: *Community based study, Prevalence, Cancer, and Churu*

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1. INTRODUCTION

Cancer continues to be a leading cause of morbidity and mortality worldwide. Cancer presents a significant global health challenge with a projected surge in cases. Globally, cancer contributes to approximately 10 million deaths each year.

[i] In 2022, the Global Cancer Observatory (GCO) estimated the total number of cancer cases worldwide at approximately 20.0 million and projected these to increase to 32.6 million by 2045.[ii] By 2045, the GCO predicted that India's cancer incidence would rise to over 2.46 million cases. In terms of the number of cancer cases, India comes in second in Asia and third globally. The chance of getting cancer in one's lifetime is about 11.0%.[iii] According to earlier reports from the National Cancer Registry Programme (NCRP), 1.46 million cancer cases were predicted for 2022, which translates to a crude incidence rate of 100.4 cases per 100,000 people in India.[iv]

Numerous causes, including fast urbanization, an older population, more sedentary lifestyles, and poor eating habits, are to blame for this increase in India. Concern over exposure to air pollution, both indoors and outdoors, is also growing.

Population aging plays a significant role, as the risk of cancer increases with age. Prevalence: The number of existing cases of a disease in a population at a given time.[v] Incidence: The number of new cases of a disease or disorder in a population over a period of time.[vi]

2. NEED OF STUDY

Cross-sectional surveys provide current estimates of disease prevalence in a specific population. This fills knowledge gaps and helps stakeholders understand the local burden of disease. Such data supports evidence-driven decision-making—shaping resource allocation, intervention design, and policy strategy tailored to community need.[vii]Limited data are available on cancer from Rajasthan. Only two studies, one from Western Rajasthan and the other from Eastern Rajasthan have been published by Sharma et al. in 1992 and 1996. Recently, "Atlas of Cancer" project of the National Cancer Registry Program (ICMR) 2001-2002 published data from Rajasthan. In this context, cross-sectional surveys are an effective research method to provide population-level prevalence estimates. In this article we were discussed community based outcome.

REASON FOR SELECTION OF CHURU:

Churu was selected as the study area primarily due to the academic and professional affiliation of all researchers involved in the study. All members of the research team are currently serving as academicians at Shri Bhawarlal Dugar Ayurved Vishwabharti, an institute located in the Sardarshahar subdivision of Churu district.

DEMOGRAPHY OF CHURU:-Churu is a district of the northern Indian state of Rajasthan. The district has an area of approximately 16,830 km2, with a road length of 1901 km. The 2011 population was approximately 2,039,547. The gender ratio is 938 females per 1,000 males; literacy among residents is 67.46%. There are 8 tehsils in the district: Churu, Ratangarh, Taranagar, Rajgarh, Sardarshahar, Sujangarh. The major crops include Wheat, Bajra, Mustard, Pulses and Guar.[viii]

AIMS AND OBJECTIVE:

1. **Primary Objective**-Conduct Survey to identify Distribution and Prevalence of Carcinomas in Churu District, Rajasthan.
2. **Secondary Objective-** Identify associated risk factors, provide baseline data for future comparisons.

3. METHODOLOGY OF SURVEY STUDY

The study was performed between 2023- 2024, where total 30 Clusters were selected. In survey sampling, a cluster is a naturally occurring group of population units that can be sampled together like villages in a rural area, urban blocks /wards etc. **Sampling Method-** Simple Random Sampling (SRS) by Excel RAND function.

After decided the clusters, we have made a small team and start planning to survey by selecting regions (cluster).We start door-to-door survey to know the prevalence of this illness in selected clusters. A specific questionnaire was employed during the survey. Subjects of either sex from all social categories, providing written informed consent were also maintained. The data were collected by the team. We inquired about patient's age, gender, and educational history.
The study complied with the guidelines of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) for reporting observational study findings.

CRITERIA FOR THE SELECTION OF THE PATIENTS

Inclusion criteria:-

1. All types of cancer patients
2. Already diagnosed patients
3. All Age, All religions, either sex
4. Alive Patients
5. Individuals who have been permanent residents in the study area for at 1 year

Exclusion criteria:-

1. *Died patient*
2. *Temporary Residents / Visitors:*
3. *Insufficient Data:-incomplete or missing data on cancer diagnosis.*

Statistical methods- The data was tabulated and analyzed using Microsoft Word and Excel. Means are used to present continuous data, and frequencies and percentages are used to describe categorical variables. Z=1.96 at a confidentiality level of 95%.

The sample size for this study was selected to offer a sufficient degree of precision around the estimate of prevalence among all patients with diagnostic various cancers.

4. OBSERVATIONS AND RESULTS

There are 6 tehsils in the district: Churu, Ratangarh, Taranagar, Rajgarh, Sardarshahar, Sujangarh.

Table N-1 Distribution &Prevalence of Cancer in Churu District

S.N	Tehsil	Number of Selected Cluster	Total Surveyed Population			Number of cancer patients	%
1.	Churu	**6**	**12490**	**M**	**F**	**11**	**0.088**
				6482	**6008**		
2.	Ratangarh	**4**	**5050**	**2674**	**2376**	**5**	**0.099**
3.	Sardarshahar	**5**	**6511**	**3137**	**2874**	**5**	**0.076**
4.	Taranagar	**5**	**6130**	**3138**	**2992**	**6**	**0.097**
5.	Rajgarh	**5**	**6800**	**3542**	**3258**	**7**	**0.102**
6.	Sujangarh	**5**	**10400**	**5659**	**5241**	**9**	**0.086**
	Total	**30**	**47381**	**24632**	**22749**	**43**	**0.090**

Table N-2 Pattern/type of cancer, Prevalence of Cancer in Churu District

S. N.	Pattern/type of Cancer	No. of Patients	%
1.	**Oral cancer**	**11**	**25.58%**
2.	**Blood Cancer**	**6**	**13.95%**
3.	**Breast Cancer**	**5**	**11.62%**
4.	**Lung**	**4**	**9.3%**
5.	**Uterus**	**3**	**6.9%**
6.	**Bones**	**3**	**6.9%**
7.	**Prostate**	**2**	**4.65%**
8.	**Cervical**	**3**	**6.9%**
9.	**Urinary Bladder**	**1**	**4.65$**
10.	**Intestinal**	**2**	**4.65%**
11.	**Hepatocellular**	**1**	**2.3%**
12.	**Colorectum**	**2**	**4.65%**

Table N-3 Age wise Prevalence

S. N.	Age in (yrs.)	Total no. of patients	Percentage %
1.	0-30	8	18.6**%**
2.	31-60	17	39.5**%**
3.	More than 60	18	41.8**%**

Table N-4 Percentage prevalence of Patients Gender wise:

S. N.	Gender	Total no. of patients	Percentage (%)
1.	Female	19	44.18**%**
2.	Male	24	55.82**%**
	Total	**43**	**100%**

Table N-5 Percentage prevalence of patient with family history

S. N.		Total	Percentage%
1.	Suffered	2	4.6**%**
2.	No suffered	41	95.34**%**

Table N-6 Percentage prevalence of cases religion status wise:

S. N.	Religion	No. of Cases	Percentage
1.	Hindu	39	90.69%
2.	Muslim	3	6.9%
3.	Jain	1	2.3%

Table N -7 Percentage prevalence of patient's marital status wise:

S. N.	Marital status	Total no. of patients	Percentage (%)
1.	Married	37	86.04%
2.	Unmarried	6	13.95%
	Total	**43**	**100%**

Table N-8 Percentage prevalence of patient's educational wise:

S. N.	Education	No. of Cases	Percentage
1.	Illiterate	2	4.65%
2.	Primary	12	27.9%
3.	Middle school	15	34.8%
4.	High School	9	20.93%
5.	Graduate	5	11.62%

Table N-9 Percentage prevalence of cases occupation wise:

S. N.	Occupation	Total no. of patients	Percentage (%)
1.	Private Job	11	25.58%
2.	Labor	16	37.20%
3.	Student	5	11.62%
4.	House-wife	7	16.27%
5.	Govt. job	4	9.30%
Total		**43**	**100%**

Table N- 10 Percentage prevalence of patients Diet pattern wise:

S. N.	Diet pattern	Total no. of patients	Percentage (%)
1.	Mixed	15	34.9**%**
2.	Veg.	28	65.11**%**
	Total	**43**	**100%**

Table N- 11 Percentage prevalence of patients'socio-economic status wise:

S. N.	Income Class	No. of Cases	Percentage
1.	High (above 40,000 per month)	8	18.60%
2.	Upper Middle (20,000 - 40,000/month)	13	30.23%
3.	Lower Middle (5,000 – 20,000/month)	19	44.18%
4.	Poor (below 5,000)	3	6.9%

Table N-12 Percentage prevalence of patients'addiction wise before diagnose cancer

S. N.	Addiction	No. of Cases	Percentage
1.	Tea / coffees	21	48.8%
2.	Tobacco+Smoking	7	16.27%
3.	Alcohol	5	11.62%
4.	Tobacco + Smoking + Alcohol	15	34.88%
5.	No addiction	6	13.95%

Table N-13 Percentage prevalence of patients'addiction wise after diagnose cancer

S. N.	Addiction	No. of Cases	Percentage
1.	Tea / coffees	9	20.93%
2.	Smoking	1	2.3%
3.	Alcohol	1	2.3%
4.	Smoking + Alcohol	3	6.9%
5.	No addiction	29	67.44%

5. DISCUSSION

DISTRIBUTION &PREVALENCE OF CANCER IN CHURU DISTRICT

Surveyed 47381 populations with 24632 males (51.98%) and 22749 (48.02%) and found 43 cancers patients, Percentage prevalence was **0.090 %**, slightly high were found in Rajgarh (**0.102%**) subdivision and slightly low in Sardarshahar (**0.076%) (Table N-1).** Means prevalence of cancer is 90 cases per lakh in Churu. Other study data showed that the

estimated number of cancer cases and crude incidence rate in India for the year 2022, 100.4 per 100,000. The estimated AAR for all sites of cancer in India would be 107.0 per 100,000.[ix] A study was also done in rural area of Jodhpur showed 0.16% prevalence of various types of cancers.[x] Recent study was done in jaipur showed the average cancer incidence in the rajasthan is estimated at 134.57 cases per one lakh population, which is significantly above India's national average of 113 cases.[xi] Less prevalence to the comparison of India and Rajasthan may be due to very small data for analysis and may be due to maximum population of rural area of this distract is based on natural resources like farming, animal husbandary. A slightly elevated incidence was observed in Rajgarh, which may be linked to canal-based farming. It is possible that farmers are using pesticides that contribute to the higher incidence in this area.

PATTERN/TYPE OF CANCER, PREVALENCE OF CANCER IN CHURU DISTRICT

Out of 43 patients, a maximum of 11 (25.58%) were found with oral cancer, blood cancer was found in 6 (13.95%), 5 (11.62%) were suffered Breast cancer, 4 (9.3%) were with Lung cancer, 6.9% (3 each) were uterus, bones and cervical cancer. 4.65% (2 each) were found with intestinal and colorectum cancer and 1(2.3%) was diagnosed with hepatocellular **(Table N-2).** Study showed oral cancer is more dominant due to most labour and males were consumed nicotin based products like Bidi, Jarda, Cigarette. Community based survey study done in rural area also showed that prevalence of oral cancer (20.87%) was highest.[xii] In female maximum prevalence of Breast cancer 9.3% in total and 26.31 % among females was found. Some other studies are also suggested similar data. Breast cancer in India: Present scenario and the challenges ahead (24.5 %)[xiii]

PREVALENCE ACCORDING OF AGE:

The age group of more than 60 years had the highest number of patients 18 (41.8%) out of 43 individuals **(Table N-3)**. Various studies[xiv],[xv] have shown that the most common age group for occurrence of cases was the sixth decade. Other study suggested maximum number of cancer cases was seen in 6th decade in males and 5th decade in females[xvi]

PREVALENCE OF GENDER:

Gender distribution in 43 patients found that males suffered 55.82% of the total, while females suffered 44.18% **(Table N-4)** Published studies also indicate that more incidence of cancer found in male with the comparison to female.[xvii] Ratio of mal female was 1.26 while in other studies this ratio was 1.5:1–2.1:1[xviii]

PREVALENCE OF FAMILY HISTORY: -

In the survey, 95.34% (41) patients had no cancer history in their family were found, but 4.6% (2) showed family history **(Table N-5).** It shows that genetics has important role in causation of cancer. Earlier studies, reported much higher rates (7.74%[xix]).

PERCENTAGE PREVALENCE OF CASES RELIGION STATUS WISE

Maximum 90.69% cases were Hindu, 6.9% were Muslim, and 2.3% were Jain **(Table N-6)**. As per official census 2011 and population data 2025 of Churu district, Hindu (87.17%) are majority in Churu district. Hindu dominance is the cause of above result.

PREVALENCE OF MARITAL STATUS:-

In 43 cases, the marital status of the patients revealed that 86.04% were married, 13.95 % were single **(Table N-7)**. No direct link was found to marriage status. Higher prevalence due to the average age of marriage in India is 25±5 years and maximum number of cancer cases was seen in 6th decade in males and 5th decade in females. From prior studies, it is difficult to draw meaningful conclusions regarding the impact of marital status on survival among patients with cancer.[xx]

PERCENTAGE PREVALENCE OF PATIENT'S EDUCATIONAL WISE:

Out of 43 instances, a maximum of 34.8% were middle school, 27.9 % were in primary school, 20.93 % were in high school, and 11.62 % were graduate. Education level in rural area of Churu district before 20-30 years was less **(Table N-8).** Due to less education most male population work as farmer and labour. Previous study was suggested the prevalence of current tobacco and alcohol use was 56.6% and 52.2% respectively. The proportion of workers with tobacco and alcohol users increases with age, consumption rate decreases with an increase in socioeconomic status. Consumption rate was high among workers with no formal education 76.1%, primary and secondary education 50.4%[xxi]

PERCENTAGE PREVALENCE OF CASES OCCUPATION WISE:

37.20 % were worked as labour, 25.58% were worked in various private organizations, 11.62% were students, 16.27% the rest were housewives and 9.30 % of patients were servicemen **(Table N-9).** The main occupation for the population in the Churu district is agriculture.

PERCENTAGE PREVALENCE OF PATIENTS DIET PATTERN WISE: Majority of patients (65.11%) were vegetarians, while the remaining 34.9% ate a mixed diet **(Table N-10).**[xxii]

PERCENTAGE PREVALENCE OF PATIENTS'SOCIO-ECONOMIC STATUS WISE:
Maximum of 44.18% cases belonged to the lower middle class; there are is no big industries. Main occupation of rural population is farming and animal husbandry. **(Table N-11)**

PERCENTAGE PREVALENCE OF PATIENTS'ADDICTION WISE BEFORE AND AFTER DIAGNOSE CANCER
Before diagnose of cancer, out of 43 patients, 48.8% were consumed tea or coffee, 34.88% were hooked to smoking and alcohol, 16.27% were smokers, and 11.62% were alcoholics. **(Table N-12)** The International Agency for Research on Cancer (IARC) has found no clear link between coffee and cancer and even removed it from its list of possible carcinogens in 2016.

Some evidence suggests that alcohol consumption may also be associated with increased risks of melanoma and of pancreatic, prostate, stomach cancers , oral and throat, Esophageal, Liver cancer.[xxiii]

Data showed after diagnosed of cancer out of 43 patients, 67.44% were no addiction, 20.93% were hooked to tea/coffees, 6.9% were Smoking + Alcohol, and 2.3% were alcoholics & Alcohol. **(Table N-13)**

Very small percentage (6.9% were Smoking + Alcohol, and 2.3% were alcoholics & Alcohol only) due to doctors were strongly advised cancer patients to stop using tobacco and alcohol due to the severe health risks and the potential to compromise treatment effectiveness.

6. CONCLUSION

The rising prevalence of cancer cases in the Rajasthan state are alarming, lack of awareness about cancer has made the scenario even worse. Finding the reason for the rising prevalence, raising awareness, and implementing preventative measures, such as cutting back on alcohol and tobacco use and minimizing exposure to pesticides and early detection, diagnosis, and treatment methods that are appropriate for this situation all require a concerted effort.

LIMITATION: - The limitation of the present study was that the data was collected from only 2.3 % population. Collected data are not fully representative of the entire community. Due to the sensitive nature of cancer, collecting accurate data proved challenging because many participants did not respond, fearing issues related to privacy, stigma, or other concerns.

RECOMMENDATIONS FOR FUTURE STUDY
Collected data are not sufficient to draw final result. The study should be carried out with large sample size, more diverse or more specific for better evidence on results.

CONFLICT OF INTEREST-No,

FINANCIAL AGENCY: - Self finance by the researchers.

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