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A COMPARATIVE STUDY ON CANCER IN TWO AREAS IN SAMWAH CITY

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ABSTRACT

Introduction: Cancer is a group of diseases characterized by abnormal cell growth, the ability to invade adjacent tissues and distant organs, and eventual death if the tumor progresses beyond a stage when it can be successfully removed. The research compares two residential neighbourhoods in Samawah—one exposed to Cement Factory pollution and one not—to determine cancer rates. To assess whether Samawah Cement Factory pollution increases cancer risk. **Method:** This study was conducted in Samawa city, Iraq over a 4-month period in 2012 and compares cancer occurrences and related deaths in two residential areas over a 9-year recall period (2003-2011). The first area is close to a cement factory and potentially affected by pollution, while the other is farther away and less likely to be affected. A total of 643 families were studied in the factory area and 688 families in the comparison area. The data was collected using a questionnaire that gathered information on family and individual characteristics, including cancer development and deaths. **Results:** This study compared two residential areas near a cement factory in Samawa city, Iraq. One area was close to the factory and potentially affected by pollution, while the other was farther away. The majority of individuals studied were adults aged 15-64 years, with a majority being married and having completed primary schooling. 69.2% of the new cancer cases reported during the 9-year recall period had died, with higher case fatality in the factory area (76.0%) compared to the comparative area (63%). 70.2% of the families had lived in their current place for more than 10 years, with 63.8% owning their houses and 26.4% renting. Children under 15 years old made up 40.7% of the total population. **Conclusion**: This research examined the risk of cancer in cement-exposed adults. Cement Factory emissions did not increase cancer risk. Even without such data, a tiny influence is possible. The research also found that Al-Muthanna's cancer incidence rate is underreported.

KEYWORDS: A comparative, study, cancer, two areas, Samwah city.

INTRODUCTION

Cancer is a group of diseases characterized by abnormal cell growth, the ability to invade adjacent tissues and distant organs, and eventual death if the tumor progresses beyond a stage when it can be successfully removed. Risk factors for cancer can be divided into environmental and genetic causes, with environmental factors accounting for 80% to 90% of all human cancers. Major environmental factors include tobacco use, alcohol consumption, dietary factors, occupational exposures, infections, parasites, obesity, physical activity, chemicals, and other factors such as sunlight, radiation, and air and water pollution.[1-5] Cancer affects all communities worldwide and is the second most common cause of death in the western world after cardiovascular disease. With an aging population and lifestyle changes in the developing world, global cancer rates have been increasing. The most significant risk factor for developing cancer is old age, with around 50% of cancers occurring in people aged over 65 years. The relationship between cancer and the cement industry is not fully understood, with studies producing conflicting results. Some studies have found increased risks of cancer among cement workers, while others have not. Factors such as asbestos exposure and confounding variables may contribute to the discrepancies in the findings.[6-10] Cancer prevention and control strategies include primary, secondary, and tertiary prevention. Primary prevention includes smoking cessation programs, alcohol moderation, healthy diet, obesity control, regular exercise, avoiding exposure to sexually transmitted infections, avoiding excess sunlight exposure, reducing exposure to known carcinogens, and mitigating residential radon levels. Secondary prevention focuses on early detection through screening programs

and chemoprevention. Tertiary prevention aims to prevent metastasis, provide rehabilitation, offer palliative care, and manage complications.[11-13] The study aims to assess the prevalence of cancer in Samawah by comparing two residential areas: one exposed to pollution from the Cement Factory and a non-exposed area. The goal is to determine whether pollution from the Samawah Cement Factory contributes to an increased risk of cancer among the population.

METHOD

This study is a comparative household survey conducted in two residential areas in Samawa city, Al-Muthana governorate, southern Iraq, over four months from February to June 2012. One area is close to the cement factory (<1000 meters) and potentially affected by pollution, while the other is farther away (7-8 km) and less likely to be affected. The study uses a cross-sectional design with a retrospective component, examining cancer occurrence and related deaths over a 9-year recall period (2003-2011). Two conveniently sampled residential areas were chosen: the targeted factory area and the comparison area. A total of 643 families were studied in the factory area, while 688 families were studied in the comparison area. A questionnaire was used to gather data on general characteristics of the families and individuals, including those who developed cancer or died from it during the recall period. Variables considered included age, gender, occupation, education, marital status, and history of major chronic diseases. Data were analyzed using SPSS software (version 16), with statistical significance tests conducted as needed. A p-value < 0.05 was considered statistically significant.

RESULTS

Table 1shows the distribution of families according to residence. Among the total studied families 48.3% were in factory area and 51.7% were from the comparative areas. There is slight difference in numbers of families in both areas. 5.4% of families were resident within less than 200 meters away from the factory, 39.7% were from 200-500 meters, 3.2% were from 501-1000 meters, and 51.7% were more than 1000 meters away from the cement factory, the latter represents the comparative population. The age distribution of individuals studied Children less than 15 years formed 40.7% of the total population, elderly aged 65 years and over represented only 1.9%. The rest were adults aged 15-64 years, the distribution of individuals according to their occupation. Among the total studied individuals, 24.2% were housewives, 13.4% free job, 11.2%governmental employees, 27.8% pupils or students, 20% were pre-school children, 1.7% were unemployed, and 1.5% were retired. regardless of age, 29.3% of the studied population were not married, 66.1% were married, 4.1% were widowed, and only 0.5% were divorced. the distribution of individuals according to the indicator of socio-economic education. About 19.9% were children not in the school, 8.7% were illiterate, 0.3% read and write only, 43.6% completed primary schooling, 14.8% intermediate schooling, 6.6% secondary schooling, 3.0% were bachelor and only 0.1% were master and more. more than two thirds (69.2%) of the new cancer cases which were reported during the nine-year recall period died during these years and only 30.8% were still alive. Case fatality was higher among cases in the cement factory area (76.0%) as compared to the comparative area (63%) but not highly significant.

Table 1: Distribution of families according to the variables.

Residence	**Number**	**Percentage**
factory area	643	48.3%
comparative areas	688	51.7%
Total	1331	100.0
Distance (meters)	**Number**	**Percentage**
<200	72	5.4
200-500	529	39.7
501- 1000	42	3.2
>1000	688	51.7
Total	1331	100.0
Job	**Number**	**Percentage**
housewife	1820	24.2
Free job	1008	13.4
governmental employees	840	11.2
Student	2118	28.2
Children not attending school (less than 6 years)	1491	19.9
unemployed	125	1.65
Retired	109	1.45
Total	7511	100.0
Marital status	**Number**	**Percentage**
Single*	1302	29.3
married	2940	66.1

widowed	185	4.1
divorced	21	0.5
Total	4448	100.0
Education attained	**Number**	**Percentage**
Pre-school age child	1491	19.9
Illiterate	651	8.7
Read and write only	25	0.3
Primary school	3277	43.6
Intermediate school	1112	14.8
Secondary school	495	6.6
Institution	233	3.1
bachelor	223	3.0
master & more	4	0.1
Total	7511	100.0
Patient fate up to the time of study	**Number of cases in 9 years**	**Percentage**
Alive	16	30.8
Dead	36	69.2
Total	52	100.0

The distribution of families according to duration of residence. About 70.2% (75.7% in factory area, 65.0% in comparative areas) were resident in current place for more than ten years, 12.4% were from 5-10 years and 17.4% were resident for less than 5 years' duration. So, the difference was statistically significant (P<0.05). comparison of families with respect to house ownership and House type (building status). Regarding ownership of a House, 63.8% (51.1% in factory area, 75.6 in comparative areas) owned their houses, 26.4% rented and 9.8% were living in others (governmental, unplanned housing). Regarding house status, 9.6%(8.5% in factory area, 10.6% in comparative areas) were new building, 72.1% were old, and 18.2% were intermediate between them. The age distribution of individuals studied. Children less than 15 years formed 40.7% of the total population, elderly aged 65 years and over represented only 1.9%. The rest were adults aged 15-64 years and detailed in the table. males accounted for 51.3% (51.3% in factory area, 51.5% in comparative areas) and females for48.7% (49.0% in factory area, 48.7 in comparative areas) of the studied population.

Table 2: Distribution of families according to the study variables.

Duration of residence	**Factory area**		**Comparative areas**		**Total**	
(years)	**No.**	**%**	**No.**	**%**	**No.**	**%**
<5	95	14.8	137	19.8	232	17.4
5-10	61	9.5	104	15.2	165	12.4
>10	487	75.7	447	65.0	934	70.2
ownership	factory area		comparative areas		Total	
	No.	%	No.	%	No.	%
Owned	329	51.1	520	75.6	849	63.8
rented	231	36.0	121	17.6	352	26.4
Others	83	12.9	47	6.8	130	9.8
house type	factory area		comparative areas		Total	
	No.	%	No.	%	No.	%
New	55	8.5	73	10.6	128	9.6
Old	524	81.5	435	63.2	959	72.1
Intermediate	64	10.0	180	26.2	244	18.3
Age(years)	factory area		comparative areas		Total	
	No.	%	No.	%	No.	%
0-4	494	14.2	591	14.7	1085	14.4
5-14	891	25.6	1087	26.9	1978	26.3
15-24	728	20.9	831	20.6	1559	20.8
25-34	514	14.8	636	15.8	1150	15.3
35-44	399	11.5	425	10.5	824	11.0
45-54	226	6.5	228	5.7	454	6.1
55-64	161	4.6	154	3.8	315	4.2
65& above	64	1.8	82	2.0	146	1.9
Gender	factory area		comparative areas		Total	

	No.	%	No.	%	No.	%
Male	1775	51.3	2076	51.5	3851	51.3
Female	1702	49.0	1958	48.5	3660	48.7

DISCUSSION

This comparative cross-sectional study analyzed data from 1331 families in Samawa city, Al-Muthanna governorate, Iraq, with a high response rate of 98.8%. It aimed to examine potential links between cancer incidence and proximity to the Samawa Cement Factory. The study's sample may not have been optimal for studying cancer, a rare condition, but increasing the recall period helped overcome this limitation. The studied population was likely to be representative of Samawa's population and cancer cases, although the controls may not be entirely representative. Cross-sectional studies have certain limitations, such as bias in ascertainment of past exposure and confusion of exposure and outcome relationships. However, the chronological relationship between exposure and disease occurrence was ensured by the fact that the factory had been operational decades before the cancer cases occurred in the studied families [(14-19)]. The study found cancer to be more prevalent in men than women in the studied population, which is comparable to previous studies in Iraq but not to worldwide gender distribution. Breast cancer ranked first among women, while lung cancer ranked first among men, consistent with Iraqi Cancer registry reports and previous studies in Basrah. Cancer risk increased with age, with the highest incidence rate in those aged 65 and above, which is comparable to previous studies in Iraq and Basrah.[20-25] The risk of cancer among the population near the Samawa Cement Factory and the comparison population was found to be similar, with no association detected between place of residence and cancer risk (RR=1.1). This finding is comparable to studies conducted in Denmark and Korea but inconsistent with those in Italy and Greece.[15,16] The study concluded that no relevant association could be drawn between exposure to cement dust and cancer incidence based on the pattern of incidence with distance to the Cement Factory and duration of residence near the factory. A study based on a single factor, as in this case, seems inadequate for exploring the risk of cancer in relation to exposure to cement dust. Efficient statistical analysis requires a larger number of cases and populations to study.[26-28]

CONCLUSION

This study aimed to investigate the risk of cancer development in people potentially exposed to environmental risk factors, such as cement. The results did not demonstrate a clear relationship between excess cancer risk and exposure to pollution from the Cement Factory. However, the absence of such evidence does not exclude the possibility of a minor effect. The study also revealed that the officially calculated incidence rate of cancer in Al-Muthanna is significantly underestimated.

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