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Evaluation of Effective Factors in Acute Myeloid Leukemia and Acute Lymphocytic Leukemia in More than 500 Patients

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Abstract

Leukemia is a cancer that originates in the blood and bone marrow. Occurs when the body produces too many abnormal white blood cells and impairs the bone marrow's ability to make red blood cells and platelets. Leukemia, or leukemia, is the fifth most common cancer in the world, accounting for 8% of all cancers. Becomes. It is also known as pediatric cancer because approximately 15% of children under the age of 15 have the condition. Many factors are involved in cancer, such as age, gender, race, blood type and radiation, and infection of the mother with *Helicobacter pylori* bacteria, etc. Materials and Methods: In this study, more than 500 patients with leukemia in wards A and B of hematology and oncology of hospitals affiliated to Iranian universities in Tehran, Ilam and Isfahan from March 2020 to 2021 were studied. Blood group, age and sex indices were analyzed accurately. Data were analyzed using SPSS 20 software and Chi-square test.

Keywords: Blood Cancer; Leukemia; *Helicobacter pylori* bacteria; Acute myeloid leukemia; Gender Acute; Acute lymphocytic

Introduction

Acute myeloid leukemia (AML) is a cancer of the blood cells that can be quite serious. This condition is characterized by the arrest of the differentiation process and the abnormal proliferation of myeloid cells. In 2017, AML was the most diagnosed leukemia subtype in the USA. AML can occur in any age group but is more common in elderly individuals. IT was reported that nearly 75% of ml patients were aged 65 years or older in and USA [1] AML is not completely understood, but there are several possible mechanisms that could lead to its development. It is generally believed that the oncogenic transformation of hemopoietic stem cells or progenitors can cause leukemia. These specific mutations early in leukemogenesis confer a selective advantage for hematopoietic stem cells or progenitors during clonal expansion, which could impair normal hematopoiesis and eventually develop into AML [2]. When someone has leukemia, the bone marrow produces abnormal blood cells that do not die when they become old, as normal, healthy cells do [3]. These abnormal cells build up in the bone marrow and prevent normal blood cells from developing. Almost all leukemia begins in the bone marrow, and it usually spreads to the blood. Leukemia may also be found in other tissues, such as lymph nodes and the spleen [4]. Chronic leukemia's tend to proliferate slower than acute leukemia's, just because the blasts multiply very quickly. People with acute leukemia will become symptomatic more rapidly, in general. Leukemia that affects myeloid cells, which would normally develop into red blood cells, platelets or granulocytes (a specific type of white blood cell), is called myeloid leukemia or myelogenous or myeloblastic leukemia. Leukemia that affects lymphoid cells, which would develop into lymphocytes, is called lymphoid leukemia or lymphoblastic or lymphocytic leukemia. Cancers occurring in childhood and adolescence differ markedly from cancers in adults in their incidence and tumor characteristics [5]. Worldwide, the average annual incidence in children aged less than 15 years is 140 new cases per million children, although there are threefold variations between world regions and ethnic groups (Figure 2). The low rates recorded by population-based cancer registries in some low-income countries are thought to result from under-diagnosis (Figure 1).

The most common cancers in children are leukemia and lymphoma, while the major cancers among adults, such as carcinoma of the lung, breast or colon, are rare in children [7]. The incidence of carcinomas increases progressively with age,

and together with lymphomas or germ cell tumors they become the most common cancers in adolescents aged 15–19 years, with the overall incidence rate rising to 185 per million. In contrast, the incidence of embryonal tumors, such as neuroblastoma, retinoblastoma, and nephroblastoma is very low in adolescents (Figure 2). Diagnosing leukemia in its earliest stages can improve a patient's prognosis, so it is important to be tested as soon as possible if leukemia is suspected.

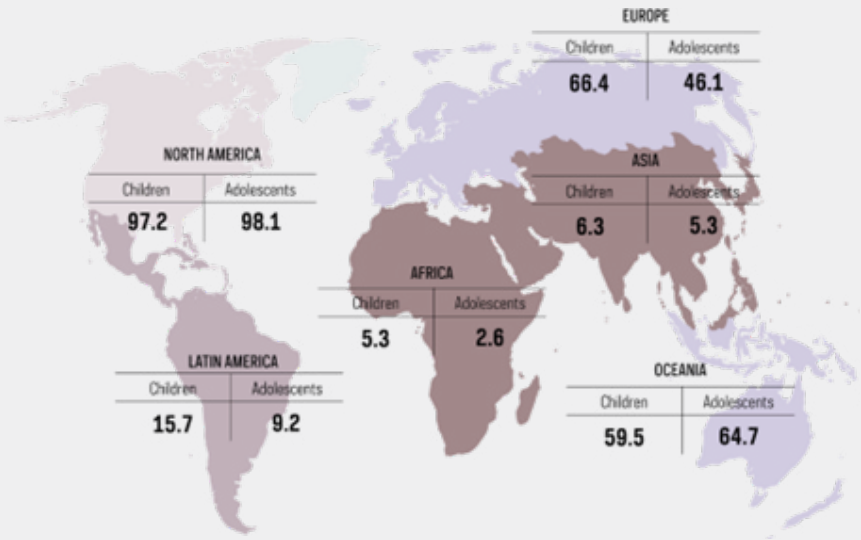

Figure 1: Percentage (%) of the population in which the frequency of cancer is measured on each continent in children (age 0-14 years) and adolescents (age 15-19 years) [6].

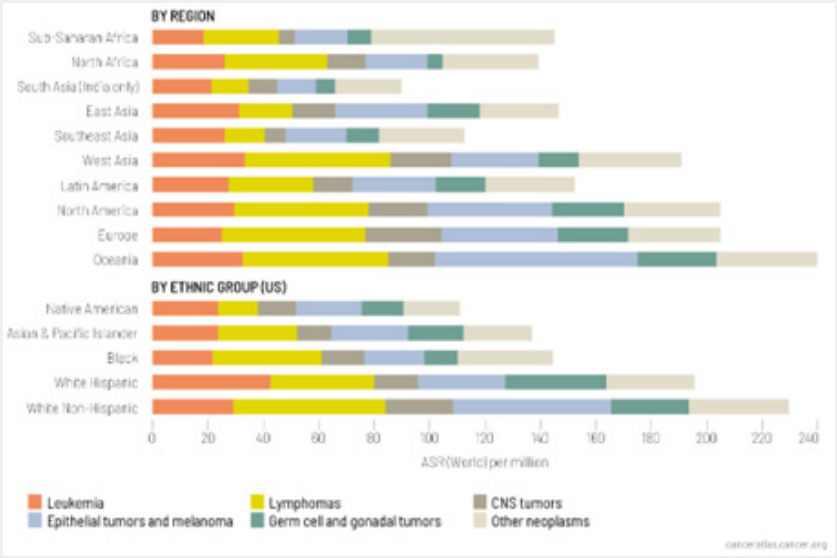

Figure 2: Ages 15-19 years: age- standardized cancer incidence rates (word) per million population, 2001-2010.

Blood cancers or leukemia's account for about 8% of the total cancer population and have been named the fifth most common cancer in the world. Hematopoietic cancers of the body, including bone marrow and the lymphatic system, are made up of white blood cells and lymph. White blood cells usually grow and divide in a controlled way according to the needs of the body. However, leukemia disrupts the process and takes the growth of blood cells out of control. In acute leukemia, the bone marrow is very large produces immature white blood cells as well as normal production white blood cells stop, leading to loss of ability of the body in fights against the diseases [8,9].

Leukemia cells affect the other types of blood cells that are made by the brain bones, including red blood cells and platelet.

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Leukemia disease, as most people think, is not just for children. This disease includes four types and several sub-types, only some of which are common among children. The treatment of leukemia is very complex and depends on the age, health status, type of leukemia, and extent of its spread) [10]. Acute myelogenous leukemia (AML) comprises a heterogeneous group of diseases defined by specific morphologic, genetic, and clinical characteristics. Identification of recurrent cytogenetic abnormalities and somatic mutations within the AML genome has proven useful in delineating AML prognosis and have thereby been incorporated into the World Health Organization classification of myeloid leukemias [1,2]. Unlike other cancers, leukemia is not a solid tumor that the doctor can remove with surgery. The bone marrow is the source of this problem. Therefore, the treatment of leukemia is complicated. There is growing evidence that a subset of AML cells, comprised of early stem/progenitor cells termed leukemic stem cells (LSCs), give rise to the leukemic blast. Inadequate eradication of the LSC population is thought to contribute to the high incidence of relapse and poor OS observed in AML. Recent data have highlighted subtle molecular differences between normal hematopoietic stem cells (HSCs) and LSCs that serve as targets for therapeutic intervention, including genetic and epigenetic alterations, dependence on survival pathways, and levels of reactive oxygen species [11,12] Acute myeloid leukemia (AML) is cancer that affects the myeloid cells, which are cells that give rise to certain types of white blood cells. Acute lymphocytic leukemia (ALL) is cancer that affects the lymphocytes, which are one of the primary white blood cells in the immune response [13].

The therapies that are currently being used to treat leukemias such as chemotherapy treatment (which is the most common type of treatment for leukemia, depending on the type of leukemia, may be a medication or a combination of different medications), biotherapy (or immunotherapy that strengthens the immune system against cancer and inhibits its progress), kinase inhibitors (the first treatment for chronic bone marrow leukemia was). These inhibitors inhibit known proteins in the occurrence of a variety of different cancers. They play a role when the patient's bone marrow is replaced by a healthy, harmonized bone marrow. In some cases, the bone marrow can also be transplanted. High amounts of chemotherapy or radiation therapy during treatment. Stem cell transplantation is like bone marrow transplantation. The difference is that cells are taken from stem cells. Physicians say this treatment is preferable to bone marrow transplantation because patients have a shorter recovery time and are less likely to become infected. The purposes of this study are to investigate the effects of factors like age, sex, and blood type on different types of leukemia.

Material and Methods

In this one-year study from September 2007 to 2008, some factors such as weight, blood groups, reason for referral, type of leukemia, gender, and age in 520 patients in oncology and hematology wards at Hospital in iran, Tehran who were randomly selected were examined. Data with complete and informed moral satisfaction patients were studied and hospital officials were collected. Due to the comprehensiveness and advanced ness of this hospital, the hospitalized people are geographically dispersed, so almost all the clients were from all provinces of the country. Desired data from information forms personal and statistical patients were extracted [14], so that people at the beginning of acceptance of several personal and public questionnaires and after completing hospitalization could have their say. In this statistical population, the number of attribute data subjects was equal. Due to its prominence and importance, characteristics such as blood type, age, and gender are subject to more detailed statistical studies. However, due to the small statistical population of the study section, the collected data was divided into quantitative and qualitative categories [15]. Qualitative data including age and quantitative data including types of leukemia were collected. Blood groups were ABO, Rh, and gender. From the chi-square test used to show the relationships between quantitative and qualitative data. For ease of reporting and statistical conclusion, cancers in two categories: general AML, ALL and lymphoma; and others, including sarcoma, Borcit, MDS, NHL, and Hodgkin's were divided. Finally, data using SPSS 20 software was analyzed.

Results

Table 1: Variation of individuals by type of leukemia.

	Variable	Abundance	Credit percentage	Cumulative percentage
Cancer	AML	254	50/47	43/87
	ALL	220	27/60	78/07
	Lymphoma	36	7/54	85/59
	Sarcoma	18	4/24	89/85
	Borcit	5	1/18	91/03
Illness	MDS	21	4/95	95/98
	Hodgkins	9	2/12	98/1
	NHL	8	1/90	100/0
	Total	520	100/0	

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Current technological advances will allow for tailored therapeutic approaches based on a full characterization of AML tumors (Figure 3). Genomic sequencing, transcriptional profiling, flow cytometry, and metabolomics assays (e.g., evaluation for IDH1/IDH2 mutations, stem cell immunophenotype, mitochondrial mass, and mitochondrial priming) will allow for a classification of patients and better identification of actionable therapeutic targets [16]. Each leukemia is ALL and AML have a higher frequency to other diseases and cancers (Table 1). In general, the proportion of cancer was higher in men than in women (59 to 39%) AML types had a higher incidence than other types. Two quantitative and qualitative parameters of disease rates and gender are 88% related had (Table 2). The Rh+ blood group has a higher value in all cancer groups. In total, 80/43% of the samples had blood + Rh. Rh type and cancer type were 67% correlated (Table 3). The incidence of cancers in two blood groups, A and O, compared to others there were more groups (Table 4) shows the blood type and cancer rate. The incidence of leukemia in the age group of 12–35 years and 30-45 years was higher. There was a high correlation (98%) of these two quantitative and qualitative parameters of age and there was a type of cancer (Table 5).

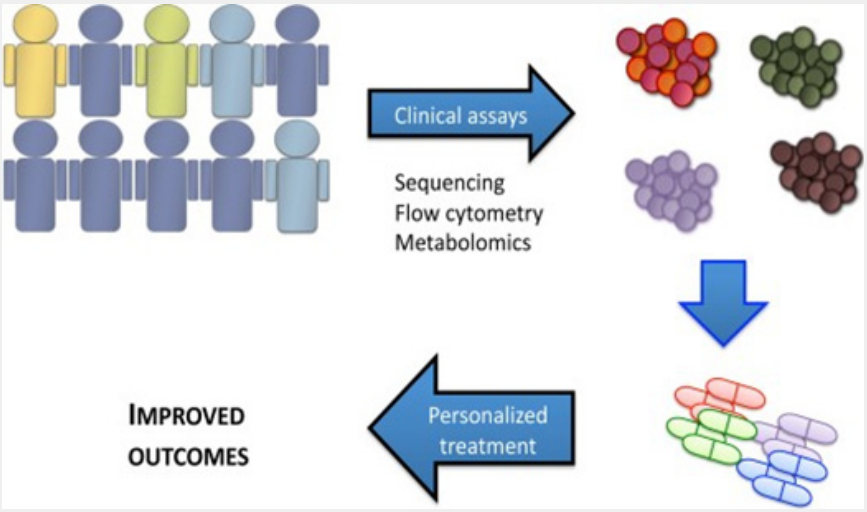

Figure 3: Implementation of personalized strategies to target leukemia stem cells in acute myelogenous leukemia (AML).

Table 2: Relationship between gender and various diseases and leukemias.

Type	Cancer		Illness			Chi-square test		
Gender	AML	ALL	Other	Lymphoma	Total	amount	Degrees of freedom	Sig
Male	161	67	59	53	340			
Female	84	40	36	11	180	6/029	3	110
Total	254	120	59	36	520			

Table 3: The Rh blood group and various diseases and leukemias.

Type	Cancer		Illness			Chi-square test		
Rh	AML	ALL	Other	Lymphoma	Total	amount	Degrees of freedom	Sig
Positive	176	88	69	28	341			
Negative	78	32	20	18	183	3/485	3	36 3
Total	254	120	59	36	520			

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Table 4: The AB blood group and various diseases, including leukemia.

Type	Cancer		Illness			Chi-square test		
ABO	AML	ALL	Other	Lymphoma	Total	amount	Degrees of freedom	Sig
A	79	37	19	9	144			
B	34	21	14	8	77			
AB	43	26	14	9	92	5/501	9	789
O	58	33	14	6	111			
Total	254	120	59	36	520			

Table 5: Relationship between age, disease type, and leukemias.

Type	Cancer		Illness			Chi-square test		
Age category	AML	ALL	Other	Lymphoma	Total	amount	Degrees of freedom	Sig
0-15	14	30	4	5	53	55/242	12	0
15-30	92	59	25	12	190	55/242	12	0
30-45	56	16	12	5	89	55/242	12	0
45-60	44	8	15	5	72	55/242	12	0
60-75	8	2	5	5	20	55/242	12	0
Total	254	120	59	36	520	55/242	12	0

Discussion

Leukemia is a clonal proliferation of hematopoietic stem cells in the bone marrow. The four broad subtypes most encountered by primary care physicians are acute lymphoblastic, acute myelogenous, chronic lymphocytic, and chronic myelogenous. Acute lymphoblastic leukemia is more common in children, while other types are more common in adults. Risk factors include genetic predisposition as well as environmental factors such as exposure to ionizing radiation. Symptoms are nonspecific and include fever, fatigue, and weight loss, bone pain, bruising, or bleeding. Complete blood counts usually show increased or depressed leukocytosis and other abnormal cell lines. Patients with suspected leukemia should be referred immediately to a hematologist-oncologist [14,17]. The diagnosis is confirmed by further examination of the bone marrow or peripheral blood. Treatment may include chemotherapy, radiation therapy, monoclonal antibodies, or hematopoietic stem cell transplants. Complications of treatment include tumor lysis syndrome and serious infections caused by suppressed immune systems. Survivors of leukemia should be closely monitored for secondary malignancies, cardiac complications, and endocrine disorders such as metabolic syndrome, hypothyroidism, and hypogonadism. The five-year survival rate is highest in younger patients and in patients with chronic myelogenous leukemia or chronic lymphocytic leukemia [18].

Leukemia is a common malignancy in children and adults that occurs when changes in normal cellular regulatory processes cause uncontrolled proliferation of hematopoietic stem cells in the bone marrow. The incidence of age-adjusted leukemia in the United States is 12.8 per 100,000 people per year [1]. The prevalence of leukemia is generally higher in whites and in men and increases with age.1, approximately one in 70 people develops leukemia. The four subtypes of leukemia most encountered by primary care physicians are: acute lymphoblastic, acute myelogenous, chronic lymphocytic, and chronic myelogenous. Family physicians must be able to diagnose common manifestations of leukemia, make an initial diagnostic evaluation, and understand how to care for leukemia survivors.

According to statistics published in 2018 by the statistics and treatment organization for US leukemia, different types of leukemia do not affect men and women equally (10) this ratio is quite different in different countries, and the scales have tipped towards men; the reason for this difference could be in environmental conditions. He searched for the type of nutrition and other such factors. In this study, it was found that the incidence of cancer in men is 1.5 times higher than in women. However, according to Iranian statistics, women outnumber men. As a result, this difference accounts for a larger share in Iran, and men are more prone to cancer.

The most common cancers in Iran (63/4%) are ALL and 18/50% AML. Statistics published in the world indicate a higher incidence of cancer in blood group + Rh and blood group O, which is also partially in blood group A. The results obtained from this article also confirm this issue. The Rh blood type is 63% associated with the incidence of different types. Cancer is 1% for blood type ABO (24%). Therefore, people with blood groups A+ and O+ are

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more susceptible to various types of different blood cancers on the other hand, because Iran has a high incidence of blood group O. This is also due to this blood group has a high percentage of blood cancers. According to statistics from the United States leukemia treatment organization 2009, leukemia is most common in people aged 40 to 70 (of course). By separating the spectrum of children from society, the highest incidence has been reported in the age group of 15 to 45 years. In Iran, because young people (20 to 40 years old make up 9% of the population and the possibility of exposure to this wide range of environmental factors such as noise pollution, chemicals, etc.) is very high, the most incidence of cancer is also in this range. Hejazi et al., indicated that the elderly aged 15 to 25 years have the highest mortality rate associated with leukemia, but due to a lack of hospitalization and treatment of children with leukemia in these two hospital wards, the age group under 15 has a very low ratio in this study. Today, prevention methods are a higher priority than treatment methods. Molecular methods such as PCR, microbial, biological chips, and a variety of molecular methods exist in the world, whose role is to identify people prone to various diseases to prevent them from contracting them before the favorable factors are provided. The staggering costs of health care have been avoided, and mental and social health are great help. Researchers have worked hard. We have a system of molecular and genetic linkages in the occurrence of diseases. Identify and prevent infections.

Conclusion

The high degree of correlation between the variables studied in this article indicates the importance of these factors in the development of various types of leukemia. Nevertheless, since the statistical population of this research is relatively small and it may not have a good geographical distribution, the importance and the ratio of this relationship between the parameters to be compared is low. Perhaps by expanding such research in different parts of the country, key results can be achieved in preventing cancer.

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