Assessment of Some Environmental, Clinical and Laboratory Risk Factors in People with Leukemia under the Age of 20: A Systematic Review

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ABSTRACT

Introduction: *Cancer is one of the major causes of death in the world and mortality rates are higher in developed countries. About one third of childhood cancers are blood cancer (Leukemia). Leukemia is high in children with high prevalence and mortality; still some of the risk factors are unknown. Therefore, this review study was conducted to determine some environmental, clinical and laboratory risk factors in people with leukemia under the age of 20.*

Materials and Methods: *The studies that were conducted in this research were written in English or Persian, Access to their full text was possible and published over the last 25 years, were included in the study and non-academic studies were deleted. The study was conducted in Persian and English by searching articles in the search engine, sites and databases scientifically Sid, Science direct, Google Scholar, Pub Med. In the first stage, 45 papers were found. Of these, 17 articles related to the subject, published in the last 25 years, were reviewed.*

Results: *According to the results of the studies, some variables and risk factors such as family history of cancer, the history of radiation exposure, the number of maternal pregnancies, the age of parents, the level of education of parents, the history of mother's use of mother's pill, smoking By the mother of a child during pregnancy, smoking by the child's father, the birthplace and residence of the child, and some other factors mentioned in result of this article , were observed in children with leukemia.*

Conclusion: *There were many environmental, clinical and laboratory factors in various studies that related to childhood leukemia. Also some of the characteristics of parents can be one of the factors affecting children with leukemia; Awareness of these issues can be effective in preventing this disease. It is advisable for the child to avoid these risk factors to prevent the risk of cancer.*

Keywords: *Leukemia, Cancer Children, Affected Child, Risk Factor, Environmental Factors*

INTRODUCTION

Increasing the incidence of various types of cancer has addressed the researchers with several questions about the various causes of the disease (1). Cancer is the third leading cause of death in our country after heart disease and accidents (2).

The global burden of cancer is increasing due to aging and population growth as well as high-risk behaviors, especially smoking and environmental factors. Proper information on various cancers in specific geographical locations can help plan health services for the treatment and screening of high-risk groups (3). One of the causes of cancer is diabetes. Diabetes is the most common endocrine disorder (4). It is a metabolic disorder that reduces life (5-9). Complications of diabetes lead to an increase in mortality in people with diabetes. Low physical activity and the use of unhealthy foods have led to an uncontrolled increase in the prevalence of diabetes in the world (10-12). Patients with diabetes are more likely to develop cancer than the general population (13). Complications of diabetes are very common among patients. (4). among diabetic patients, depression is one of the most common psychiatric disorders (14).

Depression is one of the most common and debilitating problems for youth and adolescents. (15, 16). Depression and daily occupa tional stress may cause some disorders in people's intellectual, mental and physical health (17). The high occupational stress status is known as a known psychosocial factor in cardiovascular disease (18). Diabetes mellitus is one of the most common endocrine complications in thalassemic patients (20). Thalassemia syndrome is one of the hereditary blood diseases. In general, diabetes can have direct or indirect effects on many diseases. These complications are among them. (21-26).

Cancer is also the third leading cause of death for children ages 1 to 14 years old (27). Leukemia is the most common malignant neoplasm in childhood which accounts for 41% of malignancies in children under the age of 15 years and about 3,000 children and adolescents under the age of 19 are infected (28,29). Children with cancer also lose an average of 69.5 years of age (30).

The causes of leukemia are largely unknown (31). Considering that cancer is the second cause of death and the Diabetes Association cites the disease as a growing and costly cancer related and a major health concern (32). And that leukemia is high in children with high prevalence and mortality; still some of the risk factors are unknown. Therefore, this review study was conducted to determine some environmental, clinical and laboratory risk factors in people with leukemia under the age of 20.

MATERIALS AND METHODS

The studies studied were written in English or Persian, Access to their full text was possible and published over the last 25 years, were included in the study and non-academic studies were deleted. This study was conducted in Persian and English by searching articles in search engines, SID, Magiran, and Google Scholar, Embase, Research gate, Science direct, Google Scholar, Pub Med, Springer. In the first stage, 37 articles were found. Of these, 17 articles related to the subject, published in the last 25 years, were reviewed.

This study is a systematic review using the published articles in the last 25 years; it was about the risk of environmental, clinical and laboratory factors in people with leukemia under the age of 20 years. This review study was conducted based on the Broome method. The purpose of this method was to achieve the purpose of the study and to enhance the study's thorough understanding and comprehension. The method is based on three steps in the search of texts, data evaluation and data analysis. In the search phase of the texts, the studies after the retrieval were examined in terms of the criteria for entering the study in four stages. After obtaining the terms of entry into the study, the content of the study is evaluated and at the end the analysis of the data was done.

To achieve relevant studies, a wide range of key words were used which included leukemia, Cancer Children, Affected Child, Risk Factor and Environmental Factors, as a one-to-one search and combined with using the method "And" and "OR"."".

RESULTS

The results of various studies showed there was a significant relationship between the numbers of maternal pregnancies, the age of parents and the history of contraceptive use by mother with acute leukemia in children. The highest incidence of leukemia in the age group of 0-4 years was observed. The incidence rate in patients with blood groups A, O and Rh + was higher than other groups. The incidence of relapse in the age group of 5 to 10 years is 0.035 times the age group under 5 years. Children with Down syndrome also had leukemia.

Also, the age variable had a significant relationship with the relapse status of the patient (33-42). According to studies (33), the history of drug use during pregnancy, family history of cancer, a history of radiation exposure, and breast feeding were associated with the development of cancer. Finally, after multivariate testing, there were significant relationships between the two variables of drug use during pregnancy and family history of the disease.

According to some studies (35), there was a significant relationship between maternal pregnancy, parental age, parents' education and the history of contraceptive use by mother with acute leukemia in children. But finally, after performing a multivariate test, there was a significant relationship between mother's educational level, the history of contraceptive pills and the relationship between parents with acute leukemia in children.

In the study (36), significant risk factors associated with acute leukemia in children were: Father's occupation, smoking by mother of child during pregnancy, Tobacco use by the child's father Place of birth and residence, Contact Livestock, Father's Company in Chemical War, The number of family members more than 5 and the relative ratio between parents, Infection with viral diseases of chicken pox and mumps with acute leukemia, The inverse relationship was significant and was recognized as a protective factor. Also, in the study (37), the variables of contact with x-rays during fetal life, the presence of a smoker in the family, the history of using mother's contraceptive pill, Father's job contact with home-made chemicals and close to strong electrical power lines is one of the most important factors in the development of leukemia. Also, the most common clinical manifestations in the order of priority include lethargy and weakness, Fever, Foot pain, Cervical lymphadenopathy, Bleeding, pain in the abdomen and colds.

Also in studies such as third birthday and more children and the history of leukemia in close relatives significantly correlated with the risk of developing leukemia in the child. There was also a significant relationship between the birth weight of the child, History of keeping dogs or cats, Mother's age during pregnancy, number of brothers and sisters, there was no history of radiography in childhood and the risk of developing leukemia (33-50).

DISCUSSION AND CONCLUSION

Leukemia is high in children with high prevalence and mortality; still some of the risk factors are unknown. Therefore, this review study was conducted to determine some environmental, clinical and laboratory risk factors in people with leukemia under the age of 20.

The role of familial history of leukemia in children in the study is consistent with most of the other studies conducted. The findings of these studies indicate the potential role of genetic factors in the incidence of leukemia in children. In addition, it can indicate the association between environmental and infectious agents with leukemia. Because infectious and environmental factors are common between the child and relatives, especially the first-degree relatives.

The need for training and raising public awareness in order to avoid risk factors and screening in high risk individuals to improve prognosis. It seems that some of the characteristics of parents can be considered as an effective factor in the incidence of acute leukemia in children. Awareness of these issues can be effective in preventing this disease. Recurrence is higher in the age group of less than 5 years compared to the age group of 5 to 10 years, so this age group needs more attention and follow up. Some studies have shown that farmer being the father of a child, increasing the birth rate, keeping dogs or cats, the history of leukemia in close relatives is a risk factor for acute lymphoblastic leukemia. And blood leukemia seems to be caused by the interaction of genetic and environmental factors, like other malignancies.

The results of some studies, X-ray contact variables during fetal life, the presence of a smoker in the family, the history of using mother's contraceptive pill, Father's job contact with chemicals at home, up to high voltage power lines, the most important factors were the development of leukemia. Also, according to some studies, there was a statistically significant relationship between the number of maternal pregnancies, parent age, Parental education level and the history of contraceptive use was observed by a mother with acute leukemia in children, it seems that some of the characteristics of parents can be one of the effective factors in the development of children with acute leukemia Awareness of these issues can be effective in preventing this disease.

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REFERENCES

[1] Mohamad Tavakol, Mohsen Naseri Rad. Social solidarity in people with and without cancer: a comparative study. Payesh. 2012; 11 (1) :65-72

[2] Mehdi khabazkhoob (MSc), Mohammad Ali Mohagheghi (MD), Alireza Mosavi Jarrahi (PhD), Ali Javaher Foroushzadeh (MD), Mohsen Pedram Far (MS), Ali Moradi (MSc), et al. Incidence rate of gastrointestinal tract cancers in Tehran – Iran (1998-2001). J Gorgan Univ Med Sci. 2010; 11 (4) :44-50

[3] Rohani Rasaf M, Rohani Rasaf M, Rahimi F, Mehrazma M, Golmohammadi A, Motiedoost R, et al. Distribution of Cancer Incidence in Districts and Neighbourhoods of a Number of

Tehran Districts in 1386. RJMS. 2011; 18 (89): 34-45

[4] Madmoli M, Fallah bagher shaidaei M, Rohani A, Darabiyan P, Mobarez F. The correlation between alcohol consumption and reducing the age of cancer incidence in patients with this disease. Medical Science, 2019, 23(95), 48-53

[5] Moslemirad M, Madmoli M, Madmoli Y, Niksefat M. Prevalence of type 1 and type 2 diabetes and its related factors in diabetic patients hospitalized in Khatam-ol-Anbia hospital in Shoushtar, 2014-15: A retrospective study. Journal of Research in Medical and Dental Science. 2018;6(3):421-6

[6] Mostafa Madmoli, Yasaman Modheji, Alireza Rafi, Rezvan Feyzi, Pouriya Darabiyan, Alieh AfsharNia. Diabetes and its predictive role in the incidence of Alzheimer's disease. Medical Science, 2019; 23(95), 30-34

[7] Mostafa Madmoli, Zahra Kord, Azita Bandani, Negin Sedighi, Mahla Rezaei Shandiz, Pouriya Darabiyan, Alieh AfsharNia. Epidemiological and clinical study of patients with Alzheimer's in Five Cities of Khuzestan Province in 2016-2018. Medical Science, 2019; 23(95), 1-5

[8] Raisifar Z, Afshar Nia A, Madmoli M, Madmoli Y. The Relationship between Using Insulin and Suffering Alzheimer's disease in Patients with Diabetes: A Two-Year Study. International Journal of Ecosystems and Ecology Science (IJEES). 2018 June; 8 (3): 623-28.

[9] Mostafa Madmoli, Zahra Mahmoudi Dehche shmeh, Alireza Rafi, Zahra Kord, Fariba Mobarez, Pouriya Darabiyan. The rate of some complications and risk factors of diabetes in diabetic patients: Study on cases of 3218 diabetic patients. Medical Science, 2019, 23(95), 63-68

[10] Rostami F, Madmoli M, Mirsami Yazdi N, Baraz Sh. Evaluation of The Prevalence of Lower Limb Amputation and Its Related Factors in Diabetic Patients Admitted to KHatam-ol-Anbia Hospital in Shoushtar During The 2015-2016: A Retrospective Study. International Journal of Ecosystems and Ecology Science (IJEES). 2018 June; 8 (3): 553-60.

[11] Madmoli M, Eilami O, Rezaie K, Aliabad MA, Moslemirad M. Diabetes and the risk of suffering cardiovascular Diseases: A two-year retrospective study. International Journal of Ecosystems and Ecology Science (IJEES). 2018 Jun; 8(3): 649-56.

[12] Madmoli M Rostami F, Mirsami Yazdi N, Mosavi A, Baraz Sh. Evaluation of Prevalence of Diabetic Foot Ulcer and Its Related Factors in Diabetic Patients Admitted to KHatam-ol-Anbia Hospital in Shoushtar During 2015-2016: A Retrospective Study. International Journal of Ecosystems and Ecology Science (IJEES). 2018 June; 8 (3): 545-52.

[13] Raisifar Z, Afshar Nia A, Maghamesi Moarrefi H, Madmoli M. Evaluation of Gi Bleeding Prevalence and Its Related Factors in Diabetic Patients Hospitalized in KHatam-ol-Anbia Hospital During 2015-16: A Retrospective Study. International Journal of Ecosystems and Ecology Science (IJEES). 2018 June; 8 (3): 609-14.

[14] Larijani B, Khoramshahee M, khalilygorgany M, Bandarian F, Akhondzadeh S. Association Of Depression And Diabetes In The Doctor Shariati Diabetes Clinic And Iranian Diabetes Association. ijdld. 2004; 3 (1):77-82.

[15] Madmoli Y, Madmoli M, Qashqaei nezhad N, Bosak S. Prevalence of depression and associated factors in adolescents of masjedsoleyman. JPEN. 2016; 2(4):31-40.

[16] Madmoli M, Madmoli Y, Bigdeli Shamloo MB, Etebari A, Mahmoodi Kouhi A, Azami M. The Relationship between Depression and Religiousness in Female High School Students of Masjed Soleyman in 2015. Journal of Pediatric Nursing. 2017 Jun 15; 3(4):15-22.

[17] Madmoli M, Nikpay S. An Investigation of the Relationship between Spiritual Health and Depression, Anxiety, and Stress among Students of Ilam University of Medical Sciences. Journal of Research in Medical and Dental Science. 2018 May 17;6(3):294-300.

[18] Gheisari Z, Beiranvand R, Karimi A, Ghalavandi S, Soleymani A, Madmoli M, Bavarsad AH. Relationship between Occupational Stress and Cardiovascular Risk Factors Determination: A Case-control Study. Journal of Research in Medical and Dental Science. 2018 May 17; 6(3):287-93.

[19] Madmoli Y, Aslani A, Ahmadi Y, Mousavi M, Mashalchi H, Niksefat M, Madmoli M. Study Habits and Related Factors in Students of Nursing and Midwifery College of Dezful University of Medical Sciences in 2015. Iranian Journal of Nursing Research (IJNR). 2017.

[20] Shirali M, Madmoli Y, Roohafza J, Karimi H, Baboli Bahmaei A, Ertebati S. Improvement Diagnosis of Diabetes Using a Combination of Sugeno Fuzzy Inference Systems and Firefly Algorithms. ijdld. 2017; 15 (3) :172-176

[21] Madmoli Y, Beiranvand R, Korkini N, Mashalchi H, Karimi H. [Comparison of health related quality of life in beta thalassemia major and healthy people in Dezful in 2015 (Persian)]. Iran J Nurs Res. 2016; 11(1):9-16.

[22] Madmoli Y, Akhaghi Dezfuli SM, Beiranvand R, Saberi Pour B, Azami M, Madmoli M. [An epidemiological and clinical survey of patients

with β-thalassemia in dezful in 2015 (Persian)]. Iran J Epidemiol. 2017; 13(2):145-52.

[23] Maraghi E, Adavi A, Madmoli Y, Heidari-Soureshjani R, Madmoli M. The Effect of Orem Self-Care on Mental Health of Patients with Thalassemia Major. Journal of Clinical Nursing and Midwifery. 2018; 4(3).

[24] Madmoli M, Madmoli Y, Rahmati P, Adavi A, Yousefi N, Gheisari Z, Abbaszade Aliabad M. Quality of Life and Some Related Factors in Patients with Beta Thalassemia Major in Southwest Iran. Journal of Client-centered Nursing Care (JCCNC. 2017; 3(2).

[25] Madmoli Y, Akhaghi Dezfuli SM, Adavi A, Maraaghi E, Heidari Soureshjani R, Madmoli M. The Effect of Orem Self-Care on Mental Health of Patients with Thalassemia Major. Journal of Clinical Nursing and Midwifery. 2018 Jul 1; 7(2):108-15.

[26] E. Giovannucci, D.M.Harlan, M. C. Archer et al., "Diabetes and cancer: a consensus report," CA Cancer Journal for Clinicians, vol. 60, no. 4, pp. 207–221, 2010.

[27] Is the number of cancer cases increasing or decreasing in the world? [Online]. 2008 [cited 2008 Apr 1]; Available from: URL: http://www.who.int/features/qa/15/en/index.html/

[28] Ramesht M, Pourfarzi F, Entezari M, Karamati H. An Epidemiologic Study of Spatial and Temporal Patterns of Gastric Cancer in Ardabil) Years 2006- 2012(. j. health. 2015; 6 (3):345-354.

[29] Gatta G, Zigon G, Capocaccia R, Coebergh JW, Desandes E, Kaatsch P, et al. Survival of European children and young adults with cancer diagnosed 1995–2002.

[30] Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics, 2011. CA: A Cancer Journal for Clinicians. 2011; 61(4):212–36. doi: 10.3322/caac.20121

[31] Amani O, Mazaheri M A, Nejati V, Shamsian B S. Effect of Cognitive Rehabilitation on Executive Functions in Adolescent Survivors of Leukemia: A Randomized and Controlled Clinical Trial. jrehab. 2017; 18 (1):73-82.

[32] mirzaie M, yazdi F, navidi Z. Survey personal and disease characteristics of children with Cancer hospitalized in 17 Shahrivar hospital, Rasht. J Holist Nurs Midwifery. 2009; 19 (1) :51-55

[33] Hassanzade J (PhD), Mohammadi R (MSc), Rajaeefard AR (PhD). Risk factors in childhood lymphoblastic leukemia in Shiraz-Iran (2009): an epidemilogical study. J Gorgan Univ Med Sci. 2012; 14 (4) :119-124

[34] Peterson CC, Johnson CE, Ramirez LY, Huestis S, Pai ALH, Demaree HA, et al. A meta-analysis of the neuropsychological sequelae of chemotherapy-only treatment for pediatric acute lymphoblastic leukemia. Pediatric Blood & Cancer. 2008; 51(1):99–104. doi: 10.1002/pbc.21544

[35] Kavianpour F, Malekpour M, Abedi A. Efficacy of executive functions training (response inhibition) on the rate of impulsivity in preschool children with developmental coordination disorder: a single-subject research (Persian)]. Journal of Rehabilitation. 2013; 14(1):70-80.

[36] Akramipur R, Pedram M, Zadidan K, Hashemi Azam Sadat. A 5-year study of children with acute myeloid leukemia in Shafa Hospital (Ahvaz, 1995-1999).

[37] Zolali F, Ayatollah S A, Ayatollahi S M T, Shahriari M. Determination of effective factors in the development of leukemia with the origin of acute lymphoblastis in children under 15 years old in Fars province in 2000.

[38] Zolala F, Ayatollahi S, Ayatollahi S, Shahriary M. Determination the Inducing Factors of Acute Lymphoblastic Leukemia in Children Under 15 Years Old in Fars Province in the Year 2001. JRUMS. 2004; 3 (4):267-275.

[39] Gholami A, Salari Lak Sh, Aghnejad F, Mousavi Jahromi L. Characteristics of parents and their relationship with the development of children with acute leukemia.2010: 161-162

[40] Diamond Hashiani A, Zareifar S, Hosseini Seyyed H, Dehghan A. Determination of effective factors in recurrence of leukemia in children in Fars province (1383-1883).

[41] Hadi N, Moezzi M, Etehadi H. Risk Factors in Acute Lymphocytes in Children Under the age of 15 years old in Shiraz.57-65.

[42] Hashemizadeh H, Jafarzadeh A, Broumand H. Risk Factors andthe Most Common Initial Symptoms of Acute Lymphoblastic Leukemia in Children. IJN. 2011; 24 (72):67-77.

[43] Ching Hon PUI, Behm FG. Pathology of AML: In: Leilleyman J, Hann I, editors. Ped hematology. 2nd ed. London: Churchill Livingstone; 2000, PP. 369-380.

[44] Lei SO, Abrahamsson J, Clausen N. Long term results in children with AML. Leukemia 2005; 19(12):2090-100.

[45] Ravin Dranath, Yaddannapudi MBBS. Allogenic BMT in AML. Current Opinion Oncol 2003; 15(1):23-35.

[46] Ou SX, Han D, Severson RK, Chen Z, Neglia JP, Reaman GH, et al. Birth characteristics, maternal reproductive history, hormone use during pregnancy, and risk of childhood acute lymphocytic leukemia by immunopheno type (United States). Cancer Causes Control. 2002 Feb; 13(1):15-25.

[47] Spector LG, Davies SM, Robison LL, Hilden JM, Roesler M, Ross JA. Birth characteristics, maternal reproductive history, and the risk of infant leukemia: a report from the Children's Oncology Group. Cancer Epidemiol Biomarkers Prev. 2007 Jan; 16(1):128-34.

[48] kaye SA, Robison LL, Smithson WA, Gunderson P, king FL, Neglia JP. Maternal reproductive history and birth characteristics in childhood acute lymphoblastic leukemia. Cancer. 1991 Sep; 68(6):1351-5.

[49] Westergaard T, Andersen PK, Pedersen JB, Olsen JH, Frisch M, Sørensen HT, et al. Birth characteristics, sibling patterns, and acute leukemia risk in childhood: a population-based cohort study. J Natl Cancer Inst. 1997 Jul 2; 89(13):939-47.

[50] Infante-Rivarad C, Fortier I, Olson E. Markers of infection, breast-feeding and childhood acute lymphoblastic leukaemia. Br J Cancer. 2000 Dec; 83(11):1559-64.