Archives of Pediatrics
Uzel VH. Arch Pediatr 8: 239.
www.doi.org/10.29011/2575-825X.100239
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Research Article

Determining the Breastfeeding Condition of Children Diagnosed with Leukemia

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Citation: Uzel VH (2023) Determining the Breastfeeding Condition of Children Diagnosed with Leukemia. Arch Pediatr 8: 239. DOI: 10.29011/2575-825X.100239

Received: 27 January 2023, **Accepted:** 02 February 2023, **Published:** 06 February 2023

Abstract

Objective: The aim of this study was to investigate the relationship between breast milk, nutrition and ALL development in children between the ages of 1 and 18 with acute lymphoblastic leukaemia (ALL). **Methods:** Patients between the ages of 1-18 who were diagnosed with Acute lymphoblastic leukaemia (ALL) in the Paediatric Haematology and Oncology branch of our hospital between 2019-2021 and whose follow-up and treatment continued, and patients who were admitted to the Child Health and Diseases outpatient clinic in the same age group and who were not diagnosed with any disease and did not have any chronic physical disease (control group, n: 60) was included in the study. The data in both groups are; Information including factors affecting breast milk intake such as age, gender, total and only breast milk intake periods, maternal education status, maternal age, economic gain of the family, number of siblings was obtained by face-to-face interviews in the form of a questionnaire. **Results:** There was no significant difference between the groups according to the total duration of breast milk collection. Children in the control group had a significantly longer duration of breastfeeding than the ALL group (p: 0.026). Children in the ALL group were found to start supplemental food earlier than the control group (p: 0.002). The average age of mothers of children with ALL was higher. The number of siblings was higher in the patient group. There was a significant difference between the patient and control group in terms of maternal age and number of siblings ($p<0.001$, $p= 0.002$, respectively). The rate of illiterate mothers in the ALL group (71.8%) was higher than in the control group (28.2%), and this difference was significant (p: 0.001). The monthly income level was lower in the ALL group, but there was no statistical difference (p: 0.201). **Conclusion:** In our study, it was seen that the total duration of breastfeeding did not affect the development of ALL, and we also determined that the sociocultural and economic level of the ALL group was low, unlike the literature. The fact that we have not identified a relationship between breastfeeding and ALL may be related to higher breast milk consumption in societies with low sociocultural and economic levels. Since it is not yet possible to regulate genetic factors to prevent ALL disease due to multifactorial causes, it is important to support breastfeeding, to determine environmental risk factors and to reduce the frequency of disease development.

Keywords: Child, Breastfeeding; Acute lymphoblastic leukemia

Introduction

The most common malignancy encountered in childhood is acute leukaemia [1]. Acute lymphoblastic leukaemia (ALL) is the most common type of leukaemia in children [2]. The etiology of leukaemia's is not fully known. However, genetic and many environmental factors are thought to have a combined effect [3]. It has been determined that there is a relationship between environmental factors, radiation, infection, chemical carcinogens and nutrition and leukaemia [4]. Breastfeeding provides protection against chronic diseases such as diabetes, cancer, cardiovascular diseases, acute diseases and infections as well as the development of the child in the highest level [5]. The importance of breast milk is emphasized in studies suggesting that infection and immunological factors may play a role in the development of leukaemia [6]. In this study, the aim was to evaluate the relationship between breastfeeding and the development of ALL.

Material and Methods

Working; As a research group, 60 cases were diagnosed with Acute lymphoblastic leukaemia (ALL) between 2019-2021 in the Department of Paediatric Haematology and Oncology, Faculty of Medicine, Dicle University, and between the ages of 1-18 years who were followed up and treated. . As a control group; 60 healthy cases who were admitted to the Child Health and Diseases outpatient clinic of our hospital and who were not diagnosed with any disease and who did not have any chronic physical disease were included in the study. In both groups, children born before term and who had been hospitalized during the neonatal period were not included in the study. The data in this prospective study are; by the mothers of the patient and control group; Information including factors affecting breast milk intake such as age, gender, total and only breast milk intake periods, education status, maternal age, economic gain of the family, number of siblings, breast milk intake periods were obtained by face-to-face interviews in the form of a questionnaire. While evaluating the data obtained from the cases to be included in the study, 'Statistical Package for Social Sciences (SPSS) for Windows v18.0' program was used for statistical analysis. In addition to descriptive statistical methods (Mean, Standard deviation, frequency), independent simple t test was used in the comparison of normal distributed parameters between two groups in the comparison of quantitative/numerical data, Mann Whitney U test was used in the comparison of parameters without normal distribution between the two groups, and chi-square test was used in the comparison of non-numerical data. $P < 0.05$ values were considered statistically significant in all tests.

Results

The study was conducted between January 2019 and December 2021 on a total of 120 children, 60 of whom were in the ALL group and 60 in the control group, ranging in age from 1 to 18 at the time of admission. . The mean age of the patient group was 72.9±42.5 (13-192) months and the mean age of the control group was 45.4±40.7 (4-198) months. The mean age of the patient group was higher than the control group and this difference was statistically significant ($p<0.001$). Of the 60 ALL cases, 33 were male (55%), while 27 were female (45%); of the 60 cases in the control group, 29 were male (48.3%) and 31 were female (51.7%). There was no gender difference between the patient and the control group ($p=0.465$) (Table 1). When the patient and control group were evaluated in terms of breast milk consumption, there was no breast milk consumption in 3 (5%) patients and 2 (3.3%) in the control group. While the total duration of breast milk intake was 13.56±7.6 (0-24) months in the ALL group± this period was determined as 15.28.6.4(0-24) months in the control group. The total duration of breast milk intake was higher in the control group, but there was no statistically significant difference between the groups ($p= 0.185$). In the ALL group, only the duration of breast milk intake was 2.9±1.38 (0-8) months, while in the control group this period was 3.38±0.9 (0-13) months. The duration of breastfeeding alone was greater than that of the ALL group and was statistically significant. (p: 0.026). In the control group, the number of patients who started supplementary food after 6 months was 51 (85%), while the number of cases who switched to supplementary food after 6 months in the ALL group was 33 (55%). The rate of transition to supplementary food in 4-6 months was high in the ALL group. Children in the ALL group had statistically earlier time to start supplemental food than in the control group (p: 0.002). The most common reason for early initiation of supplemental food was breast milk deficiency and the inability of the baby to gain weight (Table 2). The mean maternal age of children with ALL was 35.2±0.93 (23-56) years, and the mean age of the control group was 30.2±0.79 (19-48) years, and the mean age of mothers of children with ALL was higher ($p<0.001$). The mean number of siblings in the ALL group was 3.96±0.278 (1-11), while the mean number of siblings in the control group was 2.7±0.25 (1-7). The number of siblings was higher in the patient group. There was a statistically significant difference between the patient and control group in terms of maternal age and number of siblings (($p<0.001$), $p= 0.002$, respectively). 3 mothers in the ALL group and 2 mothers in the control group smoked during pregnancy, there was no difference (p: 0.642). The rate of illiterate mothers (71.8%) was higher in the ALL group than in the control group (28.2%), and this difference was significant (p: 0.001). Monthly income in 51.9% of ALL group <2000 TL, 63.3% of the control group had a monthly income level of TL 3000 > the monthly income level was lower in the ALL group, but there was no statistical difference (p: 0.201). Patient and control group demographic data are summarized in Table 3.

	ALL group	Control group	p
Age (month), Mean ±SD (Min-Max)	72.9±42.5 (13-192)	45.4±40.7 (4-198)	p<0.001
Gender, n (%) Male Female	 33(%55) 27(%45)	 29(%48,3) 31(%51,7)	 p=0.465
Min, minimum; Max, maximum; n, total number of patients; SD, standard deviation. Data presented as mean } standard deviation or median value (the minimum-maximum) and number/percentage values. Paired Simple t test, Ki-kare test.			

Table 1: Age and gender distribution of both groups.

	ALL group	**Control grubu**	**p**
Lactation Yes No	 58 2	 57 3	
Duration of receiving breast milk only (months)	2,9±1,38(0-8)	3,38±0,9(0-13)	(p:0.026).
Total duration of breastfeeding (months)	13.56±7.6(0-24)	15,28±6,4(0-24)	(p= 0.185).
Duration of breastfeeding Never 0-6 month 7-12 month 13-18 month 19-24 month	 2 7 9 19 23	 3 14 7 12 24	 P:0,356
Time to start supplemental food (month) >6 month 4-6 month	 33(%55) 27(%45)	 51(%85) 9 (%15)	 P:0,003

Table 2: Comparison of groups according to the characteristics of breastfeeding.

	ALL group	Control group	p
Maternal age	35,2±0,93(23-56)	30,2±0,79(19-48)	p<0.001).
Total number of Siblings (Mean ±SD) SD (Min-Max)	3,96±0,278(1-11)	2,7±0,25(1-7)	p= 0.002).
Smoking during pregnancy Yes No	 3(%5) 57(%95)	 2(%3,3) 58(%66,7)	 p:0,642)
Mode of delivery Normal delivery Caesarean section	 33 27	 30 30	 p:0,583).
Maternal educational status Nonliterate primary school middle school high school university	28 18 5 7 2	11 16 5 17 11	 (p:0,001)

Monthly revenue < 2000 TL 2000-3000 TL >3000 TL	 28 21 11	 26 15 19	**p:0,201).**

Table 3: Comparison of demographic data of ALL and healthy control group.

Discussion

WHO and UNICEF report that all infants should receive only breast milk for the first six months, switch to supplementary food from the sixth month and continue breastfeeding until the age of two [7]. Breast milk contains many beneficial biological factors, such as antimicrobial, immunomodulatory, and anti-inflammatory [8,9]. It is thought that breast milk will also be protective against cancers because it regulates the immune system and stimulates maturation. In the study conducted by Mezei et al., it was seen that breastfeeding is protective against some early childhood infections and thus has a protective effect against childhood leukaemia [10]. A 2016 study by Metayer et al. found that breastfeeding for 6 months or more reduced the development of leukaemia by approximately 10-20% [11]. In a study conducted in our country; breastfeeding for more than six months has been reported to be protective against childhood lymphoid malignancies and especially acute myeloidleukemia (AML) and acute lymphocytic leukaemia (ALL) [12]. A case-control study conducted by Rafieemehr et al. [13] in 2019 involving 125 ALL and 130 control groups showed a reduced risk of ALL in children who breastfed for more than 12 months. In our study, there was no breast milk consumption in 3 (5%) patients in the ALL group and 2 (3.3%) in the control group. While the total duration of breast milk intake was 13.56±7.6 (0-24) months in the ALL group± this period was determined as 15.28.6.4 (0-24) months in the control group.. The total duration of breast milk intake was higher in the control group, but the difference was not statistically significant (p= 0.185).

Unlike the literature, no relationship was found between total breast milk intake time and leukaemia development in our study. According to the Turkey Demographic and Health Survey (TNSA) 2018 report; While the mean breastfeeding period was 11.9 months in 1993, the mean breastfeeding period was reported as 16.7 months in 2018 [14]. The mean duration of breastfeeding obtained in our study was similar to the TNSA data. In the ALL group, only the duration of breast milk intake was 2.9±1.38 (0-8) months, while in the control group this period was 3.38±0.9m (0-13) months. The duration of breastfeeding alone was greater than that of the ALL group and was statistically significant. (p: 0.026). In the control group, the number of patients who started supplementary food after 6 months was 51 (85%), while the number of cases who switched to supplementary food after 6 months in the ALL group was 33 (55%). The rate of transition to supplemental food at 4-6 months was high in the ALL group. Children in the ALL group had statistically earlier time to start supplemental food than in the control group (p: 0.002). The most common reason for early initiation of supplemental food was breast milk deficiency and the inability of the baby to gain weight (Table 3). In our study, we found that only breast milk consumption and early transition to food before 6 months were earlier than in the control group, and these differences were statistically significant. In the study conducted by Spector et al. [15], advanced parental age was associated with childhood cancer risk. Every five-year increase in maternal age at birth resulted in a 6-15% increase in risk. In a 2019 study by Rafiemmer et al. [16], advanced maternal age was associated with an increased risk of ALL. In our study, the mean maternal age of children with ALL was 35.2±0.93 years, and the mean maternal age of the control group was 30.2±0.79 years. The mean maternal age of children with ALL was higher than in the control group and was statistically significant (p<0.001). In our study, the relationship between leukaemia development and high parental age was similar to the literature. A 2014 study reported that the risk of ALL decreased as the number of maternal births increased [17]. In our study, information about the birth order of the patients and the control group could not be obtained because the birth order was not recorded, but in our study, the mean number of siblings in the patient group was 3.96±0.27, while the mean number of siblings in the control group was 2.7±0.25. The number of siblings was higher in the patient group and statistical significance was determined (p: 0.002).

A 2015 meta-analysis by Kangkang Yan et al. [17] found that maternal smoking during pregnancy increased the risk of ALL. In our study, the smoking rate of the mothers (2.4%) was low, and there was no statistically significant difference between the groups. (p: 0.642). In our study, no relationship was found between maternal smoking during pregnancy and leukaemia. This result may have been because the families responded in a biased way during the interviews, as they were the answers given by the questionnaire. A study of 357 cases conducted by Wanga et al. [18] in 2019 found that caesarean delivery was associated with ALL. When evaluated in terms of mode of delivery, C/S was performed in 30 (50%) cases in the ALL group and in 27 (47.4%) cases in the control group and there was no difference (p: 0.583). In our study, no relationship was observed between the mode of delivery

and the development of leukaemia. Crump et al. [19] examined the relationship between parental education and leukaemia development in a 2015 study involving 1960 ALL patients and no association was found with leukaemia development. In a 2015 meta-analysis by Kangkang Yan et al. [17], it was found that higher maternal education reduced the risk of developing leukaemia by better protecting herself from harmful environmental conditions and habits. However, in a 2017 cohort study by Kehm et al. [20], a positive relationship was found between high maternal education level and leukaemia development. A case-control study conducted by Rafieemehr et al. [16] in 2019 found that mothers and fathers had higher education levels and an increase in the frequency of ALL. In our study, the rate of illiterate mothers in the ALL group (71.8%) was higher than in the control group (28.2%), and this difference was significant (p: 0.001). In some studies, the effect of socioeconomic status on the development of leukaemia has been investigated. In the vast majority of these studies, a positive relationship was found between high socioeconomic status and childhood leukemia. A 2005 Canadian study found a relatively high risk of childhood leukaemia with high socioeconomic status [21]. Kehm ve ark.'nın [20]. A 2017 cohort study similarly found a positive relationship between high socioeconomic status and childhood malignancies. A 2004 Danish study found a correlation between low-income status and leukemia, unlike other studies [22]. A 2017 cohort study similarly found a positive relationship between high socioeconomic status and childhood malignancies. A 2004 Danish study found a correlation between low-income status and leukaemia, unlike other studies [22]. In our study, the rate of those with high-income status was higher in the control group. According to the data we obtained from our study, there was an increase in the risk of leukaemia in families with low socioeconomic status. In our study, the sociocultural and economic level of the ALL group was found to be low, which differs from the literature. The fact that we have not identified a relationship between breastfeeding and ALL may be related to higher breast milk consumption in societies with low sociocultural and economic levels. In our study, we found that the duration of breastfeeding alone was longer in the control group, but it was not precisely determined whether the duration of exclusive breast milk intake was a risk factor. In ALL, which is due to multifactorial causes, good identification of environmental risk factors and taking measures for them will reduce the frequency of development of the disease. The different results in the studies show that there is a need for more numerous, larger sample studies to be carried out in this area.

Conflicts of interest: The author report no conflicts of interest. The author alone are responsible for the content and writing of the paper.

Funding/Support: No funding was secured for this study.

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