



RISK FACTORS AFFECTING SYMPTOMS OF DEPRESSION IN MOTHERS OF CHILDREN WITH LEUKEMIA

Siska Natalia Situmeang\*

Department of Child Health, University of Sumatera Utara Medical School, Jl. Dr. Mansyur No. 66, Medan 20154, Indonesia. \*Corresponding Author

Bidasari Lubis

Department of Child Health, University of Sumatera Utara Medical School, Jl. Dr. Mansyur No. 66, Medan 20154, Indonesia.

Elmeida Effendy

Department of Child Health, University of Sumatera Utara Medical School, Jl. Dr. Mansyur No. 66, Medan 20154, Indonesia.

Olga Rasiyanti Siregar

Department of Child Health, University of Sumatera Utara Medical School, Jl. Dr. Mansyur No. 66, Medan 20154, Indonesia.

ABSTRACT

The prevalence of depression in mothers of children with leukemia undergoing chemotherapy was as high as 91%, while the risk factors are still unclear. To analyze the risk factors for symptoms of depression in mothers of children with leukemia undergoing chemotherapy. A cross-sectional study was conducted in 41 mothers of children with leukemia undergoing chemotherapy at Haji Adam Malik Hospital from February to May 2016. Subjects were selected by consecutive sampling technique. The mothers were interviewed to obtain demographic data. Symptoms depression level was assessed using Beck's Depression Inventory (BDI). The relationship between mothers age, gender of child, education level, socioeconomic status, and symptoms of depression in mothers were analysed using Chi-square test and Independent t-test. The risk factors were identified using logistic regression test. Variables with P<0.25 in the univariable analysis were further analyzed by the multivariable logistic regression model. A P value <0.05 was considered statistically significant. The mean age of mothers in this study was 37.12 years (SD 6.92). Symptoms of depression proportion in this study was 61%. The lowest prevalence rate of depression (32%) is seen in mothers with a college diploma or bachelor's degree. There was a statistically significant relationship between education level, socioeconomic status, and symptoms of depression in mothers. Based on the results of multivariate analysis; low education level (OR=0.11; 95% CI, 0.02-0.62) and middle and high income (OR=0.13; 95% CI, 0.02-0.72) remained significant risk factors of symptoms of depression in mothers. Low education level and middle and high income increase the risk for symptoms of depression in mothers of children with leukemia undergoing chemotherapy.

KEYWORDS : leukemia, mother, depression, risk factors.

INTRODUCTION

Leukemia is a malignant disease in hematopoietic tissue characterized by replacement of normal bone marrow elements by abnormal blood cells or leukemic cells. The incidence of leukemia reaches approximately 33% of pediatric malignancy, the most being the case of acute lymphoblastic leukemia.

The incidence of leukemia in children and adolescents is relatively lower than in adults, but today the incidence is slowly increasing since 1975.2 Leukemia accounts for one-third of all childhood malignancies and is commonly found in children under 14 years old.3 The peak incidence of leukemia in children occurs at age 2 to 5 years.4 One of the most common cancer in children is acute lymphoblastic leukemia (ALL).2 The five-year survival rate for ALL has increased from 60% to 90% for children aged less than 15 years and from 28% to 75% for adolescents aged 15 to 19 years.

Diagnosis of cancer in children is a painful burden to parents. They will feel devastating, denial, fear, guilty, sad, anxious and angry.6 In addition, accompanying children undergoing cancer chemotherapy will give a severe and prolonged stress impact on parents, especially mothers.7 This can be due to the mothers spend more time taking care of the children.

The problems caused by leukemia that can trigger stress for mothers are long-term treatment (approximately 2 years), the cost of treatment that quite expensive, and death. A person experiencing prolonged stress is susceptible to psychiatric disorders; one of them is anxiety. Anxiety is characterized by feelings of discomfort, fear, accompanied by autonomic

symptoms such as palpitations, shortness of breath and muscle tension.

Parental depression and anxiety of children with leukemia are higher than parents of those with other chronic diseases.7,10 Parents will have difficulty understanding the conditions of their children. Unknow of the needs and care for the children affects the parents physically and mentally, especially mothers of children with leukemia.7,9,10 As for several factors maybe affecting maternal depression such as lack of knowledge about leukemia, limited information about leukemia, mother age, mother education level, and socio-economic level of the family.11-14 The aim of this study was to analyze the risk factors for symptoms of depression in mothers of children with leukemia undergoing chemotherapy.

METHODS

An analytic observational study with cross-sectional design was conducted in 41 mothers of children with leukemia undergoing chemotherapy at Haji Adam Malik Hospital from February to May 2016. Subjects were selected by consecutive sampling technique. Bone marrow biopsy was used to diagnose leukemia. Mothers of children aged 1 month to 18 years were included. Subjects with personality disorders and chronic diseases were excluded.

Data were collected from mothers of children with leukemia at admission. The following day, Beck Depression Inventory (BDI) was applied to all mothers to assess symptoms of depression. All variables that could potentially impact dependent outcome measures of the BDI were analyzed. These factors were mothers' age, mothers' education, gender

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of child, and socioeconomic status of the family. This study was approved by the Health Research Ethics Committee, University of Sumatera Utara Medical School.

Descriptive data were expressed as mean (standard deviation). The relationship between maternal age, gender of child, education level, socioeconomic status, and symptoms of depression in mothers were analysed using Chi-square test and Independent t-test. The risk factors were identified using logistic regression test. The multivariate regression modeling included the factors that were associated with symptoms of depression in mothers by univariate analysis at  $P < 0.25$ . Statistical analysis was performed with SPSS 17.0 software. A  $P$  value  $< 0.05$  was considered to be statistically significant.

**RESULTS**

The mean age of the children in this study was 7 years (SD 3.83). Of the 41 children in the study, there were 23 males and 18 females. The mean age of the mothers was 37.1 years (SD 6.92). The mothers' education levels were varied with 17.1% having an elementary school certificate, 19.5% having a junior high school certificate, 17.1% having a senior high school certificate, 24.3% having a college diploma, and 22% with a bachelor's degree. Among the families, 51% were middle and high income and 49% were low income. The number of mothers with depression was higher than those without depression (Table 1).

**TABLE 1. DEMOGRAPHIC DATA OF SUBJECTS**

Variables	Results
Mean age (SD), years	37.1 (6.92)
Mean age of the child (SD), years	7 (3.83)
Gender of the child, n (%)	
Male	23 (56.1)
Female	18 (43.9)
Diagnosis of the child, n (%)	
Acute lymphoblastic leukemia	35 (85.4)
Acute myeloblastic leukemia	2 (4.9)
Chronic myelogenous leukemia	4 (9.7)
Education level, n (%)	
Elementary school	7 (17.1)
Junior high school	8 (19.5)
Senior high school	7 (17.1)
College diploma	10 (24.3)
Bachelor's degree	9 (22)
Income (rupiah monthly), n (%)	
<3000,000 (low income)	20 (49)
≥3000,000 (middle and high income)	21 (51)
Symptoms of depression, n (%)	
No depression	16 (39)
Depression	25 (61)

**TABLE 2. DISTRIBUTION OF SYMPTOMS OF DEPRESSION IN MOTHERS BY AGE, GENDER OF CHILD, EDUCATION LEVEL, AND SOCIOECONOMIC STATUS**

Variables	Symptoms of depression		P
	No depression (n=16)	Depression (n=25)	
Mean age (SD), years	34.4 (7.62)	38.4 (4.56)	0.038*

Gender of the child, n (%)			
Male	9 (56.2)	9 (36)	0.202*
Female	7 (43.8)	16 (64)	
Education level, n (%)			
Elementary school/ Junior high school/ Senior high school	5 (31.2)	17 (68)	0.021*
College diploma/ Bachelor's degree	11 (68.8)	8 (32)	
Income (rupiah monthly), n (%)			
<3000,000 (low income)	11 (68.8)	9 (36)	0.041*
≥3000,000 (middle and high income)	5 (31.2)	16 (64)	

**\*INDEPENDENT T-TEST, + CHI-SQUARE TEST**

As shown in Table 2, the mean age was significantly higher in mothers with depression than in mothers without depression ( $P = 0.038$ ). The highest rate of depression was recorded in the mothers with female child (64%), but there was no significant relationship between the gender of the child and symptoms of depression in mothers ( $P = 0.202$ ). The lowest prevalence rate of depression (32%) is seen in mothers with a college diploma or bachelor's degree. There was a statistically significant relationship between the education level and symptoms of depression in mothers ( $P = 0.021$ ). The highest prevalence rate of depression (64%) is seen in mothers with an income level of more than or equal to 3000,000 rupiah monthly and there was a statistically significant relationship between the socioeconomic status and symptoms of depression in mothers ( $P = 0.041$ ).

**TABLE 3. Univariate analysis of age, gender of child, education level, and socioeconomic status with symptoms of depression in mothers**

Variables	Symptoms of depression	
	OR (95% CI)	P
Maternal age	1.07 (0.92, 1.24)	0.392
Gender of the child	Reference group	
Male		
Female	0.79 (0.15, 3.99)	0.772
Education level	Reference group	
Elementary school/ Junior high school/ Senior high school	0.12 (0.02, 0.72)	0.020
College diploma/ Bachelor's degree		
Income	Reference group	
<3000,000 (low income)		
≥3000,000 (middle and high income)	0.18 (0.03, 1.09)	0.063

Education level ( $P = 0.020$ ) and socioeconomic status ( $P = 0.063$ ) were included in multivariate regression analysis ( $P < 0.25$ ). Maternal age and gender of the child were excluded (Table 3).

**TABLE 4. Multivariate analysis of education level and socioeconomic status with symptoms of depression in mothers**

Variables	Symptoms of depression	
	OR (95% CI)	P

Education level	Reference group	
Elementary school/ Junior high school/ Senior high school	0.11 (0.02,0.62)	0.013
College diploma/ Bachelor's degree		
Income	Reference group	
<3000,000 (low income)		
≥3000,000 (middle and high income)	0.13 (0.02,0.72)	0.020

In this adjusted analysis, low education level (OR=0.11; 95% CI, 0.02-0.62) and middle and high income (OR=0.13; 95% CI, 0.02-0.72) remained significant risk factors of symptoms of depression in mothers (Table 4).

## DISCUSSION

The diagnosis and subsequent chemotherapy of childhood leukemia is undeniably stressful for any mother. A mother's ability to manage her distress during treatment of the child is vital as there may be potential impact on the well-being and long-term psychological adjustment of both mothers and child. Various studies have shown that mothers display symptoms such as hopelessness, despair, anger, stress, anxiety, and depression.

In this study, the prevalence of depression in mothers was as high as 61%. Kholasehzadeh et al in a study in Iran reported that the prevalence of depression in mothers was as high as 91%.<sup>16</sup> A study in Pakistan, Iqbal et al have reported more than 65% of mothers of children with leukemia were found to be depressed.<sup>17</sup> In a consistent study with conducted in Turkey reported that 88% mothers were depressed.

In our study, there was a statistically significant relationship between the education level and symptoms of depression in mothers. The multinomial predictive model demonstrated that baseline education plays an important role in determining membership in a specific depressive symptoms trajectory.

In the present study, it was a significant relationship between symptoms of depression in mothers and socioeconomic status of the family. Kholasehzadeh et al also showed a meaningful difference between depressions levels of mothers with respect to the income level of the family.

While, Erkan et al when examined to determine whether the depression of mothers varied with respect to the income level of the family, they have not found statistically meaningful difference.

In this study, maternal age and gender of the child were not significant as risk factors for symptoms of depression in mothers. On multivariate analysis, low education level (OR=0.11; 95% CI, 0.02-0.62) and middle and high income (OR=0.13; 95% CI, 0.02-0.72) were the significant risk factors for symptoms of depression in mothers. A study in Pakistan showed that depression was more common among mothers with low education level and among those belonging to lower socioeconomic class.

In conclusion, low education level and middle and high income increase the risk for symptoms of depression in mothers of children with leukemia undergoing chemotherapy.

## CONFLICT OF INTEREST

None declared.

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