



## Άγχος ασθενών με οξεία λευχαιμία και μελών της οικογένειάς τους

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### ΠΕΡΙΛΗΨΗ

Η οξεία λευχαιμία, αν και συγκαταλέγεται μεταξύ των κακοθών νοσημάτων, κατέχει μια ιδιαίτερη θέση, λόγω της ραγδαίας πολλές φορές πορείας της. Αν και τα ψυχοκοινωνικά ζητήματα που σχετίζονται με τις κακοήθειες έχουν μεγάλο ενδιαφέρον, η διερεύνηση συγκεκριμένων ψυχολογικών παραμέτρων σε ενήλικους ασθενείς με οξεία λευχαιμία και τις οικογένειές τους παραμένει ιδιαίτερα περιορισμένη. Ο σκοπός της παρούσας μελέτης ήταν η αξιολόγηση του άγχους ασθενών που πάσχουν από οξεία λευχαιμία και των οικογενειών τους. 111 άτομα συμμετείχαν εθελοντικά στην έρευνα, από τα οποία οι 41 ήταν ασθενείς που νοσηλεύονταν στο Αιματολογικό Τμήμα του Πανεπιστημιακού Νοσοκομείου Ιωαννίνων και οι 70 συγγενείς πρώτου βαθμού. Το ερευνητικό εργαλείο που χρησιμοποιήθηκε ήταν η Κλίμακα Αυτοεκτίμησης του Άγχους του Spielberger (State - Trait Anxiety Inventory - STAI). Από τα αποτελέσματα προέκυψε, ότι οι δύο ομάδες διέφεραν σημαντικά ως προς το παροδικό άγχος ( $P=0,014$ ) με υψηλότερες τιμές αυτές των συγγενών. Παρά τους εύλογους περιορισμούς της συγκεκριμένης μελέτης, θα μπορούσε να υποστηριχθεί ότι η στάση της οικογένειας απέναντι σε μια απειλητική νόσο, καθώς και οι ψυχοκοινωνικές ανάγκες που δημιουργούνται θα πρέπει να επαναπροσδιοριστούν. Προκειμένου να διερευνηθεί η επίδραση του άγχους στην οξεία λευχαιμία, ιδιαίτερο ενδιαφέρον θα παρουσίαζε η μελέτη των ασθενών και των συγγενών τους κατά την πορεία της νόσου. Ο ρόλος της οικογένειας στην πορεία μιας καρκινικής διεργασίας καθώς και στην αντιμετώπιση αυτής της κρίσης θεωρείται ένας από τους πιο ενδιαφέροντες τομείς, του οποίου η μελέτη θα συμβάλλει ουσιαστικά στην κατανόηση του ρόλου της οικογένειας στην εξέλιξη και πορεία της νόσου.

**Λέξεις Κλειδιά:** Οξεία Λευχαιμία, Άγχος, Οικογένεια, Ασθενείς, Ψυχολογία.



## Anxiety in acute leukemia patients and their family

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### ABSTRACT

Among other malignant diseases, acute leukemia appears to directly threaten life due to the remarkably rapid course of illness. Although psychosocial issues related to cancer have been of a great interest, little research has been conducted on psychological characteristics of adult patients suffering from acute leukemia and their families. The present study aimed to evaluate state and trait anxiety in acute leukemia patients and their families. 111 subjects participated voluntarily, including 41 patients, hospitalized at the Hematology Department of the Ioannina University Hospital during the year 2001, and 70 patients' first-degree relatives. The instrument adopted was the State - Trait Anxiety Inventory (STAI). Patients and their relatives were asked to complete this self-report questionnaire and a demographic questionnaire, while being at wards. Results showed that relatives reported significantly greater state anxiety ( $P = .014$ ). Despite the possible limitations of the present study, it could be suggested that family attitude towards a life threatening disease as well as the psychosocial needs related to such a stressful situation should be reconsidered. In order to investigate the effect of anxiety on acute leukemia, a re-evaluation of the patients and their relatives examined should be attempted later in the course of illness. Family involvement in the course of a malignant disease as well as coping with such a crisis is considered as an important area of research. .

**Keywords:** Acute Leukaemia, State – Trait Anxiety, Family, Patients, Psychology

### INTRODUCTION

Personality and temperament as well as other related factors (e.g. age, gender, life experiences, family structure and familial relationships) determine the way that people react to a stressful stimulus, such as a life threatening disease. Sklar and Anisman<sup>1,2</sup> concluded that most findings concerning the role of stressful events in cancer vary, since other factors, such as patients' family environment, are being involved.

Taking into account that anxiety is determined in terms of various biological, psychological and social factors, it seems necessary to define the nature of stressful events and enrich our knowledge regarding personality and familial relations involvement. In order to achieve that, coping reactions to anxiety should be considered<sup>3,4</sup>.

In the case that a stressful event concerns the diagnosis of a life threatening disease, such as acute leukemia and other haematological malignancies, high levels of stress have been reported<sup>5,6</sup>. This has been found to be correlated with high psychiatric morbidity<sup>6</sup>, less effective coping strategies, low quality of life<sup>7,8</sup>, a less desirable illness course and an unsuccessful bone marrow transplantation<sup>9,10</sup>.

According to recent findings, some authors<sup>11,12</sup> reported an interaction between stress and family environment, while some others<sup>13,14</sup> concluded that such interaction together with social support and coping abilities influence the onset of a malignant disease. Other findings<sup>15,16</sup> suggested that cancer patients' relatives present higher levels of stress, depression and fear of cancer and its treatment. Especially, in the early period of the onset of the

disease, they are taken under intense stress<sup>17</sup>, mainly as a result of the uncertainty they experience and their difficulty to take decisions.

Although anxiety effects have been clinically recognized in acute leukaemia, only some persuasive indications have been reported in relation with its clinically important role to survival or illness relapse<sup>18</sup>. This fact together with the absence of relevant findings in Greece have motivated us to conduct the present study, which aimed to assess state and trait anxiety in acute leukemia patients and their family.

## MATERIAL AND METHODS

### Subjects

Greek patients diagnosed with acute leukemia and admitted to the University Hospital of Ioannina as well as their first degree relatives (i.e. husbands or wives, children, brothers or sisters, parents) participated voluntarily at the present study. All subjects had at least graduated from Primary school and they had no history of other malignancy or a mental disorder, requiring psychiatric medication. Patients had all been given a confirmed diagnosis of acute leukemia and not of a secondary etiology and their clinical condition had not been extremely severe.

### Procedures

The head of the Hematology Department informed all patients about the study carried out and introduced them to the researcher (MG), who proceeded with a structured interview. The latter concerned the collection of disease related information as well as the development of a secure and a trustful setting. During the interview, the researcher described the nature and the aim of the study, making clear to the patients that it was up to them to decide whether they wished to take part to the study.

Patients, who accepted to participate, assumed the responsibility to inform their relatives and arranged an appointment with the researcher for the questionnaires to be administered to and completed. The researcher encouraged all family members to participate at this appointment and, for that reason, it used to take place on Saturdays or Sundays, since most of them were working or living outside Ioannina city. Questionnaire was completed at patients' room simultaneously by all members of patients' family. The researcher passed the questionnaires, explained the procedure and then announced the questions and asked them to check the answer, which better expressed them.

### Material

Spielberger's State-Trait Anxiety Inventory (STAI)<sup>19,20,21,22</sup> was used, translated and adjusted to the Greek language<sup>21</sup>. It includes two subscales: a) state anxiety, which concerns current situation that one experiences and is revealed by psychic reactions to stress as well as by autonomous neural system response, and b) trait anxiety, which refers to anxiety as a character feature, revealed by one's readiness to express anxiety when s/he faces a threatening situation. Both subscales consist of 40 statements, which are answered according to a 4-point Likert scale (not at all, maybe, indifferent, very much). For the Greek population, the average value of Trait Anxiety is

34.54 for males and 37.47 for females, while that of State Anxiety is 35.11 for males and 37.34 for females<sup>21</sup>. The Greek version of the questionnaire holds satisfactory psychometric characteristics<sup>21</sup>.

### Statistical analyses

For the description of sample's social, demographic and psychological characteristics, distribution frequencies, median and variance were performed. The non-parametric Mann Whitney test was adopted to compare patients and relatives' scores on the quantitative variables, since their distribution was non symmetric<sup>23</sup>.  $\chi^2$  (chi-square) test<sup>24,25,26</sup> was performed for the comparison:

- $\chi^2$  of Pearson for tables 3x2 in the cases where less than 25% of expected values was <5, no one of the expected values was <1 and the total of observations was >24.
- $\chi^2$  of Pearson was used for tables 2x2 in the cases where all the expected values were >10.
- $\chi^2$  of Yates was used for tables 2x2 in the cases where even one of the expected values was between 5 and 10.
- Fisher's Exact Test was used in the cases, where even one of the expected values was <1 and where the  $\chi^2$  test could not be applied.

Regarding the correlations of quantitative variables<sup>27</sup> for patients and relatives, we used Kendall's correlation coefficient of<sup>28</sup>.

The statistical analyses concerning the descriptive characteristics of the variables examined were performed by both Excel and SPSS10, while those concerning comparisons and correlations of quantitative and categorical variables were performed by the statistical parcel of SPSS10 only. For all statistical analyses  $p < 0.05$  was considered as statistically significant.

## RESULTS

### Sample

61 were all the acute leukaemia patients admitted to the University Hospital of Ioannina in 2001. 6 of them were in a severe clinical condition and, thus, it was not possible to participate at this study. 11 were elderly (i.e. over 75 years old), who did not fulfil participation criteria either because of their low education level or other health problems, such as previous cerebral episodes, communication problems and memory disorders. Thus, the total number of patients examined was 41 (67.2%).

Relatives of 3 patients refused to participate, 6 of 96 relatives were underage patients' children, 18 of them were living far away and, thus, it was not possible to be present, while 2 of them had not returned the questionnaire completed. Thus, 70 relatives were examined in total (72.9%).

In general, 111 individuals (i.e. 41 patients and 70 first degree relatives, all members of 41 families) out of 157 (67.2%) participated voluntarily at the present study.

**Table 1.** Distribution of 41 patients with acute leukemia, who were hospitalised in the University Hospital of Ioannina since January till December 2001 and of 70 relatives, according to age, sex, marital situation, education level, occupational situation, origin and residence.

	<b>Patients</b>	<b>Relatives</b>	<b>All</b>	<b>Statistical analysis</b>	
	No (%)	No (%)	No (%)		
All	41 (100,0)	70 (100,0)	111 (100,0)		
<b>Age</b>					
Min-max (years)	25-75	17-71	17-75		
10-49 years	11 (26,8)	44 (62,9)	55 (49,5)	$X^2_p=13,423$ , $P<0,001$	
50-79 years	30 (73,2)	26 (37,1)	56 (50,5)		
Intermediate, years ( $Q_1$ , $Q_3$ )	65,0 (42,5, 70,5)	41,0 (34,0, 58,2)	51,0 (36,0, 65,0)	$Z^* = -4,279$ , $P< 0,001$	
<b>Sex</b>					
Males	27 (65,9)	24 (34,3)	51 (45,9)	$X^2_p=10,375$ , $P= 0,002$	
Females	14 (34,1)	46 (65,7)	60 (54,1)		
<b>Marital situation</b>					
Unmarried	4 (9,8)	12 (17,1)	16 (14,4)	Fisher's exact test=8,960 $P= 0,021$	
Married	30 (73,1)	54 (77,2)	84 (75,7)		
Divorced	2 (4,9)	4 (5,7)	6 (5,4)		
Widow	5 (12,2)	0 (0,0)	5 (4,5)		
<b>Education level</b>					
Graduate of primary school	24 (58,5)	19 (27,1)	43 (38,7)	Fisher's exact test=14,679  $P= 0,002$	
Graduate of high school	4 (9,8)	17 (24,4)	21 (18,9)		
Graduate of lyceum	10 (24,4)	15 (21,4)	25 (22,5)		
Graduate of university	3 (7,3)	19 (27,1)	22 (19,8)		
<b>Occupational situation</b>					
Unemployed	1 (2,4)	2 (2,9)	3 (2,7)	Fisher's exact test=11,907 $P= 0,112$	
Domestic job	8 (19,5)	14 (20,0)	22 (19,8)		
Farmer	10 (24,4)	7 (10,0)	17 (15,3)		
Private employee	13 (31,7)	18 (25,7)	31 (27,9)		
Civil employee	2 (4,9)	17 (24,3)	19 (17,1)		
Businessman	1 (2,4)	3 (4,3)	4 (3,6)		
Professional	5 (12,2)	6 (8,6)	11 (9,9)		
Student	1 (2,4)	1 (1,4)	2 (1,8)		
Pupil	0 (0,0)	2 (2,9)	2 (1,8)		
<b>Origin</b>					
Region of Ioannina	19 (46,3)	22 (31,4)	41 (36,9)		Fisher's exact test=3,933 $P= 0,564$
Region of Arta	11 (26,9)	21 (30,0)	32 (28,8)		
Region of Preveza	6 (14,6)	14 (20,0)	20 (18,0)		
Region of Thesprotia	4 (9,8)	9 (12,9)	13 (11,7)		
Regions out of Epirus	1 (2,4)	4 (5,7)	5 (4,5)		
<b>Residence</b>					
Region of Ioannina	22 (53,7)	32 (45,7)	54 (48,6)	Fisher's Exact Test=2,203 $P= 0,873$	
Region of Arta	10 (24,4)	18 (25,7)	28 (25,2)		
Region of Preveza	6 (14,6)	9 (12,9)	15 (13,5)		
Region of Thesprotia	2 (4,9)	5 (7,1)	7 (6,3)		
Regions out of Epirus	1 (2,4)	6 (8,6)	7 (6,3)		

$X^2_p$ : Pearson's chi-square,  $Z$ : Mann Whitney U test.

#### ▪ Social-Demographic profile of the sable

Patients' age ranged from 25 to 75 years, while relatives' age ranged from 17 to 71 (table 1). 73.2% of patients and 37.1% of relatives were almost 50 years old ( $P<0.001$ ). Medium age ( $Q_1$  to  $Q_3$ ) for patients was 65.0 years (42.5 to 70.5), while for their relatives was 41 (34.0 to 58.2) ( $P<0.001$ ).

Almost 2 out of 3 patients (percentage 65.9%) were males, while, on the contrary, 2 out of 3 relatives (percentage 65.7%) were females ( $P=0.002$ ).

Regarding their marital status, most patients and their relatives were married (73.1% and 77.2% correspondingly). The difference observed between both groups marital status was statistically significant

(P=0.021). This difference could be explained as that all the widowers were patients and that two times more relatives were unmarried (17.1% vs 9.8%).

As far as subjects' education level was concerned, a significant difference was found (P=0,002). More patients (58,5%) were graduates of municipal education compared to their relatives, who were almost equally distributed in the four rungs of education.

Regarding their job status, their place of origin and residence of both groups, there were non significant differences (P=0.112, P=0.564 and P=0.873 respectively).

The time passed from diagnosis to the completion of the questionnaire ranged from 3 to 53 days. Most completed the questionnaire in the first 20 days (51.2%) and the first 10 days (34.0%). Only two families completed the questionnaire 45 days and 53 days after the diagnosis respectively.

▪ **State and Trait Anxiety**

As presented at Table 2, patients' state anxiety ranged from 30 to 75 degrees on Spielberger scale, with an average of 53.3 and a standard deviation of 14.8. Relatives' state anxiety ranged from 30 to 78 degrees on the same scale, with an average of 53.3 and a standard deviation of 11.7. The intermediate anxiety

and the 1<sup>st</sup> and 3<sup>rd</sup> quadrants (Q<sub>1</sub>, Q<sub>3</sub>) were found to be 55 degrees (39.5, 68.0) for the patients and 60.5 degrees (50.0, 68.0) for their relatives, without a statistically significant difference (P=0.083) according to the Mann-Whitney test. According to the Fisher's exact test, it was noticed that state anxiety for relatives was higher comparing to patients' (P=0.014).

Groups comparison, after abbreviation of the units in a divergence, revealed that it was consisted of two categories with a section in 40 degrees (since 39.69 is the average for the state anxiety of the healthy population), showed that relatives' anxiety was notably higher compared to patients (P=0.021).

Regarding patients' trait anxiety, it was found to range from 28 to 73 degrees, with an average of 42.8 and a standard deviation of 10.7. However, their relatives' trait anxiety ranged from 22 to 76 degrees, with an average of 43.7 and a standard deviation of 11.4. The intermediate anxiety and the 1<sup>st</sup> and 3<sup>rd</sup> quadrants (Q<sub>1</sub>, Q<sub>3</sub>) was found 41.0 degrees (34.0, 51.5) for patients and 43 degrees (34.7, 48.0) for their relatives, without any significant difference according to the Mann-Whitney test (P=0.744). Comparing the two groups on trait anxiety, no difference was noticed (P=0.518), according to the Fisher's exact test.

	<b>Patients</b>	<b>Relatives</b>	<b>All</b>	<b>Statistical analysis</b>
	No (%)	No (%)	No (%)	
<b>All</b>	41 (100,0)	70 (100,0)	111 (100,0)	
<b>State anxiety</b>				
Min-max	30 - 75	30 - 78	30 - 78	
Average (SD)	53,3 (14,8)	58,7 (11,7)	56,7 (13,1)	
Intermediate (Q <sub>1</sub> , Q <sub>3</sub> )	55,0 (39,5, 68,0)	60,5 (50,0, 68,0)	59,0 (45,0, 68,0)	Z=-1,733, P=0,083
30-39	10 (24,4)	5 (7,1)	15 (13,6)	
40-49	10 (24,4)	9 (12,9)	19 (17,1)	
50-59	4 (9,8)	19 (27,1)	23 (20,7)	Fisher's exact test=12,250
60-69	9 (22,0)	23 (32,9)	32 (28,8)	P=0,014
70-79	8 (19,4)	14 (20,0)	22 (19,8)	
0-40	11 (26,8)	6 (8,7)	17 (15,3)	X <sup>2</sup> <sub>Y</sub> = 5,31
41-80	30 (73,2)	64 (91,4)	94 (84,7)	P=0,021
<b>Trait anxiety</b>				
Min-max	28-73	22-76	22-76	
Average (SD)	42,8 (10,7)	43,7 (11,4)	43,3 (11,1)	
Intermediate (Q <sub>1</sub> , Q <sub>3</sub> )	41,0 (34,0, 51,5)	43,0 (34,7, 48,0)	42,0 (34,0, 51,0)	Z=-0,327, P=0,744
20-29	4 (9,8)	4 (5,6)	8 (7,2)	
30-39	15 (36,6)	23 (32,9)	38 (34,2)	
40-49	10 (24,4)	27 (38,6)	37 (33,4)	Fisher's exact test=4,269
50-59	10 (24,4)	10 (14,3)	20 (18,0)	P=0,518
60-69	1 (2,4)	3 (4,3)	4 (3,6)	
70-79	1 (2,4)	3 (4,3)	4 (3,6)	
0-40	20 (48,8)	29 (41,4)	49 (44,1)	X <sup>2</sup> <sub>P</sub> = 0,567
41-80	21 (51,2)	41 (58,6)	62 (55,9)	P=0,452

SD=standard deviation, Q<sub>1</sub>=1<sup>st</sup> quadrant Q<sub>3</sub>=3<sup>rd</sup> quadrant, X<sup>2</sup><sub>P</sub> = X<sup>2</sup> Pearson, X<sup>2</sup><sub>Y</sub> = X<sup>2</sup> Yates Z = Z test Mann-Whitney U, according to SPSS, P=P - value

Regarding patients' trait anxiety, it was found to range from 28 to 73 degrees, with an average of 42.8 and a standard deviation of 10.7. However, their relatives' trait anxiety ranged from 22 to 76 degrees, with an average of 43.7 and a standard deviation of 11.4. The intermediate anxiety and the 1<sup>st</sup> and 3<sup>rd</sup> quadrants (Q<sub>1</sub>, Q<sub>3</sub>) was found 41.0 degrees (34.0, 51.5) for patients and 43 degrees (34.7, 48.0) for their relatives, without any significant difference according to the Mann-Whitney test (P=0.744). Comparing the two groups on trait anxiety, no difference was noticed (P=0.518), according to the Fisher's exact test.

Groups comparison, after abbreviation of the units in a divergence, revealed that it was consisted of two categories with section in 40 degrees (since 40.41 is the average for the trait anxiety of the healthy

population), showed that there was no difference as well (P=0.452).

▪ **Correlations of the quantitative variables**

Regarding the Kendall's coefficient correlations of all quantitative variables for the whole sample as well as for each group separately (Table 3), it was found that the higher the trait anxiety, the higher the state anxiety for patients (P<0.001) and their relatives (P<0.01). Trait anxiety was non significantly correlated with the time passed from diagnosis for patients and relatives. However, it was found to be significantly related to age, only for the relatives (P<0.05). State anxiety was found to be significantly correlated to the time passed from diagnosis only for the patients (P<0.05), while it was non significantly correlated with age for both groups.

**Table 3 .** Correlation of age and time distance (from diagnosis to the study) with Trait and State Anxiety. Coefficient correlation of Kendall.

	Age	Time distance	State anxiety
<i>All (n=111)</i>			
Time distance	0,059 <sup>NS</sup>		
State Anxiety	0,025 <sup>NS</sup>	0,109 <sup>NS</sup>	
Trait Anxiety	0,129 <sup>MS</sup>	0,021 <sup>NS</sup>	0,306 <sup>***</sup>
<i>Patients(n=41)</i>			
Time distance	0,121 <sup>NS</sup>		
State Anxiety	-0,056 <sup>NS</sup>	0,257 <sup>NS</sup>	
Trait Anxiety	0,018 <sup>NS</sup>	0,053 <sup>NS</sup>	0,053 <sup>NS</sup>
<i>Relatives(n=70)</i>			
Time distance	-0,003 <sup>NS</sup>		
State Anxiety	0,144 <sup>NS</sup>	0,014 <sup>NS</sup>	
Trait Anxiety	0,211 <sup>*</sup>	0,000 <sup>NS</sup>	0,238 <sup>**</sup>

<sup>NS</sup>=P>0,10 (non significant), <sup>MS</sup>=P<0,10 (marginally significant), <sup>\*</sup>=P<0,05 (significant), <sup>\*\*</sup>=P<0,01 (very significant), <sup>\*\*\*</sup>=P<0,001 (very much significant).

**DISCUSSION**

The relatively high rates of both state and trait anxiety found in acute leukemia patients were certainly expected, as it was indicated by our initial hypothesis. However, it was interesting that, in the present study, the mean score of patients' state and trait anxiety was even higher than that of Greek patients with other malignancies<sup>29,30</sup>. Similar anxiety rates were also found by Wrona-Polanska<sup>5</sup>, who examined methods of defense against anxiety and self-concept in leukemia patients, as well as by dos Santos et al<sup>6</sup>, who assessed psychiatric disorders in the same patients. Such findings could possibly be explained in terms of the high intensity of symptoms and the extremely rapid course of acute leukemia, as opposed to other malignancies, which seem to threaten patients more.

The high rates of trait and especially state anxiety observed in patients' first degree relatives also supported our hypothesis and agreed with previous findings. The latter suggested that the family members of cancer patients reported greater levels of anxiety, depression and fear of the disease than the patients themselves, especially shortly after diagnosis<sup>15,16</sup>. The present results were also in line with recent findings suggesting the presence of an interaction between anxiety and family environment<sup>11,12,13,14</sup>.

According to the systemic perspective, Schwartz<sup>31</sup> stressed the role of personality, age, gender, subjective experiences as well as family structure and familial relationships in determining a person's response to a stressful event, such as the diagnosis of a life threatening disease. Numerous researchers suggested that high occurrence of stressful life events was also related with the appearance and/or relapse of cancer<sup>32,33</sup>.

During late 70's and early 80's, many descriptive studies made clear that the family of cancer patients expressed high levels of anxiety<sup>34,35,36</sup>. In particular, husbands and wives reported eating and sleeping disorders, high levels of anxiety and depression, hopelessness and fear of cancer and its therapeutic interventions. These findings suggested the need for a further investigation of anxiety levels as quantitative data in patients' relatives by using standardized methods, as it was done by Blanchard et al<sup>37</sup>.

All previous findings regarding a highly anxious response by one's family towards his/her diagnosis of a malignancy showed that the function of the whole family as a system as well as of every member separately is disrupted by such a stressful event. According to Sclump-Urquhart<sup>157</sup>, the sudden appearance of a disease does not give enough time for the family to be psychologically prepared to cope,

even if there is similar previous experience. The relationships within the family differentiate, while every member's health is affected as well<sup>158,159,161</sup>. Such adverse effects arise from an external factor, that is the disease, which threatens one family member and, thus, the stability and integrity of the whole family as a system, since this is formed on the basis of an interaction between all members<sup>160</sup>. According to Kleeman<sup>200</sup>, the sudden need for hospitalization is also a stressful event, since the family experiences, among other things, a first, even temporal, loss of the beloved member. Such loss may have emotional, social and even financial implications for the family as a whole and for each individual member.

These biopsychosocial dimensions of a life threatening disease may put both the patient and his/her family into a crisis. Straker<sup>167</sup> suggested that a crisis emerges, when all mechanisms adopted by the individual to cope with a threatening event and, thus, to adjust fail. High levels of anxiety appear and unconscious defense mechanisms are then employed, in order to prevent the individual from breaking down. When these mechanisms fail, emotional and cognitive functioning is somewhat disrupted, resulting in a regression to early experiences and a feeling of experiencing less realistic facts. New resources may then emerge, helping the individual to return to a usual way of functioning. Otherwise, adjustment to the new situation will fail, affecting both physical and psychological health<sup>131</sup>.

Evidently, early evaluation of family's coping resources seems important since anxiety has proven to be high. Further investigation of family environment and dynamics may also be needed, regarding their involvement in acute leukemia patient's ability to cope with the stresses of the disease as well as in the course of illness.

## REFERENCES

1. Sklar, L. & Anisman, H. (1980). Social stress influences tumor growth. *Psychosom. Med.* 42: 347-365.
2. Sklar, L. & Anisman, H. (1981). Stress and cancer. *Psychol. Bull.* 89(3): 369-406.
3. Lazarus, R. (1992). Coping with the stress of illness. *WHO Regional Publications European Service.* 44: 11-31.
4. Lazarus, R. (1993). Coping theory and research: past, present and future. *Psychosom Med.* 55: 234-247.
5. Wrona-Polanska, H. (1989). Methods of defense against anxiety and self concept of patients with leukemia. *Pol. Tyg. Lek.* 44(20): 446-8.
6. dos Santos, M.J., Pimentel, P., Monteiro, J.M. et al. (1991). Psychiatric disorders in hospitalized patients with hematologic neoplasia. *Acta Med Port.* 4(1): 5-8.
7. Montgomery C, Pocock M, Titley K, et al. (2002). Individual quality of life in patients with leukaemia and lymphoma. *Psychooncology.* May-Jun;11(3):239-43
8. Greenberg DB, Kornblith AB, Herndon JE, et al. (1997). Quality of life for adult leukemia survivors treated on clinical trials of Cancer and Leukemia Group B during the period 1971-1988: predictors for later psychological distress. *Cancer.* Nov 15;80(10):1936-44.
9. Tschuschke V, Hertenstein B, Arnold R, et al. (2001) Associations between coping and survival time of adult leukemia patients receiving allogeneic bone marrow transplantation: results of a prospective study. *J Psychosom Res.* May;50(5):277-85.
10. Prieto JM, Blanch J, Atala J. et al. (2002). Psychiatric morbidity and impact on hospital length of stay among hematologic cancer patients receiving stem-cell transplantation. *J Clin Oncol.* Apr;20(7):1907-17.
11. Holahan, C.J., Moos, R., Holahan, C.K. et al. (1997). Social Context, Coping Strategies, and Depressive Symptoms: An Expanded Model With Cardiac Patients. *Journal of Personality and Social Psychology.* Vol. 72(4): 918-928.
12. Cassileth, B., Kusk, E.J. & Strouse T.B. (1985). A psychological analysis of cancer patients and their next-of-kin. *Cancer.* 55: 72-76.
13. Forsen, A. (1991). Psychosocial stress as a risk for breast cancer. *Psychother. Psychosom.* 55(2-4): 176-185.
14. Hilakivi - Clarke, L., Rowland, J., Clarke, R., Lippman, M. (1994). Psychosocial factors in the development and progression of breast cancer. *Breast cancer Res Treat.* 29(2): 141-160.
15. Oberst, M. & James R. (1985). Going home: Patient and spouse adjustment following cancer surgery. *Topics of Clinical Nursing.* 7: 46-57.
16. Conatser, C. (1986). Preparing the family for their responsibilities during treatment. *Cancer.* 58: 508-511.
17. Aggelopoulos N. (1997). Psychiatric parameters and quality life in cancer patients and their families. Educative seminar Psycho-oncology: The role of the family facing the cancer. Metsovo, Greece. Seminar appendices: 156-174.
18. Petticrew, M., Bell, R. & Hunter, D. (2002). Influence of psychological coping on survival and recurrence in people with cancer : systematic review. *B.M.J.* 325:1066-76.
19. Trichopoulos, D. (1975). Medical Statistics. Principles and basic methods in bio-medical statistics. Athens, Publications Gregory K. Parizianos: 46-47.
20. Katsougiannopoulos, B.X. (1990). Basic Medical statistics. Thessaloniki. Publications Kyriakidis Bros:151-163
21. Ioannidis, J. P.A. (2000). Principles of Evidence-based medicine- Epidemiology-Public Health-Statistical Methods. Athens: Medical Publications Litsas.
22. Papaioannou T., Ferentinos, K. (2000). Medical Statistics and principles of Bio-mathematics. Athens: Publications "Ath. Stamoulis AE": 275.
23. Ahlbom, A. & Norell S. (1992). Introduction in Modern Epidemiology. Translation: Dimoliatis, G., Chouliara, S. & Anastasopoulos P.). Athens: Medical Publications Litsas.
24. Paraskevopoulos I.N. (1993). Statistics-Inductive Statistics. Volume B. Athens.
25. S.P.S.S. Base 10.0. (1999). Application Guide. U.S.A.: SPSS Inc. Illinois.
26. Sifaka, B.(2000). Comparative study of psychological parameters and personality's characteristics in patients with testis cancer and in healthy men. Doctoral Thesis (submitted to the Medical School of University of Ioannina)
27. Belikis, I. (2000). Comparative study of life events and psychological characteristics (anxiety, depression, alexithymia) in patients with colon cancer, cardiovascular disease and healthy people. Doctoral Thesis (submitted to the Medical School of University of Ioannina).
28. Schwartz, M.A. & Wiggins, O.P. (1986). Systems and the structuring of meaning: contributions to a biopsychosocial medicine. *Am. J. Psychiatry.* 143: 1213-21.

29. Forsen, A. (1991). Psychosocial stress as a risk for breast cancer. *Psychother. Psychosom.* 55(2-4): 176-185.
30. Horne, R. & Picard, R. (1979). Psychosocial risk factors for lung cancer. *Psychosom Med.* 43: 431-438.
31. Leherer, S. (1980). Life change and gastric cancer. *Psychosom Med.* 42: 499-502.
32. Ramirez, A., Craig, T., Watson, J. et al. (1989). Stress and relapse of breast cancer. *Br Med J.* 298: 291-293.
33. Ganz, P., Hirji, K., Sim, M. et al. (1993). Predicting psychosocial risk in patients with breast cancer. *Med Care.* 31(5): 419-431.
34. Stanic, J. (1989). Caring for the family of the critically ill surgical patient. *Critical Care Nurse.* 10: 43-47.
35. Wooley, N. (1990). Crisis theory: A paradigm of effective intervention with families of critically ill people. *Journal of Advanced Nursing.* 15: 1402-1408.
36. Sager, U. & Schlesinger, Z. (1981). Rehabilitation of patients after acute myocardial infraction: an interdisciplinary family oriented program. *Heart and Lung.* 10: 841-847.
37. Straker, M. (1980). *Crisis intervention: An overview.* In Dovanloo, H. (Ed.) Short-term Dynamic Psychotherapy. New York: Jason Aronson.
38. Sclump-Urquhart, S.R. (1990). Families experiencing a traumatic accident: Implications and nursing management. *AACN.* 3: 552-534.