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**RESEARCH ON FACTORS INFLUENCING LEVEL  
OF STRESS IN FAMILIES OF PATIENTS TREATED  
IN THE INTENSIVE CARE UNIT**

**Czynniki wpływające na poziom stresu wśród rodzin pacjentów  
leczonych w oddziałach intensywnej terapii**

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A - Koncepcja i projekt badania, B - Gromadzenie i/lub zestawianie danych, C - Analiza i interpretacja danych, D - Napisanie artykułu, E - Krytyczne zrecenzowanie artykułu, F - Zatwierdzenie ostatecznej wersji artykułu

**Abstract (in Polish):**

**Cel pracy**

Hospitalizacja na oddziale Anestezjologii i Intensywnej Terapii (AiIT) to sprawa nie tylko tej jednostki, ale również pozostałych osób i stanowi ogromny stres. Pojawiają się obawy o przyszłość oraz lęk związany z separacją, progresją choroby czy śmiercią. Celem badań była ocena nasilenia stresu i analiza emocji towarzyszących rodzinom pacjentów hospitalizowanych na oddziale intensywnej terapii oraz wpływu zmiennych socjodemograficznych i zmiennych związanych z hospitalizacją członków ich rodzin na oddziale AiIT na nasilenie stresu u rodzin pacjentów przebywających na oddziale AiIT.

**Materiał i metody**

Badania przeprowadzono wśród 103 osób, których bliscy przebywali na oddziale AiIT w Szpitalu Wojewódzkim w Gorzowie Wlkp. Średni wiek respondentów wynosił 45±17lat. Badania przeprowadzono

metodą sondażu diagnostycznego przeprowadzonego przy użyciu standaryzowanego kwestionariusza PSS-10 oraz autorskiego kwestionariusza ankiety.

### **Wyniki**

Badania wykazały, że u większości badanych (76%) poziom stresu osiągał wysoki poziom. U osób na których największe wrażenie wywarł widok osoby bliskiej lub widok sprzętu medycznego, poziom stresu był zdecydowanie wyższy niż u osób, które tego pierwszego wrażenia nie pamiętają ( $p < 0,05$ ).

### **Wnioski**

Wśród badanych istotnym czynnikiem wpływającym na nasilenie się stresu wśród bliskich pacjentów przebywających na oddziale AiIT był widok bliskiej osoby oraz sprzętu medycznego obecnego na sali chorego. Wśród badanych stwierdzono wysoki poziom nasilenia stresu, jednak osoby budujące poprawne relacje oraz skupiające się na pozytywnych emocjach łatwiej radziły sobie ze stresem w porównaniu do osób, które nie wykorzystywały technik radzenia sobie ze stresem.

### **Abstract (in English):**

#### **Aim**

Illness and stay in hospital, especially in the Anesthesiology and Intensive Care Unit (AICU), is a huge stress for patients families. The aim of this study was to measure the level of stress among the relatives of patients hospitalized in the intensive care unit, to analyze their emotions and to assess the impact of sociodemographic and hospitalization-related variables on exacerbation of stress.

#### **Material and methods**

The study was conducted among 103 persons whose close ones were hospitalised in the ICU of the Voivodship Hospital in Gorzów Wielkopolski. Average age of respondents was  $45 \pm 17$  years. The study was carried out using a PSS-10 questionnaire and author's questionnaire form.

#### **Results**

Studies showed that majority of respondents (76%) experienced high level of stress. Among people who were most influenced with the first impression of their close one or the medical equipment suffered from greater level of stress than people who did not recall this image ( $p < 0,05$ ).

#### **Conclusions**

A factor increasing stress of the relatives of patients staying in the AICU was the sight of their loved ones and of medical equipment in the patient's room. The respondents had a high level of stress, however those of them who were able to establish healthy relationships with other people and focused on positive emotions coped with stress better than those who did not use stress-coping strategies.

**Keywords (in Polish):** rodzina, stres, intensywna terapia.

**Keywords (in English):** family, stress, intensive care.

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## **Introduction**

Stress is a physical and mental response to rapid changes which present in everyday life [1]. Each person manages their stress in a different way which is a natural and common phenomenon. Some individuals due to their sensitivity may not be able to deal with stressors resulting in destructive influence on health and serious mental changes [2].

In 1956 Hans Hugo Selve published "The Stress of Life" in which he presented pattern of reactions to stress called General Adaptation Syndrome – GAS. He describes three stages of reaction to stress. Mobilization and alert (distress) are the first stage. It is a period of changes in the organism a significant intensification of cognitive and intellectual processes, caused by adrenaline and noradrenaline which raise blood pressure, dilates blood vessels, increases level of blood glucose, pulse and respiratory rates, occurs [3]. In this period symptoms such as nerve seizures, disorders of sleep and emotional balance, insomnia, infirmity, trouble concentrating, disaffection, nervousness, shaking hands etc. appear [4]. This period characterizes with sensitivity, vigilance and tension which are supposed to prepare organism for two possible reactions: fight or flight [5]. The next is the endurance stage (eustress) during which the organism effectively deals with stressors. In this time the shock passes, and the organism begins to function properly [4,6]. The last stage is called exhaustion stage (neustress) which comes down to exhaustion of impairment of immune reserve due to long-term exposure to stressors and lack of energy and defence mechanisms. Consequently, it may cause nervous breakdown, psychosomatic diseases, mental disorders and even death. In early stage before it reaches serious consequences following symptoms occur extreme apathy, uncontrollable violence, delusions and hallucinations [5, 6].

Disease is one of the most stress-inducing events in human's life and always news about illness of a loved one or one's own are a stimulus causing negative emotions. Each disarray of organism's balance causes serious stress and forces one to take radical steps. People demonstrate their emotions in a variety of ways, fear losing certain social roles and may isolate from close ones [7, 8].

Disorganization in family functioning caused by an illness of one of its members is a special situation. Rapid change forces one to adapt to new situation, reevaluation of life and change of priorities and career, social and family plans. It often leads to numerous misunderstandings and conflicts [9].

Family, same as a patient, needs time to familiarize with the situation that occurred. Natural mechanisms which help with avoiding negative experiences are developed, i.e. denial, distortion of reality, euphemism, intellectualism [10,11]. Each of those mechanisms allow time to process stressful situation and lead to decrease of stress and fear caused by sickness of their close one. Family has an important and real impact on the sickness of the family member, and it is what begins the process of healing. A human needs emotional support and closeness of their family [12, 13].

The aim of this study was to measure the level of stress among the relatives of patients hospitalized in the intensive care unit, to analyze their emotions, and to assess the impact of sociodemographic and

hospitalization-related variables (contact with the patient, negative emotions, stress factors during the first visit to the Anesthesiology and Intensive Care Unit (AICU)) on exacerbation of stress.

### **Materials and methods**

The study was conducted among 103 members of families of patients hospitalized in the Intensive Care Unit of the Voivodship Hospital in Gorzów Wielkopolski. Study's inclusion criteria were: age of majority of surveyed, hospitalization of a family member for at least 7 days. Exclusion criteria were shorter period of hospitalization of close one, lack of consent to participate in the study. The study was carried out in accordance with the Declaration of Helsinki after obtaining a favorable opinion of the Bioethical Commission of Pomeranian Medical University in Szczecin. Each respondent was informed about the aim of the study and use of results for research purposes. The participation was anonymous and voluntary.

The study was conducted with diagnostic poll method using a standardized PSS-10 tool (The Perceived Stress Scale) and author's own questionnaire.

1. The PSS-10 questionnaire is a tool that allows to subjectively assess feelings associated with problems and personal events, behaviors and ways to deal with stress. A surveyed gives an answer which is scored on a 0 to 4 points scale and the sum of all points ranges between 0 and 40. The higher the score, the greater us the severity of experienced stress. Standard tens ranging between 1 and 4 are considered low, and those from 7 to 10 as high [14].
2. Author's own questionnaire consists of 17 questions regarding sociodemographic information (sex, age, place of residence, education) and aspects regarding emotions of the respondents (severity of stress, ways to deal with negative emotions).

Obtained results were subjected to statistical analysis using R programme, version 3.5.1. Analysis of quantitative variables was conducted by calculating the average, standard deviation median, quartiles, minimum and maximum. Analysis of qualitative variables was conducted by calculating number and percentage of occurrences of each value. Comparison of qualitative values was conducted in two groups with T-student Test or Mann-Whitney test. Comparison of qualitative values in three or more groups was conducted using analysis of variance (ANOVA) or the Kruskal–Wallis test. After finding statistically significant differences a post-hoc analysis with LSD Fisher test was conducted in order to identify statistically different group. During analysis 0.05 was adopted as a significance level.

### **Results**

103 respondents in the age of  $45 \pm 17$  were studied. Among surveyed the majority were women (55.3%). The largest group were people whit lived in cities with number of residents ranging between 10 and 100 thousand (45%). The majority of respondents were in a formal relationship (50%), had secondary education (43%) and were professionally active (53%). Most frequently hospitalized patients in the ICU were fathers (16%) followed by mothers (15%) of the respondents.

Presence in the ICU caused feeling of anxiety (50%) and helplessness (49%). Most commonly, surveyed were concerned about the uncertain future of their close ones (45%) and the majority of negative feeling during the first visit were caused by the sight of their close person (52%). Majority of respondents reported low mood and frequently cried in connection with this situation (42%).

Assessment of stress in families of patients hospitalized in an intensive care unit.

Analysis of obtained data showed that the majority of surveyed suffered from high level of stress (76%). Others experienced moderate (19%) or low (5%) level of stress.

The studies subjected to analysis influence of selected sociodemographic variables (age, sex, marital status, professional activity, education) on the severity of stress in families of ICU's patients. Analysis did not show any statistically significant relationships between sociodemographic variables and level of stress  $p>0.05$  (Table 1).

**Table 1. Influence of chosen sociodemographic variables on the level of stress in families of ICU's patients.**

Variables		PSS10 (points)		
		M±SD	Q1-Q3	p
Sex	Women (n=57)	21.7±4.1	17.5-22	0.496*
	Men (n=46)	20.7±3.4	17,5-22	
Marital status	Single (n=12)	20±3.9	17.8-22	0.365**
	Formal relationship (n=51)	22±3.9	20-24	
	Informal relationship (n=39)	20.6±3.7	19.5-22.5	
Professional activity	Active (n=55)	20.7±4	19-23	0.212*
	Inactive (n=44)	21.9±3.7	20-23.3	
Education	Primary or vocational	21.9±4.2	19.5-23.5	0.947**
	Secondary (n=44)	21±3.2	19.8-22.3	
	Higher (n=36)	21.1±4.3	20-24	

\* Group distribution not normal, Mann-Whitney test  
 \*\* Group distribution not normal, Kruskal-Wallis test  
 M- mean, SD- standard deviation, Q- quartiles, p- statistical significance

Analysis of relationships between chosen variables related to the hospitalization of close ones in an ICU (contact with patient, negative emotions, stress-inducing factor on the first visit to the ward) and severity of stress has been carried out. Statistically significant link between first impression of surveyed' close ones in the ICU ward and severity of stress has been established. Post-hoc analysis showed that people who were the most influenced by the sight of their loved one or medical equipment suffered from much greater stress than those who had no such memory ( $p<0.05$ ). In case of other variables related to stay in of the surveyed' close one in an ICU unit no statistically significant relationship has been established ( $p<0.05$ ) (Table 2).

**Table 2. Influence of chosen variables related to the stay of the close person in an ICU on the level of stress in families of the hospitalised**

Variables		PSS10 (points)		
		M±SD	Q1-Q3	p
Contact with patient	Every day, she lives with a sick person (n=40)	21.9±3.5	20-23.3	0,498*
	More than once a week (n=23)	20.5±5.2	16.5-24.5	
	Twice a month (n=22)	21.8±2.8	20-23.8	
	Twice a year (n=18)	20.1±3.3	20-21.8	

Anger	No feeling of anger (n=92)	21.1±3.9	19-23	0,076**
	Feeling of anger (n=11)	22.7±2.4	22-23	
Fear	No feeling of feel (n=51)	21.3±4.4	19.5-23.5	0,833***
	Feeling of anger (n=52)	21.2±3.2	20-23	
Stress-inducing factor on the first visit to the ward	View of a close person(n=54) A	21.9±3.8	20-24	A,B>C
	Medical equipment (n=30) B	21.6±3.3	20-23	
	Don't remember (n=18) C	18.7±3.9	17-21	

\* Group distribution not normal, Kruskal-Wallis test

\*\* Group distribution not normal, Mann-Whitney test

\*\*\* Normal distribution in groups, Student's t-test

\*\*\*\* Group normal distribution, ANOVA + post-hoc analysis results (Fisher's LSD test)

M- mean, SD- standard deviation, Q- quartiles, p- statistical significance

Analysis of emotions accompanying members of families of patients hospitalized in an ICU.

The studies subjected to analysis influence of hospitalization of a close person on family relations. A statistically significant relationship between dealing with stress and meeting with friends and severity of stress in the families of patients hospitalized in an ICU has been established. It has been observed that people who could not deal with negative emotions suffered from higher level of stress than other group which managed to meet wit friends ( $p < 0.05$ ). Furthermore, people who cannot deal with the current situation scored higher in the PSS-10 scale ( $p < 0.05$ ). No statistically significant link between contacts with family and level of stress has been established (Table 3).

**Table 3. Factors influencing severity of stress in families of patients hospitalised in an ICU.**

Variables		M±SD	Q1-Q3	p
Contacts with family	I close myself in and avoid my family (n=25)	21.7±4.2	20-24	0,772*
	I often talk to my family, we help each other (n=65)	21±3.7	19-23	
	I have no opinion (n=12)	21.5±3.9	20-24,25	
Dealing with stress	I'm doing fine (n=76)	20.7±3.9	19-23	0,028**
	I can't cope (n=27)	22.7±3.4	21-24	
Meeting with friends	I don't hang out with my friends (n=60)	22.1±3.7	20-24	0,003**
	Hanging out with friends (n=43)	20±3.7	17,5-22	

\* Group distribution not normal, Kruskal-Wallis test

\*\* Group distribution not normal, Mann-Whitney test

M- mean, SD- standard deviation, Q- quartiles, p- statistical significance

## Discussion

The Intensive Care Unit is a place strictly assigned to a very particular field of medial activity. It is adapted to treat life-threatening conditions and gathers specialist equipment and qualified staff who offer high-quality care. Hospitalization of a patient in the ICU is extremely difficult both for the patient and his or her family. Additionally, it causes variety of emotions, depressive disorders, anxiety and above all

stress-related disorders which accompany family throughout the whole hospitalization of their family member in the ICU [10].

Our own studies showed that high level of stress was experienced by 75% of surveyed whose family was hospitalized in the ICU. In case of studies by Płaszewska-Żywko and Grazda high level of stress occurred more frequently in women (68%) than in men [15]. Similar results were presented by Białek and Lickiewicz – level of stress was more severe in women and young people [16]. Additionally, studies conducted by Jesiorski et al. showed greater stress load in women than in men. Factors increasing prevalence of uncertainty, anxiety, bursts of crying and mental stress are related with health of relatives [17].

Analysis of socio-demographic factors in own studies indicated that age, sex, marital status, physical activity and education did not influence severity of stress in surveyed. Studies carried out by Płaszewska-Żywko and Grazda confirmed lack of influence on the level of stress and showed that people with higher education were able to more effectively control their emotions. Stronger emotions and higher level of stress were observed in parents of ICU's patients than in spouses or siblings [15]. Studies carried out by Jezierska et al. indicated that severity of stress was greater in spouses and single parents [17]. Results of Jezierska and Borkowska confirm that level of mental stress was higher in patient's spouses and parents and coexisting anxiety was influenced by age and education of respondents [15].

Author's own studies showed that more than 58% of persons who did not live with the patient on daily bases suffered from similar level of stress like those who did. Results of Białek's and Lickiewicz's studies indicated that level of stress experienced by family who had spent time with the patient everyday was similar to that experienced by those living away [16]. The disease did not only concern the patient but also his or her relatives. The changes restricted family and professional activity and forced submission to the health care system. A variety of intensive feelings has been observed in every member of the family which influenced functioning of the family and caused changes in a way of living. Płaszewska- Żywko and Grazda also confirmed in their studies lack of influence of living with the patient and intensity of emotions [15]. Sickness requiring treatment in an ICU caused intense stress response in every member of the family regardless of when and how often they had been seeing the patient. Different results were obtained by Jezierska et al. who showed that the closest family who systematically saw and took care of the patient were exposed to greater level of stress and increased risk of depression than relatives who occasionally contacted the sick person [15].

Analysis of influence of the first impression from the first visit in the ICU to see the sick family member of author's own studies showed that 53% of respondents reacted emotionally at the sight of their close one and another 29% reacted emotionally to the sight of medical equipment in the ICU. Similar relationship has been established by Białek and Lickiewicz – they have proven that the most stressful impression for the visitors in the ICU was made by medical equipment and life support apparatuses. Furthermore, similar strong feelings were caused by the first visit and an entirely changed appearance of their relative [16]. Increase in stress has also been observed during circumstances such as rapid deterioration of health and introduction of new treatment methods leading to strong emotional disorders among visitors [18].

Author's own studies indicated that sickness in family did not influence relationships, the majority (63%) of surveyed had frequent and good contact with relatives, and the level of stress stayed on average level. However, different results were presented by Białek and Lickiewicz. They showed that hospitalization of a relative in the ICU caused reorganization of private life which often lead to a serious crisis [16]. Similar results were obtained by Jezierska et al. who showed that a hospitalization of respondent's relative

in the ICU caused a distortion to the lifestyle they lead so far and negatively influenced relationships in the family [17].

Author's own studies indicated that level of stress in respondents influenced the ways they were dealing with negative emotions. Surveyed who did not manage to meet with their friends suffered from more severe stress. Analysis of Płaszewska-Żywko's and Grazda's studies show that 87% of surveyed express their willingness to take care of their relative who was hospitalized in the ICU. People who received emotional, spiritual or financial support stressed maintained on a lower level than in those who did had never received such support [15]. Jezierska et al. arrived to similar conclusions which indicated that engaging in care activities, such as applying lotion, passive exercises by relative's bed, was a way of dealing with negative emotions. It reduced negative emotions and level of stress [17]. Results of author's own studies were consistent with Białek's and Lickiewicz's studies. Level of stress was significantly lower in people who not only took care of their relative but also took care of themselves, that is: proper nutrition, rest, mental and spiritual support, using relaxation techniques [16].

Results of author own studies and presented studies from the literature prove that severity of stress in close relatives of patients hospitalized in ICU is influenced by emotional support and good communication with therapeutic team. Obtained results of own studies can be put into practice and become a source of inspiration to further analysis. The disease that occurs in the family and the associated hospitalization in the AICU is not only an individual problem affecting the sick person. The family participates in its entirety in its experience. Traumatic experiences can lead to neurobiological changes. Elevated catecholamines are clinically equivalent to hyperactivity. A decrease in serotonin has also been observed. Therefore, further analyzes seem to be necessary to find and minimize factors influencing the occurrence of PTSD.

### **Conclusions**

1. Sociodemographic variables and negative feelings associated with hospitalization of a close person in the ICU do not influence the level of experienced stress.
2. Relevant factors influencing severity of stress in respondents whose relative were hospitalized in the ICU the sight of the relative and medical equipment present in the ward.
3. Respondents suffered from high levels of stress, however, persons who established proper relationships and concentrated on positive emotions were more capable to deal with stress in comparison with others who did not use mitigation measures.

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