



## Use of the Hamilton anxiety scale to assess mothers of pediatric patients on mechanical ventilation

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### ABSTRACT

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**Introduction:** The risk of complications is higher in intensive care units (ICU) than in other units. As children with severe conditions are hospitalized, many drugs are used concomitantly, and invasive interventions are more frequently required. Therefore, pediatric ICUs are medical settings which cause traumatic stress to both children and their parents. Knowing the extent to which anxiety levels are affected in a parent whose child is hospitalized in the intensive care unit is important. This study investigated the anxiety levels of mothers with a child in the ICU and compared the levels of anxiety of mothers of children on mechanical ventilation (MV) with mothers of children not on MV.

**Methodology:** *Hamilton Anxiety Rating Scale* (HAM-A) forms were filled during face-to-face interviews with the mothers after their children's admission to the ICU. The mothers details were recorded in case report forms. Basic demographic data were collected for the children involved.

**Results:** In total, 128 patients were enrolled; 64 each on MV (patient group) and not on MV (control group) and their mothers. There was no significant difference in the mean ages of the patient and the control groups ( $73.9 \pm 38.4$  months vs.  $75.7 \pm 48.6$  months;  $p = 0.815$ ). The mean HAM-A scores of the patient group and the control group were found to be  $23.7 \pm 2.2$  and  $7.9 \pm 1.8$ , respectively ( $p = 0.001$ ). The age of the mothers was not correlated with the HAM-A score in either the patient or control group. No difference was found between the HAM-A scores in terms of educational level in the patient and control groups ( $p > 0.05$ ).

**Conclusion:** The anxiety levels of the mothers whose children were admitted to the intensive care unit were high and these levels further increased with the possibility of their children being connected to mechanical ventilators.

**Key words:** Child; Mother; Anxiety Scale; Intensive care unit

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### INTRODUCTION

Intensive care units (ICUs) are medical settings in which patients whose vital signs are under threat due to one or more organ failures receive care and treatment in a multidisciplinary approach. Patients in pediatric ICUs (PICUs) vary in terms of age and diagnosis.

These patients generally require close monitoring and invasive catheterization, are administered sedatives and analgesics, and require intensive supportive care such as mechanical ventilation (MV). The primary goals of MV are to ensure efficient gas exchange, optimize the respiratory parameters of the patient, and minimize pulmonary damage associated with ventilator use.<sup>1</sup>

The problems experienced during the disease and treatment process are a significant source of stress to both the children and their parents.<sup>2,4</sup> 'Medical traumatic stress' is defined as a range of psychological and physiological responses resulting from invasive medical procedures and treatments applied in cases of disease that cause pain, injury, or severe problems. Traumatic stress response occurs according to the individual's subjective perception of the event, regardless of the real problem. What the individual feels is generally irrelevant to an objective prognosis.<sup>2,3,5-8</sup> The severity of the disease, being frightening or life-threatening, sudden onset, severe pain, difficult treatment, etc. make the stress traumatic.<sup>2,5,6</sup>

Admission to PICUs has been associated with traumatic stress in children and their parents.<sup>9,10,11</sup> It increases the risk of exposure to factors that cause trauma. If not addressed and treated, parental stress can cause a loss of confidence in healthcare providers, difficulty in complying with hospital rules and decisions, feeling of anger and rage, and complaints / quarrels.<sup>12</sup> Severe anxiety in mothers might prevent them from correctly understanding the explanations about their children, interpreting events in a realistic manner, making the right decisions, contributing to the care of children, and remembering and applying the proper coping methods.<sup>13,14</sup>

Based on this information, identification of anxiety levels in a parent whose child is in a PICU and identifying the factors that affect these anxiety levels would be beneficial for eliminating the adverse results described above. The present study assessed the anxiety levels of parents whose children had been admitted to the PICU, and in the families of patients on MV, and the factors that might affect these anxiety levels.

## METHODOLOGY

We enrolled mothers of the patients admitted to the PICU of Health Sciences University, Okmeydanı Training and Research Hospital between November 2017 and February 2018. We used *Hamilton Anxiety Rating Scale* (HAM-A) to record the level of the anxiety.<sup>15,16</sup>

Face-to-face interviews were conducted with the mothers of patients in the first 24-48 hours after their children's admission to the PICU. HAM-A forms were completed by a single experienced physician within the standard periods. Information including the mother's age, educational background, number of children, whether they had any relative whose child was in the ICU or on MV, and time their child was connected to the mechanical ventilator, was obtained and recorded in forms.

Mothers whose children were in the PICU and on MV comprised the patient group, while mothers whose children were in the PICU but not on MV comprised the control group.

Approval for this study was obtained from the Hospital Clinical Trials Ethics Committee on 06/02/2018 (decision number 828) and the study was, therefore, performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Inclusion Criteria were consenting mothers of pediatric patients aged 1-18 years, without a disease that might affect their mental and emotional state. The mothers, who were a family member of a patient who was previously hospitalized in the PICU, who were unable to complete the standard HAM-A, were excluded. Basic demographic data were collected for the children involved.

**Statistical analysis:** The data obtained in the study were evaluated using SPSS Statistics for Windows, version 17.0 and MedCalc. For the study data, charts showing the absolute numbers and percentages were prepared and the arithmetic means and median values were calculated. Chi-square, independent sample Student's t-test, Mann-Whitney U test, analysis of variance (ANOVA), and correlation tests were used for statistical analyses as appropriate.  $p < 0.05$  was considered statistically significant.

## RESULTS

The study enrolled a total of 128 patients; 64 each with and without MV (patient and control groups, respectively) and their mothers. Among these 128 patients, 65 were male (50.8%) and 63 were female (49.2%). No significant difference was found between the patient and control groups in terms of the distribution of female and male patients ( $p = 0.112$ ).

The mean ages of the children in patient and control groups were  $73.9 \pm 38.4$  and  $75.7 \pm 48.6$  months, respectively. No significant difference was found between the patient and control groups in terms of their mean ages ( $p = 0.815$ ).

The mean age of the mothers in the patient group ( $n = 64$ ) was  $29.2 \pm 5.4$  y, higher than the mean age of  $32.5 \pm 5.7$  y of the mothers in the control group ( $n = 64$ ) ( $p = 0.001$ ). The educational levels of mothers in the patient and control groups were similar ( $p = 0.990$ ).

In the patient group, MV was started  $1.3 \pm 0.8$  days after admission to the PICU (median = 1; range: 1-4 days). The mean total period of connection to a mechanical ventilator was  $15.1 \pm 16.2$  days (median = 9; range: 2-81 days).

**Table 1: Rates of exitus in the patient and control groups**

Group	Recovery	Exitus	p-value
Patient	50	8	0.003
Control	61	0	

**Table 2: Comparative Hamilton Scale scores**

Anxiety level (HAM-A score)	Patient Group	Control Group	p-value
Mild anxiety (<17 points)	0	64	0.001
Mild to moderate anxiety (18-24 points)	40	0	
Moderate to severe anxiety (25-30 points)	24	0	
Severe anxiety (>30 points)	0	0	

Six patients in the patient group and three patients in the control group discontinued the treatment due to rejection of the medical procedure or referral and were excluded; thus, the progress of a total of 119 patients was assessed. A statistically significant difference was observed against the patient group in terms of the exit rates between the patient and control groups ( $p = 0.003$ ) (Table 1).

The mean HAM-A was significantly higher among mothers of children in the patient group than that among mothers with children in the control group ( $23.7 \pm 2.2$  vs.  $7.9 \pm 1.8$  points,  $p = 0.001$ ). The anxiety levels were classified according to these results (Table 2).

Correlations between the age of mothers and the scale points were assessed in the patient and control groups. No correlation was found between the age of the mothers and the HAM-A points either in the patient or control groups ( $p = 0.517$ ,  $r = -0.082$  and  $p = 0.037$ ,  $r = 0.216$ ). There was also no co-relation to educational levels in the patient and control groups ( $p = 0.389$  and  $0.136$ , respectively).

## DISCUSSION

Anxiety is a vague internal emotional state with an unknown cause and is accompanied by fear, concern, distress, and the worry that something bad is going to happen.<sup>17</sup> The signs of anxiety might occur in the parent of a child with a medical problem due to not knowing what the child's medical condition is related to or how serious is the medical condition. Anxiety that occurs in a parent due to such a medical condition is consistent with the 'acute stress disorder' and 'generalized anxiety disorder' subtypes. Such anxiety might arise in a parent whose child is admitted to ICU due to poor general condition of the child and the risk of a severe life-threatening condition. In our study, anxiety was present in both groups.

In a study by Smith L and colleagues parents of

children who were diagnosed with an acute medical condition and those who were hospitalized, felt detached from the outside world at and after the 48th hours of hospitalization.<sup>18</sup> Similarly, in an assessment by Seliner and colleagues, the time when a parent's view started to change due to their physical location in the hospital was the 48th hour after hospitalization.<sup>19</sup> Based on this, we conducted our assessments in the first 24-48 hours to evaluate the responses of the attending mothers to their current situation in the early period and to prevent our assessment from being affected from the physical distress of the

locations.

As a patient's physical health and psychological state deteriorate, the quality of life of their relatives is affected accordingly. Maxwell mentioned Leske's dimensions (assurance, proximity, information, comfort, and support) that correspond to the expectations of family members whose relatives are hospitalized. The lack of one of these dimensions leads to anxiety.<sup>20</sup> In a study conducted by Başbakkal et al. in Turkey, the hospitalization of a child increased the anxiety level of the mother; training of mothers on behavioral changes that could be observed in children after hospitalization was not effective in decreasing their anxiety, and informing mothers about the clinic reduced their anxiety.<sup>21</sup>

Tiedeman et al. examined the anxiety levels of the families of 52 children aged between 5 and 11 y who were admitted to ICU, reporting that the anxiety level of the parents peaked during the first admission to the ICU.<sup>22</sup> Although this study did not have a separate control group with which to compare the patient group (e.g., patients admitted to the unit), the results of the present study indicate that the mothers in both the control and patient groups had increased levels of anxiety. In other words, although severe anxiety was not detected in any parent, mild-to-moderate anxiety was observed in most of them in the patient group.

Carter et al. reported that many stress factors in ICU affected the parents. For instance, prevention of the parents' role as caregiver and behavioral changes in children cause stress in families.<sup>23</sup> Moreover, Turner et al. pointed out that anxiety due to the uncertain condition of a child in the ICU adversely affected communication between the parent and the child, which could increase anxiety in the family.<sup>24</sup> As a general note, it is plausible that parents with children who are connected to mechanical ventilators in PICUs are at a higher risk for increased anxiety. Our study observed that the mortality risks of patients on MV was significantly higher than that in those who were not on MV. Therefore, as the general condition

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of the patients on MV are perceived to be worse, it is expected that the anxiety levels of families in such situations would be higher compared to the levels in other parents. Our study's results confirm this hypothesis.

Youngblut and Shiao reported no positive correlation between the mortality risk of a child and the anxiety of their parent.<sup>25</sup> Similarly, Doering et al. reported no relationship between a parent's stress and the severity of their child's disease.<sup>26</sup> Although, we did not obtain results to directly correlate the mortality risk of a child and the anxiety of their parent, our observation that being connected to a mechanical ventilator is a factor that increases the anxiety of mothers and the fact that patients on MV had higher mortality rates, the poor general condition of a child at the time of the first admission to the PICU, and resulting worries indicate a potential correlation between the mortality risk and parent anxiety.

Some studies have reported anxiety levels to be higher in mothers with low educational level than those in mothers with higher education level.<sup>27</sup> This might result from the possibility that mothers with lower educational levels cannot sufficiently learn how to make use of coping strategies and support systems or cannot quickly understand the causes of changes in the condition of their children. However, our study

did not find a correlation between the educational level of the mother and anxiety level in either the patient or control groups.

## CONCLUSION

In conclusion, the anxiety levels of mothers whose children were admitted to the PICU were higher at the time of their admission, their anxiety levels further increased if their children were connected to mechanical ventilators, and were further increased in the mothers of patients with a higher mortality risk and a poor overall condition at the time of admission. Therefore, it is essential that healthcare providers in intensive care units and hospitals have the behavioral and communication skills to approach families that might be under stress.

**Conflict of interest:** None declared by the authors

### Authors' contribution:

MNY: Concept, literature search, manuscript writing

HD: Literature search, manuscript writing

YK: Statistical analysis, literature search

ET: Manuscript editing, review

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