



# Knowledge Levels of Pediatric Intensive Care Staff About Delirium, Single Center Experience

## Çocuk Yoğun Bakım Çalışanlarının Deliryum Hakkındaki Bilgi Düzeyleri, Tek Merkez Deneyimi

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### Abstract

**Introduction:** Delirium is frequently encountered in pediatric intensive care units (PICUs) in critical patients and is characterized by fluctuating acute impaired awareness and cognition. An inadequate level of knowledge in critical care staff can bring about a significant risk that would delay diagnosis and treatment. This study investigated the delirium knowledge of PICU staff.

**Methods:** This was a single-center, cross-sectional, descriptive survey study. A 17-item online questionnaire was administered to PICU staff who worked in the PICU, surgery PICU and burn PICU.

**Results:** We invited 120 PICU staff to the study, and 88% (n=106) responded to the questionnaire. Of the responders, 30% had an inadequate level of knowledge regarding hypoactive delirium, 57% inaccurately chose the Glasgow-Coma score as the appropriate screening tool for delirium, 80% incorrectly responded that benzodiazepines were used in the treatment of delirium, and 79% thought that patients did not remember their moments of delirium.

**Conclusion:** The results indicated that PICU staff required training on the importance, risk factors, diagnosis, and treatment of pediatric delirium. The lack of a screening tool in the native language further complicates the assessment of delirium. PICU staff equipped with improved knowledge and the appropriate screening tools can make a difference in recognizing, preventing, and proper treatment of pediatric delirium.

**Keywords:** Delirium, pediatric intensive care, knowledge, survey

### Öz

**Giriş:** Deliryum, dalgalı, akut, bozulmuş farkındalık ve biliş ile karakterize, çocuk yoğun bakım ünitelerinde (ÇYBÜ) sıklıkla karşılaşılan bir durumdur. Yoğun bakım çalışanlarının yetersiz bilgi düzeyi, tanı ve tedaviyi geciktirebilir. Bu çalışma ÇYBÜ çalışanlarının deliryum bilgi düzeyini araştırmayı amaçlamıştır.

**Yöntemler:** Bu çalışma, tek merkezli, kesitsel, tanımlayıcı bir tarama çalışmasıdır. ÇYBÜ'de, cerrahi ÇYBÜ'de ve yanık ÇYBÜ'de görev yapan çalışanlara 17 maddelik çevrimiçi anket uygulandı.

**Bulgular:** Çalışmaya 120 ÇYBÜ çalışanı davet edildi ve %88'i (n=106) anketi yanıtladı. Yanıt verenlerin %30'u hipoaktif deliryum hakkında yetersiz bilgi düzeyine sahipti, %57'si hatalı bir şekilde deliryum için uygun tarama aracı olarak Glasgow-Koma skorunu seçti, %80'i deliryum tedavisinde benzodiazepinlerin kullanımı ile ilgili yanlış bilgiye sahipti. %79'u ise hastaların deliryum anlarını hatırlamadıklarını düşünüyordu.

**Sonuç:** Çalışmamız, ÇYBÜ çalışanlarının pedyatrik deliryumun önemi, risk faktörleri, tanı ve tedavisi konusunda eğitim alması gerektiğini göstermiştir. Ana dilde bir tarama aracının olmaması, deliryumun değerlendirilmesini daha da zorlaştırmaktadır. Gelişmiş bilgi birikimi ve uygun tarama araçlarıyla donatılmış ÇYBÜ çalışanları, çocuk deliryumun tanınması, önlenmesi ve uygun tedavisinde fark yaratabilir.

**Anahtar Kelimeler:** Deliryum, çocuk yoğun bakım, bilgi, anket

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## Introduction

Delirium is a prevalent condition in pediatric intensive care units (PICUs), and it causes acute impaired awareness and cognition with a fluctuating course in critical patients.<sup>1</sup> In the literature, studies have reported the prevalence of delirium in PICUs to be 25%, in adult burn ICUs to be 77%.<sup>2,3</sup> The predisposing factors for delirium in critically ill children include younger age, neurodevelopmental retardation, severe disease, and mechanical ventilation. Furthermore, delirium has also been associated with prolonged ventilation and hospital stay and increased mortality and morbidity rate.<sup>4,6</sup> Studies with children and adults have demonstrated that patients remember the moments experienced during delirium, even under the influence of benzodiazepines. Delirium has also been suggested to be associated with long-term cognitive impairment and elevated posttraumatic stress scores.<sup>7,8</sup> Therefore, it is crucial to recognize and appropriately treat pediatric patients' delirium, especially those with high life expectancy. The early recognition of delirium can be achieved by increasing delirium awareness of the PICU staff and routine delirium screening of the patients.<sup>9,10</sup> The present study aimed to measure the level of delirium knowledge of staff in a PICU setting.

## Materials and Methods

We planned a single-center, cross-sectional, descriptive survey study. We invited 120 PICU staff working at the PICU, surgery PICU, and burn PICU. We received ethical approval from the Ethics Committee of Ankara City Hospital (approval no: E2-21-376). The participants were informed in advance about the confidentiality of their responses and that they would not share them with any institution or organization. We collected the relevant consent forms from the participants online. The participants who did not provide their consent were excluded from the study. The participants' demographic information, including age, gender, education level, and professional and PICU experience, was recorded. The questionnaire was administered online and sent the link to the participants via e-mail. The questionnaire used for data collection was developed by the pediatric delirium specialists at John Hopkins Hospital based on the risk factors, screening methods, treatments, and diagnostic criteria for adult and pediatric delirium.<sup>11</sup> This is a published questionnaire established for assessing the knowledge level regarding delirium in healthcare professionals providing care for critically ill children. We obtained permission of use from the author of the original questionnaire. We coded the statements of knowledge based on the responses to the 17-item questionnaire as true or false. The evaluation was based on the percentage of correct answers to the items in the questionnaire.

## Statistical Analysis

Statistical analyzes were performed using SPSS (Statistical Package for Social Sciences) for Windows 25.0. Frequency data were expressed as % (number) and non-parametric data as median (25<sup>th</sup>-75<sup>th</sup> percentile).

## Results

Of the 120 PICU staff, 106 (88.3%) completed the questionnaire and were included in the study. The percentage of the responders working in the PICU, burn PICU, and surgical PICU were 56.6% (n=60), 23.6% (n=25), and 19.8% (n=21), respectively. Of the responders, 83% were female and 17% were male. The median age was 25 years [interquartile range (IQR) 24-28]. 92.5% were university graduates and 5.7% had a postgraduate degree out of the responders. The median experience in the intensive care setting was 18 months (IQR 1-132).

No participant answered all the items accurately. One responder answered with 94% accuracy, four with 88% accuracy, and 88.7% of the responders answered with 50% accuracy. Accordingly, 97.2% (n=103) of the responders were aware of the perceptual disturbances experienced by the patients during delirium, 90.6% (n=96) confirmed that behavioral changes occurred during the day, and 72.6% (n=77) responded that fluctuation between the states of orientation and disorientation was typical in delirium. The majority of the responders (91.5%) displayed awareness regarding altered sleep-wakefulness cycle as a symptom of delirium, and 86.8% of the responders were aware that symptoms of depression could mimic those of delirium. The percentage of the responders who inaccurately stated that the episodes of delirium last only a few hours, that it was not affected by the patients' sex, and that it would always manifest as a hyperactive condition were 36.8%, 39.6%, and 30.2%, respectively. The participants identified poor nutrition (83.9%), dehydration (90.6%), hearing and vision impairment (87.7%), and multiple drug use (77.3%) as risk factors for the development of delirium. 34% of the responders incorrectly thought that the risk of delirium would decrease in the presence of a Foley catheter. Concerning the Glasgow-Coma score (GCS), 43.3% of the responders were aware that it was not used in the diagnosis of delirium, whereas 56.7% answered the question incorrectly. Only 17.9% of the responders were aware that benzodiazepines would not facilitate delirium treatment, and 79.2% believed that patients would not remember their delirious moments. The distributions of the correct and incorrect responses to each questionnaire item are shown in Table 1.

**Table 1. Survey answers**

Survey item	Correct	Incorrect
Fluctuation between orientation and disorientation is not typical of delirium (FALSE)	77 (72.6%)	29 (27.4%)
Poor nutrition increases the risk of delirium (TRUE)	89 (83.9%)	17 (16.1%)
The GCS score is the best way to diagnose delirium in critically ill children (FALSE)	46 (43.3%)	60 (56.7%)
Hearing or vision impairment increases the risk of delirium (TRUE)	93 (87.7%)	12 (12.3%)
Delirium in children always manifests as a hyperactive, confused state (FALSE)	74 (69.8%)	32 (30.2%)
Benzodiazepines can be helpful in the treatment of delirium (FALSE)	19 (17.9%)	87 (82.1%)
Behavioral changes in the course of the day are typical of delirium (TRUE)	96 (90.6%)	10 (9.4%)
Patients with delirium will often experience perceptual disturbances (TRUE)	103 (97.2%)	3 (2.8%)
Altered sleep/wake cycle may be a symptom of delirium (TRUE)	97 (91.5%)	9 (8.5%)
Symptoms of depression may mimic delirium (TRUE)	92 (86.8%)	14 (13.2%)
The greater the number of medications a patient is taking, the greater their risk of delirium (TRUE)	82 (77.3%)	24 (22.7%)
Delirium usually lasts several hours (FALSE)	67 (63.2%)	39 (36.8%)
A urinary catheter <i>in situ</i> reduces the risk of delirium (FALSE)	70 (66.0%)	36 (34.0%)
Gender has no effect on the development of delirium (FALSE)	64 (60.4%)	42 (39.6%)
Dehydration can be a risk factor for delirium (TRUE)	96 (90.6%)	10 (9.4%)
Children generally do not remember being delirious (FALSE)	22 (20.8%)	84 (79.2%)
A family history of dementia predisposes a patient to delirium (FALSE)	14 (13.2%)	92 (86.8%)

GCS: Glasgow-Coma score

## Discussion

Our study has revealed a significant lack of knowledge in PICU staff. Results of our study has indicated a lower level of knowledge concerning diagnosis, treatment, and prognosis of delirium than the level in relevant studies in literature. The results indicated that the PICU staff required periodical trainings regarding the importance, risk factors, diagnosis, and treatment of pediatric delirium.

Delirium can be categorized into three types, hypoactive (decreased physical activity, lethargy, reduced response), hyperactive (agitated and/or aggressive behavior), and mixed delirium.<sup>12</sup> Most of our nurses demonstrated awareness regarding behavioral changes during the day and fluctuations between orientation and disorientation in cases of delirium; however, 30% of the responders described delirium as solely a hyperactive condition, suggesting a lower rate of awareness concerning hypoactive delirium compared with the results of relevant studies in the literature. As demonstrated by Traube et al.<sup>5</sup> in their research, hypoactive (45%) and mixed delirium (46%) were much more prevalent in PICU compared with hyperactive delirium (8%). Hyperactive delirium leads to complications in patient care, and therefore, can be readily diagnosed.<sup>13</sup> On the other hand, the gravity of the symptoms of patients with hypoactive delirium may go unrecognized.<sup>14,15</sup> Given the prevalence of hypoactive delirium in the pediatric population<sup>2,4,6</sup> the results of our questionnaire indicate that hypoactive delirium is often ignored by the PICU staff and is not treated as a problem.

Most of our staff were aware of the risks, including poor nutrition, dehydration, hearing and vision impairment, and multiple drug use associated with delirium.<sup>16</sup> In addition to the risk of infection, and induce urethral complications in a child with hyperactive delirium. However, 34% of our staff had incorrect knowledge that a foley catheter would reduce the risk of delirium. A PICU staff aware of such risks may help prevent the development of delirium by providing care intended to eliminate these risks.<sup>16-18</sup>

There are two scales reported in the literature, the Pediatric Confusion Assessment Method for the ICU for the ICU and Cornell Assessment of Pediatric Delirium with proven validity and reliability, which can be used in critically ill children for delirium diagnosis. Despite the availability of verified screening tools, most of PICUs do not the routine delirium screening. A multicenter study by Kudchadkar et al.<sup>19</sup> found that only 2% of the pediatric intensive care specialists conducted routine delirium screenings. Inadequate knowledge about the usage of GCS to diagnose cases of delirium was demonstrated by 57% of our staff, which was a higher rate compared with the rates reported in the relevant literature.<sup>17,18</sup> This result can be associated with the lack of routine delirium screening. The reason behind lack of routine screening associated with the language barrier as most of the PICU staff has not enough language skills to perform screening using a tool other than their native language.

When assessing children with hyperactive delirium, staff who have lower delirium awareness could think that sedation levels are insufficient and consequently ask the intensive

care residents to increase the benzodiazepine dose. In the literature, studies have reported benzodiazepines to be an independent risk factor in developing delirium.<sup>5,7,20</sup> However, compared with the relevant studies in the literature using the same questionnaire, which reported 33-38% of nurses considering that benzodiazepine was used in delirium treatment,<sup>17,18</sup> 82% of the responders who participated in the present study responded incorrectly about benzodiazepine use in delirium treatment.

In research by Colville et al.<sup>8</sup> one in three children remembered the moments they experienced during a delirium episode, which was associated with the duration of benzodiazepine administration, and the children who reported remembering delirious memories had higher posttraumatic stress scores. Nevertheless, consistent with the results reported in the relevant literature,<sup>11,18</sup> approximately 79% of the staff in the present study thought that pediatric patients did not remember their delirious moments. Therefore, it is crucial to raise the PICU staff's awareness about pediatric delirium. Two effective methods to reach this goal can be giving periodical trainings and conducting routine delirium screening at PICUs. Studies have reported that one in every 3-4 children in the PICU has experienced delirium, which emphasizes the importance and severity of the problem in question.<sup>2,21,22</sup> Recognizing delirium in pediatric patients may be challenging. An inadequate level of knowledge in the critical care staff may pose a significant obstacle delaying in diagnosis and treatment.<sup>23,24</sup> Given that the course of delirium fluctuates, nurses who provide continual care can closely monitor and recognize orientation disorders, abnormal behaviors, or hallucinations in the patients.<sup>20,23</sup> Following up and keeping accurate records of the objective and specific findings regarding the mental state of the patients by PICU staff would facilitate the recognition of delirium and ensure adequate treatment.<sup>20,24</sup>

Complex screening tools constitute difficulties for practitioners during routine screening.<sup>25,26</sup> The lack of a screening tool in the native language further complicates the assessment of delirium. Therefore, it is important to validate the established screening tools in native languages and use them for routine screening.

## Conclusion

The PICU staff with improved knowledge who use appropriate screening tools can potentially improve the recognition, prevention, and proper treatment of pediatric delirium.

The lack of validation of the questionnaire used in this study to assess the knowledge level of the staff who provide critical care to pediatric patients as a Turkish instrument is a limitation of the present study.

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## Ethics

**Ethics Committee Approval:** We received ethical approval from the Ethics Committee of Ankara City Hospital (approval no: E2-21-376).

**Informed Consent:** We collected the relevant consent forms from the participants online.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Concept: E.U., S.E., A.E., Design: E.U., S.E., Data Collection or Processing: E.U., S.E., S.Ö., O.P., A.E., E.E.E., S.A.B., Analysis or Interpretation: E.U., S.Ö., O.P., Writing: E.U., S.E., M.N.A.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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