Introduction

Intensive care patients are faced with unusual and unfriendly environments [1]. Longer recovery times from any critical illness and long-term and short-term patient outcomes may be related to the patients' perceptions of their intensive care unit (ICU) experiences [2]. Traumatic cardiovascular surgery experiences cause disturbing recollections and post-traumatic stress disorder [3].

Research on intensive care experiences of cardiovascular surgery (CS) patients is very limited [4–7]. The ICU experiences of patients other than cardiovascular surgery have been primarily reported in the scientific literature [8–13]. Additionally, standardized measurement tools were not used in the majority of these studies, and there were many differences concerning the ICU characteristics and the time interval between the ICU experiences and interview [14–16].

CS patients insufficiently recalled or did not recall at all their stay in the ICU. While all the ICU patients recollected some of their experiences [17], sudden illness, unusual intensive care environments, and feelings of uncertainty made it difficult to interpret patient experiences [12]. Some patients had bright and strong memories [5], whereas longer durations of mechanical ventilation were associated with a significant decrease in environmental awareness [18]. Additionally, older patients were more aware of the ICU [19]. In total, 44% of patients remembered their dreams during their stay in the ICU; there was a significant association between the length of stay in the ICU and patients' dream experiences [11]. A total of 15.0% of patients did not recall events in the ICU, and some of them remembered real memories, such as visits from family members [10].

Patients generally had negative experiences in the ICUs. CS patients reported apprehension, fear, anxiety, confusion and hallucinations related to their stay in the ICU [20]. Postoperative coronary artery bypass graft patients expressed themes including a lack of comfort, damaged communication, loss of control, loneliness, being transitory and human interaction [21]. Mechanically ventilated patients expressed themes such as being in an unusual environment, physically and psychologically suffering [9], feeling helpless, and feeling abandoned and powerless [8]. There was a significant
relationship between the patients' perceptions of their ICU experiences and their scores for depression, anxiety, avoidance and intrusion [2].

There are limited studies reporting that patients had positive experiences when staying in the ICU [13,22,23] such as emotional, perceptual and environmental comfort [13]. Cardiovascular surgery patients in the ICU expressed positive themes in addition to negative ones. Some of the positive themes were comfort, getting better and hope [5]. Another study determined that ICU patients remembered pleasant memories in addition to unpleasant ones [13].

ICU patients mostly recollected frightening experiences [22]. CS patients defined several painful experiences in the ICU, including chest tubes, endotracheal suctioning, being on a bed with an air pattern, and wound dressing changes [4]. Other studies revealed that CS patients felt restless and painful during their ICU stay [24]. Patients indicated that they emotionally drove similarity between staying in the ICU and being dead [25], and a lack of social support was comparable to death [12].

Patients' satisfaction with care was related to various factors. The quality and presence of the nursing personnel was important for patients in the ICU following cardiovascular surgery [15]. Supported by this result, CS patients receiving vigilant and individualized care felt secure in the ICU [20]. The nurses supported their patients by performing preoperative visits, providing continuous and repeated explanations to patients, encouraging family visits, and providing sufficient sleep and pain control. Across these situations, patients remembered that they had felt safe in the ICU [17]. Positive ICU environments positively affected patient recovery [26]. However, increased periods of mechanical ventilation were associated with reduced satisfaction with care [18]. Care in the ICU was perceived as a stressor by the patients [13].

The following items are four essential factors on ICU environment, which frequently affect patients' experience of stay. The factors are (a) the smell factor, which includes eliminating smells and regulating fragrances; (b) the voice factor, which includes pleasant sounds and removing excessive noise; (c) the light factor, which concerns natural lighting; and (d) natural environments and recovery space, where the individuals can feel comfortable [27]. Removing barriers to healing and increasing a patient's feeling of safety are necessary to support patient recovery [1]. Cardiac transplant patients did not recognize their ICU environment [7]. Patients stated that they felt environmental distress while in the ICU [13]. Some ICUs do not have natural light [28]. Additionally, the use of aromatherapy results in improvements in the mood and anxiety levels of ICU patients [29].

Some sociodemographic factors can have an impact on the experiences of patients. It was reported that age and marital status affected patient's ICU experiences positively or negatively [10,19]. Some researchers did not find any associations among these factors [19,22,30].

The ICU contains various biotechnological devices. In this physically complicated setting, the nurses have a key responsibility in the decision-making process with other healthcare team members. The scarcity of research on the ICU experiences of CS patients, not using any standardized tool to measure the ICU experiences of CS patients, unavailability of studies aiming at determining associations between related factors and ICU experiences of CS patients due to different study designs implied a need on further research. Determining patient experiences will provide specific data to healthcare teams to make appropriate arrangements in the ICU environment and make successful decisions to support the patients' recovery process.

The aims of this research were (a) to determine the ICU experiences of cardiovascular surgery patients at least 24 hours after discharge from the ICU, and (b) to define the associations between the patients' ICU experiences and their sociodemographic and clinical characteristics, as well as the smell and light factors in the ICU environment.

**Methods**

**Study design**

Descriptive design was used in the study.

**Setting and sample**

This study included 106 adult CS patients who had been discharged at least 24 hours or more (24–48 hours) from a CS ICU in an education and research hospital in Ankara, Turkey between January and July 2012. The patients were conscious, orally communicable and volunteered to participate in the study. The sample size was determined with regard to the number of items in the Intensive Care Experiences Scale (ICES). The scale is composed of 19 items, with 5-point Likert scales for each item. In accordance with Gorsuch, the subject-to-item ratio of 5:1 was adopted as acceptable [31]. The sample size was determined to be 95 patients.

**Ethical consideration**

Written permission was obtained from the authors, who adapted the Turkish Version of the ICES. Ethical approval, which agreed with the principles in the Declaration of Helsinki [32], was obtained from the local university ethical council prior to the study. The patients gave their written informed consent to participate in this study.

**Measurements/instruments**

**Sociodemographic and clinical characteristics form**

This form included 11 variables (sociodemographic and clinical characteristics of patients, pain levels of patients). Additionally, two open-ended questions on smell and light were prepared. Items regarding smell and light were not available in the ICES.

**Visual Analog Scale**

The Visual Analog Scale (VAS), first developed in 1921 by Hayes and Patterson [33], is commonly used to measure clinical phenomena, including pain and comfort. The VAS is a method for converting certain qualitative measures to quantitative measures. It is easy to use and requires very little written language [34]. On the two ends of a 10 cm (100 mm) line, extreme definitions of a parameter are written, and the patient is asked to indicate his or her current status. For instance, in dealing with pain, one end of the line is “no pain”, and the other end is “severe pain” and the patient indicates his or her current level of pain on the scale. The distance from “no pain” to the patient’s mark quantitatively represents the patient’s pain level [35].

**ICES**

The ICES was developed by Rattray, Johnson, and Wildsmith [36] and adapted to Turkish by Demir, Korhan, Eşer, and Khorsheid [37]. The ICES consists of 19 questions using a 5-point Likert scale for the responses; patients were required to select only one response per item. The Cronbach α coefficient was .79 in Turkish ICU patients demonstrating the established internal consistency of the instrument [37]. The Cronbach α was found as .73 in our study. Four subscales of the ICES are Awareness of Surroundings, Recalling of Experiences, Frightening Experiences and Satisfaction with Care. The Awareness of Surroundings subscale scores ranged from 5 to 25; high scores indicate a high environmental awareness. The
Recalling of Experiences subscale scores ranged from 4 to 20, where high scores indicate a good recall of experiences. The Frightening Experiences subscale scores ranged from 6 to 30; high scores indicate many frightening experiences in the ICU. The Satisfaction With Care subscale scores ranged from 4 to 20; high scores indicate a high level of satisfaction with care [38].

**Data collection/procedure**

The ICES, a data form requesting information about the patients’ sociodemographic (age, gender, education, marital status) and clinical characteristics, and two open-ended questions were used to collect the data. Having any visitors, witnessing of death of another patient during their ICU stay were also inquired. The researcher conducted 22-minute face-to-face patient interviews. Clinical characteristics were taken from the patient’s records. Patient pain levels were measured using the VAS during their stay in the ICU, and mean pain scores were calculated. Pain scores between 1 and 5 points were defined as “mild–moderate pain”. Pain scores more than 5 points were defined as “severe pain”. The level of consciousness (by Glasgow Coma Scale) was obtained from patient records before data collection. The following open-ended questions were used: (a) Did you sense any smell in the ICU? If yes, was it a bad or nice smell? (b) Were you annoyed with the lighting in the ICU? If yes, was it excessive or mild?

**Data analysis**

Data were analyzed using Statistical Package for the Social Sciences (SPSS) for Windows 15.0 software (SPSS Inc., Chicago, IL, USA). Descriptive statistics (frequencies, percentages, mean and standard deviations), student’s t tests and Mann-Whitney U tests were used for the two independent groups.

Answers to the open-ended questions regarding smell and light were shown by frequencies and percentages. These answers were compared with subscale scores and total ICES scores. Mann-Whitney U test was used for the analysis. The results were evaluated at \( p \leq .05 \) and at 95% confidence interval.

**Results**

The mean duration of stay in the ICU was 2.23 ± 2.89 days (range: 1.00–24.83 days). The sample characteristics indicated that most of the patients were younger than 65 years (63.2%), male (71.7%), and married (84.0%); 54.7% had a primary education level; 67.9% had another chronic illness; and 57.5% had previous ICU experiences. Additionally, most of them were mechanically ventilated (98.1%); the mean duration of mechanical ventilation was 7.86 ± 4.16 hours (range: 2.00–26.00 hours). A majority of the patients (61.3%) had no visitors in the ICU, and a minority of the patients witnessed the death of another patient during their ICU stay (12.3%). The mean pain score in the ICU was 5.18 based on the data collected from theVAS. According to the Glasgow Coma Scale, the level of consciousness reached 15. All patients who sensed smell in the ICU defined it as a bad smell, whereas all of the patients who were disturbed by the light thought it was at an excessive level (Table 1).

The mean ICES score was 64.15 ± 6.56. Subscale scores were as follows: (a) Awareness of Surroundings was 19.97 ± 2.62 (range: 13.00–25.00); (b) Recalling Experiences was 13.34 ± 3.37 (range: 6.00–20.00); (c) Frightening Experiences was 15.11 ± 5.31 (range: 6.00–27.00); and (d) Satisfaction with Care was 15.71 ± 2.73 (range: 10.00–20.00), as shown in Table 2.

Patients in the 65 years and older group less frequently recalled their ICU experiences than the younger group did (\( t = 2.16, p = .033 \)) and more frequently remembered their frightening experiences than the younger group did (\( t = 2.22, p = .028 \)). Patients with a primary education level remembered more frightening experiences than the high school graduates did (\( t = 2.78, p = .006 \)). Married patients had higher total ICES scores (\( z = 2.47, p = .013 \)) and higher Satisfaction with Care subscale scores than single patients did (\( z = 2.88, p = .004 \)). Patients who sensed smell had higher scores of frightening experiences than those who did not (\( z = 2.94, p = .030 \)). Patients who were annoyed by the excessive light expressed lower satisfaction with care than those who were not (\( t = 2.71, p = .007 \)). Patients suffering from mild–moderate pain were more satisfied with their care than patients suffering from severe pain (\( t = 2.14, p = .035 \)) (Table 3).

**Discussion**

Patients were moderately aware of their intensive care environment. Although 98.1% of the patients had been mechanically

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%)</th>
<th>M ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td></td>
<td>59.73 ± 13.20</td>
</tr>
<tr>
<td>&lt; 65</td>
<td>67 (63.2)</td>
<td></td>
</tr>
<tr>
<td>≥ 65</td>
<td>39 (36.8)</td>
<td></td>
</tr>
<tr>
<td>Duration of stay in ICU (days)</td>
<td>2.23 ± 2.89</td>
<td></td>
</tr>
<tr>
<td>Duration of mechanical ventilation (hours)</td>
<td>7.86 ± 4.16</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>30 (28.3)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>76 (71.7)</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>89 (84.0)</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>17 (16.0)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>58 (54.7)</td>
<td></td>
</tr>
<tr>
<td>High school and higher</td>
<td>48 (45.3)</td>
<td></td>
</tr>
<tr>
<td>Another chronic disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>72 (67.9)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>34 (32.1)</td>
<td></td>
</tr>
<tr>
<td>Any experience before this admission</td>
<td>61 (57.5)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45 (42.5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>104 (98.1)</td>
<td></td>
</tr>
<tr>
<td>Mechanical ventilation in ICU</td>
<td>2 (1.9)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>29 (27.3)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>77 (72.6)</td>
<td></td>
</tr>
<tr>
<td>Excessive light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21 (19.8)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>85 (80.2)</td>
<td></td>
</tr>
<tr>
<td>Comorbidities</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>72 (67.9)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>34 (32.1)</td>
<td></td>
</tr>
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<td>Any visitors</td>
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<tr>
<td>Yes</td>
<td>41 (38.7)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>65 (61.3)</td>
<td></td>
</tr>
<tr>
<td>Being witness to any death in ICU</td>
<td>13 (12.3)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>93 (87.7)</td>
<td></td>
</tr>
</tbody>
</table>

Note. ICU — intensive care unit.

**Table 1 Sociodemographic and Clinical Characteristics of Study Participants (N = 106).**

<table>
<thead>
<tr>
<th>Subscales of ICES</th>
<th>M ± SD</th>
<th>Min–Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness of Surroundings</td>
<td>19.97 ± 2.62</td>
<td>13–25</td>
</tr>
<tr>
<td>Recall of Experience</td>
<td>13.34 ± 3.37</td>
<td>6–20</td>
</tr>
<tr>
<td>Frightening Experience</td>
<td>15.11 ± 5.31</td>
<td>6–27</td>
</tr>
<tr>
<td>Satisfaction With Care</td>
<td>15.71 ± 2.73</td>
<td>10–20</td>
</tr>
</tbody>
</table>

Note. ICES — Intensive Care Experiences Scale.

Experiences in Cardiovascular Surgery Patients (N = 106).

ventilated, the duration of mechanical ventilation was short (7.86 ± 4.16 hours); this situation can positively affect the patient’s status of being environmentally aware. Mechanically ventilated patients remembered that they had been in an unusual environment [9]. One study conducted in Turkey found that ICU patients were aware of their surroundings [22]. Different from our results, cardiovascular surgery patients reported that they were not familiar with the medical environment and politics after their release from the ICU. Furthermore, they experienced mental and physical uneasiness because of the examinations in the ICU and their changeable health status [7].

Patients partly remembered intensive care experiences. This finding is consistent with the results of studies regarding the ICU experiences of cardiovascular surgery patients [4–6] and patient experiences in various ICUs [10,11,13,39]. As examined from a qualitative perspective, patients after cardiovascular surgery recalled their confusion in the ICU. They also experienced anxiety at the point between their awareness and unawaresness status in the ICU [15].

Patients who were 65 years and older less frequently recollected their ICU experiences than younger patients did. This result can be attributed to the slower cognitive functions of elderly patients that are associated with the aging process. Unlike our results, two studies showed that ICU experiences did not differ between age groups [22,30]. These findings can result from different sample sizes and heterogeneous samples from different ICUs (surgery, gynaecology-obstetrics, cardiovascular surgery, cardiology, internal medicine and neurology) in their studies.

CS patients highly recalled frightening experiences in the ICU. This finding was consistent with the results of studies related to the ICU experiences of cardiovascular surgery patients [4,6,20,21]. Patients reported unreal ICU experiences and delusional memories regarding other ICUs [10]. In one Jordanian study, female patients had difficulty interpreting their experiences due to the sudden beginning of their disorder, the unusual ICU environment and a feeling of uncertainty during their suffering process in the ICU [12]. ICU patients experienced mostly pain and sleep disorders [17,40,41], and patients associated staying in the ICU with death [25].

Patients who were 65 years and older recollected their frightening experiences more than younger patients did; this can be explained by increased number of health problems associated with the aging process and the fact that elderly people may be exposed to various medical procedures. Unlike our results, one study determined that young patients (< 50 years) more frequently had more delusional experiences than older patients did [10]. In our sample, patients were classified as two groups: “younger than 65 years” and “65 years and older”. In yet another study, there was no statistically significant difference among the age groups regarding frightening experiences [30].

Patients with a primary education level remembered more frightening experiences than patients with other education levels did. This result can be attributed to the fact that patients with a primary education level could have inaccurate information about their environment and have difficulty in gaining or understanding information in the written education materials provided to them. Different from our results, other studies reported that patients’ experiences did not significantly differ with their education levels [19,22].

The patient satisfaction with care level was good. Similar to our results, some studies have indicated that ICU patients felt secure [15,20]. According to the reports of ICU patients, support and care practices were the main theme and most important things in the ICU [40]. In an intervention study, a positive effect was noted in patients who were treated in a positive environment that contained encouraging values and feelings of motivation and trust, where patients received additional care and participated in desired care.
activities [26]. Based on this perspective, one study found that patients' suggestions to relieve suffering in the ICU were communication, participation in care activities and companionship [8]. ICU patients expressed the “need for the presence of the nurse” [42]. The satisfaction with care of the ICU patients was in the middle level [22]. Inconsistent with our results, studies have shown that ICU patients stated that the nurses had not listened, had not understood and had not talked with the patients and instead focused on practical activities [25].

Patients with a mild—moderate pain level were more satisfied with their care than those who suffered from severe pain. This situation can be explained by the possibility of ineffective pain management due to the complicated nature of pain. CS ICU patients had various levels of pain [4,6,24]. One study reported that satisfaction with care did not differ depending on the patients' pain status in the ICU [30].

Married patients were more satisfied with the care than single individuals were. Single patients may have felt lonelier and could have had higher expectations of the care they would receive. There are contradictory results in the scientific literature; for example, one study stated that married ICU patients had more negative experiences [19], whereas another study showed ICU experiences did not differ with marital status [22]. These findings can result from different sample sizes.

Most of the patients had previous intensive care experiences, had a moderate pain level, stayed in the ICU for a relatively short period of time and were mechanically ventilated for a short time.

Patients who sensed smell in the ICU had more frightening experiences than those who did not. All patients who sensed smell in the ICU defined it as a bad smell. This finding can be explained by the fact that the patients perceive smell as a powerful environmental component. Removing unpleasant smells is one of the important issues when designing hospital care environments [27]. Using aromatherapy was emphasized as a strategy to improve smell-related conditions [43].

The satisfaction with care of patients who were annoyed by the light was low. All of the patients who were disturbed by the light could have bothered the patients' eyes, resulting in the patients being unable to clearly see care activities. Natural light is considered essential for ICUs [27]. One study reported that nurses thought that only 66.0% of the ICUs had natural light, which can affect the resting status of patients [28]. Eye masks were useful to improve the sleeping patterns of the ICU patients [41].

In summary, CS patients were moderately aware of their intensive care environment and partly remembered their intensive care experiences. Patients could easily recall frightening experiences. Patients' intensive care experiences significantly differed by age, education level, marital status, and pain level. Smell and light factors also influenced the ICU experiences of CS patients.

In this study, the ICU experiences of CS patients were measured using a standardized tool. Because patients were interviewed between 24 and 48 hours after discharge from CS ICU, there may be some probability of patients’ forgetfulness regarding their experiences. As the study was quantitative, different themes were not qualitatively explored. The study was conducted in only one hospital to eliminate the effects of different cardiovascular surgery ICU characteristics.

Conclusion

Contrary to expectations, this study implied that the intensive care experiences of cardiovascular surgery patients were not completely negative. However, various aspects of the care process need improvement. Individualized care for all cardiovascular surgery ICU patients should be tailored to the patients' sociodemographic and clinical characteristics, such as age, education level, marital status and pain level. Necessary measures should be taken to accommodate patients with a primary school education level, patients who are 65 years old or older, and patients who are single, as they expressed negative experiences in certain areas. In this context, CS nurses can provide preoperative face-to-face education to ensure that the patients understand the procedures and cardiovascular CS ICU environmental factors. Additionally, effective communication techniques should be used during nursing care.

CS ICU architecture factors are important for promoting patient recovery. Adequate natural sunlight and pleasant smells can be used in the intensive care environment. CS nurses can assume a key role in selecting and using these modalities based on evidence-based guidelines. For example, bad smells can be removed from ICU by special systems. Nurses can inquire patient’s smell preference before their ICU stay in the context of nursing health history. Nurses can also direct the healthcare team in the decision-making process.

Further research can focus on measuring intervention effects aimed at improving patient satisfaction with care in CS ICUs. The results from studies using standardized tools and exploring various environmental factors, such as color and music, will provide valuable information to the cardiovascular healthcare team.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

This study was presented as a poster presentation at 26th Annual Congress of the European Society of Intensive Care Medicine on October 5–9, 2013 in Paris, France.

References


37. Terzi B. Reanimasyon ünitesinden taburcu olan bireylerin yoğun bakım deneyimleri [The Intensive Care Experiences of Individuals Discharged from Intensive Care Unit] [master’s thesis]. İstanbul (Turkey): Istanbul University Medical Science Institute; 2009. Turkish.


