State and Trait Anxiety in Patients Undergoing Coronary Angiography

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Abstract

**Background and Objectives**: Studies have shown that patients awaiting coronary angiography (CA) are often anxious. High level of anxiety can lead to physical and psychological stress with adverse effects on organs, especially heart. There is limited information on state and trait anxiety level in these patients in the literature. This study was thus designed to investigate the level of these two types of anxiety in patients undergoing CA.

**Methods**: A cross-sectional study was conducted by enrolling 50 patients. A demographic questionnaire and Spielberger State and Trait Anxiety Inventory were used for data collection. T test was used to compare the anxiety level between gender and age groups.

**Findings**: The baseline state and trait anxiety mean levels in the CA patients were low (34.36 ± 5.56, 35.98 ± 7.49, respectively). The highest level of both state and trait anxieties was observed 30 minutes before CA (41.44 ± 8.45 and 37.84 ± 6.88, respectively), and it was significantly higher than the corresponding value at baseline state as well as the anxiety after CA (P<.05). Female patients were significantly more anxious than male patients both before and after CA (P<.05).

**Conclusions**: The state and trait anxiety of CA patients reaches to a relatively high level immediately before angiography. Given the adverse effects of anxiety on the patients' health, it is crucial to take measures to get the patients relaxed before CA. Evidence-based designing of nursing interventions, training the nurses on this issue, and providing patients with information on the nature of the CA practice may be effective. Females should be more focused in the relevant interventions.

**Keywords**: Coronary angiography, Patient care, State anxiety, Trait anxiety, Adverse effect

**Background and Objectives**

The prevalence of coronary artery diseases has increased recently as a result of population aging and changes in the lifestyle.1 Cardiovascular diseases (CVDs), especially coronary artery diseases, are a major cause of death and hospitalization.2,3 According to the World Health Organization (WHO), about 18 million deaths have occurred due to CVDs in 2008; this rate is estimated to reach 23 million by the year 2030.4 Coronary angiography (CA) is the method of choice for diagnosis of coronary artery disease and identification of the appropriate treatment strategy.5 Annually, more than one million cardiac catheterization and angiography is performed in the United States.6 A comprehensive statistics on the number of cardiac catheterization is not available from Iran. However, one study has estimated that a total of 260,514 CA (347 per 100,000 individuals) has been performed in Iran in 2011, and this procedure has been cited as the fourth most common invasive treatment in this country.7 Like other invasive procedures, CA can be stressful for patients.1,5,8 A study on the anxiety level of patients before angiography showed that more than 82% of patients undergoing angiography experience preoperative fear and anxiety.9 Increased anxiety can lead to physical and psychological stress with adverse effects on organs, especially heart.8,10,11 Following increased anxiety, blood pressure as well as heart and breathing rates increase. These effects may negatively influence the
patients’ cardiovascular system. Augmented heart rate and blood pressure may also result in increased endothelial injury and platelet aggregation through increased sympathetic nervous system activity. Increased heart rate, blood pressure, endothelial injury and platelet aggregation also carry the risk of ischemia during cardiac catheterization. High anxiety may also lead to long hospitalization, postoperative complications, cardiovascular reactivity, and trait anxiety between the males and females and also the age groups. $P < .05$ was considered as significance in all tests. Data analysis was performed by SPSS version 16 software package.

Results

In total, 60% of the patients were male, 70% had 50-70 years of age, and all were married. The mean score of baseline state anxiety in the patients was low (34.36 ± 5.56). Two hours before CA, the anxiety score mean increased to the level of 38.14 ± 7.36, and 1.5 hours before CA, it reached to the level of 40.38 ± 8.16. The increasing trend of anxiety level continued to 41.44 ± 8.45, at 30 minutes before CA, which is significantly higher than the baseline value ($P < .05$). Thirty minute after CA, the mean state anxiety of the patients significantly decreased to 33.24 ± 3.49 ($P < .05$).

The mean score of baseline trait anxiety in the patients was low (35.98 ± 7.49). Two hours before CA, the anxiety score mean was at the level of 36.46 ± 7.24, and reached to the level of 37.30 ± 7.18 at 1.5 hours before CA. The increasing trend of anxiety level continued to 37.84 ± 6.88 at 30 minutes before CA, which is significantly higher than the baseline value ($P < .05$). Thirty minutes after CA, the mean trait anxiety significantly decreased to 36.70 ± 6.32 ($P < .05$).

The test identified a significant difference in both state and trait anxiety comparison.
and trait anxieties between the male and female patients ($P < .05$) (Tables 1 and 2). No significant difference in anxiety level was found between the age groups (Tables 3 and 4).

**Discussion**

Our results showed that the state and trait anxieties of the patients follow an increasing trend as it becomes more and more close to the time of angiography. The highest level of state and trait anxieties was observed immediately before angiography. On the other hand, the patients’ anxiety returned nearly to the baseline after angiography.

The anxiety of patients before invasive procedures such as CA and per-cutaneous coronary interventions (PCI) has been explored by several studies.\(^5,8,10,20\) Gallagher et al\(^20\) and Uzun et al\(^5\) reported moderate level of anxiety in the patients waiting for CA and PCI. In another study, Bally et al reported a relatively high level of anxiety (40.7) before CA, where it relaxed (to 33.6) after CA.\(^5\)

While the baseline state anxiety was found to be lower than the trait anxiety in our survey, it elevated very faster that the latter. This indicates the higher priority of the state anxiety to be controlled using nursing interventions.\(^5\)

The literature points towards patients’ lack of knowledge of the medical practice and unfamiliarity with the hospitalization environment as the main reasons for their anxiety.\(^5,8,10,20\) In particular, most of patients waiting for angiography reportedly lack adequate information about this medical procedure, making them anxious.\(^9,23\) Fear, anxiety and other unpleasant emotional experiences are common before other cardiovascular interventions as well.\(^24\)

According to Harkness et al, providing patients with information regarding the nature of CA a few days before the practice may significantly reduce the state anxiety.\(^5,25\) Consistently, Jawaid et al,\(^12\) found that providing correct information to the patients undergoing surgery and answering their questions may effectively reduce their anxiety level. In their survey, most patients stated that if the surgery procedure was explained to them in detail, their anxiety would reduce. They also showed that patients who have previous experience of invasive procedures experience less anxiety, confirming the relevance of previous familiarity of patients with the medical practices to their anxiety.

### Table 1. Comparison of State Anxiety Between Male and Female Patients

<table>
<thead>
<tr>
<th>Time of Assessment</th>
<th>Males Mean</th>
<th>Males SD</th>
<th>Females Mean</th>
<th>Females SD</th>
<th>df</th>
<th>t</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>One day before CA</td>
<td>33.10</td>
<td>5.42</td>
<td>36.25</td>
<td>5.35</td>
<td>2</td>
<td>-2.02</td>
<td>.049</td>
</tr>
<tr>
<td>2 hours before CA</td>
<td>36.20</td>
<td>6.36</td>
<td>41.05</td>
<td>7.95</td>
<td>2</td>
<td>-2.28</td>
<td>.029</td>
</tr>
<tr>
<td>1.5 hours before CA</td>
<td>38.20</td>
<td>6.82</td>
<td>43.65</td>
<td>9.06</td>
<td>2</td>
<td>-2.29</td>
<td>.029</td>
</tr>
<tr>
<td>30 minutes before CA</td>
<td>39.08</td>
<td>7.27</td>
<td>45.00</td>
<td>9.01</td>
<td>2</td>
<td>-2.45</td>
<td>.019</td>
</tr>
<tr>
<td>30 minutes after CA</td>
<td>31.97</td>
<td>3.10</td>
<td>35.15</td>
<td>3.21</td>
<td>2</td>
<td>-3.50</td>
<td>.001</td>
</tr>
</tbody>
</table>

### Table 2. Comparison of Trait Anxiety Between Male and Female Patients

<table>
<thead>
<tr>
<th>Time of Assessment</th>
<th>Males Mean</th>
<th>Males SD</th>
<th>Females Mean</th>
<th>Females SD</th>
<th>df</th>
<th>t</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>One day before CA</td>
<td>32.97</td>
<td>5.86</td>
<td>40.50</td>
<td>7.50</td>
<td>2</td>
<td>-3.97</td>
<td>.0002</td>
</tr>
<tr>
<td>2 hours before CA</td>
<td>33.77</td>
<td>5.58</td>
<td>40.50</td>
<td>7.67</td>
<td>2</td>
<td>-3.37</td>
<td>.002</td>
</tr>
<tr>
<td>1.5 hours before CA</td>
<td>34.47</td>
<td>5.48</td>
<td>41.55</td>
<td>7.45</td>
<td>2</td>
<td>-3.64</td>
<td>.001</td>
</tr>
<tr>
<td>30 minutes before CA</td>
<td>35.57</td>
<td>5.45</td>
<td>41.25</td>
<td>7.51</td>
<td>2</td>
<td>-2.91</td>
<td>.006</td>
</tr>
<tr>
<td>30 minutes after CA</td>
<td>34.57</td>
<td>5.23</td>
<td>39.90</td>
<td>6.58</td>
<td>2</td>
<td>-3.18</td>
<td>.003</td>
</tr>
</tbody>
</table>
other studies have also shown that informing the patients can positively affect behaviors, attitudes and skills, maintain and promote health, and reduce anxiety in the patients. 

In our study, female patients showed higher level of state and trait anxiety compared with male patients. This finding is consistent with the results from several other studies. For instance, Vural et al reported higher level of anxiety in women with coronary artery disease compared with men suffering from the same disease, before the diagnosis procedure. Also Yeganehkhah et al found a higher level of anxiety in females compared with males among the hospitalized patients with myocardial infarction.

It maybe speculated that the higher level of anxiety in female patients may stem from the fact that women experience coronary artery disease at an older age as compared with male patients, and experience more severe limitations after that; thus they have lower resistance against stressors. Nevertheless our and previous studies did not identify any significant difference in the anxiety level of different age groups.

**Study Limitations**

One of the limitations of this study was that the measurement of anxiety relied solely upon the patients’ self-reports. Self-report methodology has several drawbacks. Also, the small sample and the used sample technique pose limits to generalizing the results. A comprehensive conclusion on the anxiety of patients undergoing CA may be resulted from future large-scale studies.

**Conclusions**

Our study surveyed the level of state and trait anxiety in patients undergoing CA. The results showed that both types of anxiety increases before CA, and their highest level appears immediately before this diagnosis practice. Considering the negative impact of anxiety on the well-being of cardiovascular patients and the subsequent medical outcomes, measures should be taken to alleviate anxiety in these patients. Evidence-based design of nursing interventions, training the nurses on...
this issue, provision of structured care, and provision of patients with information on the nature of the diagnostic practice before CA may be effective. Based on our findings, females should be more focused in the relevant interventions.

Abbreviations
(CA): Coronary angiography; (PCI): Per-cutaneous coronary interventions

Competing Interests
The authors declare no competing interests.

Authors’ Contributions
TM and MAH jointly conceived and designed the study. TM performed the sampling, data collection, data analysis and prepared the draft manuscript. TM and MAH made critical revisions to the manuscript. Both authors read and approved the final manuscript.

Acknowledgments
The researchers would like to express their gratitude to the directors and personnel of the Angiography Unit of Shahid Beheshti Hospital of Kashan University of Medical Sciences. The authors are also thankful to all patients and their relatives who participated in this study. This study was granted by the Research Deputy in Kashan University of Medical Sciences (grant No. 9223).

References

Please cite this article as: