

## **Effect of Age Transition on Preoperative Anxiety among Women Undergoing Cardiac Surgery in Pakistan**

**\*Sadaf Javed, Saman Waqar, PhD, Yusra Fatima Kiyani, Najam Us Sabah, Siddiqa Batool and Suzzana Akbar Khan**

Al-Shifa School of Public Health, Rawalpindi, Pakistan

The aim of the study was to determine change in preoperative anxiety level, if any, among females of different age groups and compare baseline anxiety levels with preoperative anxiety. This cross-sectional study was conducted at different cardiac centers in two urban localities of Pakistan. A total of 383 female patients were included in this study through non-probability consecutive sampling. Patients were divided into three age groups; <40 years, 40-51 years and >51 years. Anxiety levels were assessed using State-Trait Anxiety Inventory (STAI). For descriptive analysis, mean, and standard deviation were used for quantitative variables while for categorical variables, frequency and percentage were used. For analytical part, One-Way ANOVA and Pearson Correlation were used. It was noted that majority of the study population belonged to <40 years' age group. On STAI scale ranging from 20-80, mean preoperative anxiety levels were  $47.30 \pm 10.74$  as compared to baseline anxiety levels which were  $43.16 \pm 10.51$ . Moreover, females less than 40 years of age reported highest levels of baseline anxiety as well as preoperative anxiety; also, a six-fold increase in anxiety levels was observed before surgery ( $p < 0.05$ ). It was observed that baseline anxiety was positively correlated with preoperative anxiety. Younger females are more prone to develop higher levels of preoperative anxiety and baseline anxiety has a direct influence upon preoperative anxiety levels.

**Keywords.** Cardiac surgery, Preoperative anxiety, State-Trait Anxiety Inventory

Epidemiologic transition has put the non-communicable diseases as a major source of morbidity and mortality worldwide. Of these non-communicable diseases, cardiac disorders are contributing a major role in the overall burden of disease. According to American Heart Association (AHA), nearly 18.6 million people died of cardiovascular disease (CVD) in 2019 (Virani, 2021). In developing countries, CVDs are a major threat to health of the population due to changing lifestyle patterns. The prevalence of CVD in Punjab, Pakistan was reported to as 17.5% with female population at more risk of these disorders (Zubair et al., 2018).

Surgical procedures are used to correct various cardiovascular anomalies when pharmacologic interventions have little or no effect. These procedures are always a source of distress and anxiety for the patients as well as their caretakers. This is a natural response and may vary from person to person. Preoperative anxiety is a feeling of apprehension and uneasiness that is mostly caused by some present condition or due to some expected future risk (Xie et al., 2019). Abate et al. (2020) reported that anxiety before a surgical procedure is mainly due to the factors that are mostly unknown by the patients. However, they are sufficient to cause various hemodynamic changes in body of the patient and can cause delay of a planned surgical procedure as well as delay the process of postoperative recovery (Abate et al., 2020). Menkovic et al. (2018) found that preoperative anxiety can differ with respect to

---

\* Correspondence concerning this article should be addressed Ms Sadaf Javed, Al-Shifa School of Public Health, Rawalpindi, Pakistan Email: [sadafjaved365@gmail.com](mailto:sadafjaved365@gmail.com)

different surgical procedures. It was reported that patients undergoing obstetric procedure, esthetic surgery (Menkovic et al., 2018) and cardiac surgical procedure (Rosiek et al., 2016; Sigdel et al., 2020) are prone to develop higher levels of anxiety during preoperative period.

Females are more prone to develop higher levels of anxiety before a surgical procedure and many researchers from different regions of the world found that female gender is an independent predictor of developing preoperative anxiety (Sigdel et al., 2020; Kanwal et al., 2018; Barkhori et al., 2021). Hantsoo et al. (2017) in their study concluded that symptoms of anxiety among women can exacerbate during the period of hormonal fluctuations such as premenstrual phase, pregnancy, postpartum period and menopausal changes (Hantsoo et al., 2017). Yuzkat et al. (2017) in their study found that menstruation phases can alter the levels of anxiety among patients before a surgical procedure. They revealed that during luteal phase, females are more prone to develop preoperative anxiety. It is reported that during luteal phase, estrogen and progesterone levels decline that leads to change in emotional status of a female which is often accompanied by irritability, anger and mood disorders (Yuzkat et al., 2017). Likewise, during menopausal transition, sex hormones fluctuate unpredictably which can also impact the anxiety levels of the patients. It is reported that anxiety levels increase greatly during menopausal period and then decline gradually (Hantsoo et al., 2017). Moreover, baseline anxiety level was also compared to determine if it has any relation with the preoperative anxiety levels. The findings of the study will provide significant insights to devise effective tools to address preoperative anxiety among women.

## **Method**

### **Research Design**

A cross-sectional study was carried out at different cardiac centers in two urban localities of Pakistan to determine the changes of preoperative anxiety levels among women with respect to their age.

### **Participants**

A total of 383 female patients undergoing cardiac surgery were selected for this study through non-probability purposive sampling. Sample size was calculated using the prevalence of moderate to severe preoperative anxiety in Pakistan which was reported as 47%. OpenEpi Menu Software version 3.0 was used to calculate sample size with 95% confidence interval, 5% margin of error and 5% non-response rate. Female patients undergoing coronary artery bypass grafting (CABG), valvular surgeries and both CABG and valvular surgery were selected for the current study. All patients were above 18 years of age. Only those patients were included in the study whose surgery was scheduled. Pregnant females were excluded from the study. Patients who were diagnosed with some physical and psychiatric illness were also not included in the study. Furthermore, emergency cases and those with critical preoperative condition were also excluded from the study.

### **Measures**

The data was collected through structured interview format using following measure:

### ***State-Trait Anxiety Inventory (STAI)***

Anxiety assessment was carried out through State-Trait Anxiety Inventory (STAI) (Spielberger, 1983). It measured two dimensions of anxiety: baseline anxiety (trait anxiety) and anxiety on the day of surgery (state anxiety). It is a 4-point Likert scale ranging from 1= *not at all/ almost never* to 4 = *very much so/almost always* and consisted of total 40 items (20 in each sub-section). Data regarding general characteristics of the patients along with their brief medical history was also collected. Total score of the anxiety ranges from 20-80 for both state and trait anxiety. Score between 20-37 shows low or no anxiety, score between 38-44 shows moderate anxiety and 45-80 represents high anxiety levels.

### **Procedure**

Researchers carried out an interview of nearly 20 minutes to collect data from each patient on the day of surgery. All patients were explained the purpose of the study and written consent was obtained from all participants. Participants were ensured about the confidentiality of their data. All participants took part in the study voluntarily. Duration of study was five months from June 2022- October 2022. Statistical analysis was carried out using SPSS version 26.0.

### **Results**

Descriptive analysis was performed to determine frequencies and percentages of categorical variables while for continuous variables, mean and standard deviation were calculated. For determining the effect of age transition on the preoperative anxiety levels of women, One-way ANOVA was carried out. While Pearson Correlation Coefficient was determined to check the relation between baseline anxiety and state anxiety. *P* value below 0.05 was considered as significant.

**Table 1**

*Sociodemographic Variables and Medical History of Participants (N=383)*

| Variables                         | <i>f</i> (%) |
|-----------------------------------|--------------|
| Age                               |              |
| <40 years                         | 135 (35)     |
| 40-51 years                       | 116 (30)     |
| >51 years                         | 132 (34)     |
| Marital status                    |              |
| Unmarried                         | 54 (14)      |
| Married                           | 310 (81)     |
| Widowed                           | 19 (5)       |
| Education                         |              |
| Illiterate                        | 109 (29)     |
| Matric                            | 243 (63)     |
| Above Matric                      | 31 (8)       |
| Place of residence                |              |
| Urban                             | 91 (24)      |
| Rural                             | 291 (76)     |
| Family history of cardiac disease |              |

|                             |          |
|-----------------------------|----------|
| Yes                         | 235 (64) |
| No                          | 138 (36) |
| Type of surgery             |          |
| CABG                        | 152 (40) |
| Valvular                    | 184 (48) |
| CABG + Valvular             | 47 (12)  |
| Hypertension                |          |
| Yes                         | 128 (33) |
| No                          | 255 (67) |
| Diabetes                    |          |
| Yes                         | 77 (20)  |
| No                          | 306 (80) |
| Previous hospital admission |          |
| No                          | 146 (38) |
| 1-2 times                   | 117 (31) |
| 3-4 times                   | 67 (18)  |
| >4 times                    | 53 (13)  |

Note: CABG is Coronary Artery Bypass Grafting

A total of 383 female patients were included in the current study. In the present study, younger patients (<40 years) were slightly more ( $n=135$ , 35%) in number as compared to other age groups. Most of the respondents were married females ( $n=310$ , 81%) and belonged to rural areas ( $n=291$ , 76%). Twenty-nine percent of respondents were illiterate and only 8% ( $n= 31$ ) had above matric education. The majority of respondents were undergoing valvular surgeries ( $n=184$ , 48%). Thirty-eight percent of patients had no previous history of hospital admission and less than half of the respondents were hypertensive and diabetic ( $n=128$ , 33% and  $n=77$ , 20% respectively).

**Table 2**  
*Baseline anxiety and Preoperative anxiety levels (N=383)*

|                      | <i>M ±SD</i>  | <i>Min</i> | <i>Max</i> |
|----------------------|---------------|------------|------------|
| Baseline anxiety     | 43.16 ± 10.51 | 21         | 66         |
| Preoperative anxiety | 47.30 ± 10.74 | 29         | 66         |

Mean score of state anxiety was higher than that of trait anxiety revealing that preoperative anxiety was much higher one day before surgery than the normal baseline anxiety levels. Age of the patients was divided in to three categories: less than 40 years, 40-51 years and more than 51 years.

**Table 3***Trends of Baseline and Preoperative Anxiety among Different Age Groups*

| Age groups                  | <i>n</i> | M ±SD         | <i>F</i> ( <i>df</i> ) | <i>p</i> |
|-----------------------------|----------|---------------|------------------------|----------|
| <b>Baseline Anxiety</b>     |          |               |                        |          |
| <40 years                   | 135      | 45.00 ± 9.03  | 3.40 (382)             | 0.035*   |
| 40-51 years                 | 116      | 41.75 ± 8.47  |                        |          |
| >51 years                   | 132      | 42.52 ± 13.04 |                        |          |
| <b>Preoperative Anxiety</b> |          |               |                        |          |
| <40 years                   | 135      | 51.36 ± 9.54  | 16.65 (382)            | 0.0001** |
| 40-51 years                 | 116      | 44.39 ± 9.89  |                        |          |
| >51 years                   | 132      | 45.70 ± 11.40 |                        |          |

Note. N= 383, \*p <0.05, \*\*p <0.01

There is a significant difference in the baseline and preoperative anxiety based on different age group. It was found that baseline anxiety and preoperative anxiety on the day of procedure were higher among patients below 40 years of age followed by those above 51 years of age. Lowest levels of anxiety were reported by patients lying 40-51 years of age. All these values were statistically significant (p value<0.05).

**Table 4***Correlation between Baseline and Preoperative Anxiety (N=383)*

|                      | Baseline Anxiety |
|----------------------|------------------|
| Preoperative anxiety | 0.69**           |

Note. \*\*p <0.01

It was noted that baseline anxiety levels and preoperative anxiety were positively correlated with each other suggesting that patients with increased baseline anxiety were more likely to develop higher levels of preoperative anxiety.

### Discussion

Preoperative anxiety is a well-known phenomenon that is evoked by higher levels of stress before any surgical procedure. Different patients experience different levels of preoperative anxiety depending upon varying factors related to their disease and social context. Current study was carried out to determine the effect of age upon preoperative anxiety levels among female patients undergoing cardiac surgical procedure. It was found that anxiety levels rise significantly one day before surgery among females of all age groups. Results indicated that highest level of change in the anxiety level was reported by the females younger than 40 years and they showed a relatively higher level of anxiety one day before surgery as compared to baseline levels. Younger females also presented highest levels of baseline anxiety and preoperative anxiety levels. Our findings are consistent with literature already available in this regard. It could be seen in one of the previous studies that anxiety levels young females reported higher levels of anxiety as compared to older females (Avery et al., 2021). These females reported nearly six-fold increase in anxiety levels one day before surgery than their baseline anxiety levels.

Females are a heterogeneous group in relation to expression of their anxiety symptoms due to varying hormonal response during different phases of their lives. This could be attributed to their hormonal fluctuation to the procedural stress (Kocamanoglu et al., 2005). Changes in the levels of ovarian hormones and phase of monthly cycle among women in this age group play a great role in determining their anxiety levels (Yuzkat et al., 2019; Radovanovic et al., 2020). In countries like Pakistan, there are certain social factors that can aggravate the levels of preoperative anxiety among young female patients. Fear of nakedness (*bepardagi*) is the main concern that mainly heightens the anxiety levels among young females.

Present results showed that females of other two age groups showed low anxiety levels as compared to younger age group. However, there is a slight aberration in the anxiety trend as females of more than 51 years of age reported slightly higher anxiety symptoms as compared to females of middle age group (40-51 years). Older females reported nearly three times greater levels of preoperative anxiety as compared to their baseline anxiety levels. Different previously conducted studies supported this finding. A study carried out by Dotlic et al. reported that anxiety levels among women of older age experienced higher level of anxiety than mid age females (Bromberger et al., 2013). It is reported that during old age, women experience a decrease in levels of estrogen (Ozdemir et al., 2020), tryptophan and serotonin in the blood that ultimately leads to higher levels of anxiety and depression (Schwartz et al. 2012). As already stated, that certain social factors also contribute in the development of higher levels of anxiety among females. It was observed during current study that most of the women in older age group had many misconceptions regarding surgical procedure and separation from family was another reason which raised their anxiety levels.

In current study, it was found that women of 40-51 years of age reported lowest levels for both baseline and preoperative anxiety and their increase in anxiety level on the day of surgery as compared to baseline anxiety levels were similar to older women i.e. three times. It could be noted that females in this age group were mostly those who were probably passing through menopausal transition or perimenopause as average age of menopause of Pakistani females is reported to be 42-52 years (Shaheena et al., 2001). During this period, generally women face different psychological changes due to fluctuation in ovarian hormones. The level of estrogen starts decreasing which is often accompanied with mood irritability and depressive mood symptoms. However, these symptoms of menopause may differ from women to women (Uzun et al., 2022). Results of the current study revealed that baseline anxiety was positively and significantly related with preoperative anxiety levels among women of all ages. Previous studies also confirmed the current finding. A study conducted by Leal et al. found that trait anxiety positively correlates with state anxiety (Leal et al., 2017). Another study reported that females who have history of high anxiety levels tend to report more anxiety during any stressful situation (Hantsoo et al., 2017).

The current study has certain limitations despite the utmost efforts of the authors. Firstly, the study results were not supported with any hemodynamic finding. It is recommended for the future researchers to also investigate hemodynamic changes during preoperative period among women. Moreover, authors only investigate the effect of age transition on preoperative anxiety levels among women, so it is recommended to include data from both genders in future studies for a comparative analysis.

As there are no anxiety assessment tools during preoperative evaluation of patients which hinders the surgical team to identify the stress level of the patients preoperatively and address their concerns. So, it is highly recommended that health policy makers should incorporate anxiety assessment tools during preoperative evaluation of patients in all hospitals and made it necessary. Furthermore, health professionals and especially surgical team should be trained to effectively communicate the concerns of their patients. There should be proper trainings for effective doctor-patient communication during preoperative period especially. Moreover, hospitals should provide comfortable inpatient environment during preoperative stay. This has great impact on the anxiety levels of the patients. Attending medical staff should be considerate of the individual needs of the patients.

Females are the most vulnerable group for developing higher preoperative anxiety levels so they need more attention and care during this crucial period. Moreover, females of younger age and more than 51 years were reported more susceptible for preoperative anxiety levels, so greater attention should be provided to these age groups.

### Conclusion

Females are the most vulnerable group for developing high levels of anxiety during preoperative period. Hormonal fluctuations and social stressors can play an important role for the development of increased anxiety levels. High preoperative anxiety levels were reported by older women however, change in levels of anxiety at baseline and one day before surgery were more prominent among females below 40 years of age. Further research is needed to generalize the findings and identify the root causes of anxiety among females of different age groups.

### References

- Abate, S. M., Chekol, Y. A., & Basu, B. (2020). Global prevalence and determinants of preoperative anxiety among surgical patients: A systematic review and meta-analysis. *International Journal of Surgery Open*, 25, 6-16. <https://10.1016/j.ijso.2020.05.010>
- Avery, A., Tsang, S., Seto, E., & Duncan, G. (2021). Differences in stress and anxiety among women with and without children in the household during the early months of the COVID-19 pandemic. *Frontiers in Public Health*, 9. <https://doi.org/10.3389/fpubh.2021.688462>
- Barkhori, A., Pakmanesh, H., Sadeghifar, A., Hojati, A., Hashemian, M. (2021). Preoperative anxiety among Iranian adult patients undergoing elective surgeries in educational hospitals. *Journal of Education & Health Promotion*, 10(1),265-280. [https://doi.10.4103/jehp.jehp\\_81520](https://doi.10.4103/jehp.jehp_81520)
- Bromberger, J. T., Kravitz, H. M., Chang, Y., Randolph Jr, J. F., Avis, N. E., Gold, E. B., & Matthews, K. A. (2013). Does risk for anxiety increase during the menopausal transition? Study of Women's Health Across the Nation. *Menopause*, 20(5), 488-495. <https://10.1097/GME.0b013e3182730599>
- Dotlic, J., Radovanovic, S., Rancic, B., Milosevic, B., Nicevic, S., Kurtagic, I., & Gazibara, T. (2020). Mental health aspect of quality of life in the menopausal transition. *Journal of Psychosomatic Obstetrics & Gynaecology*, 42(1), 40-49. <http://10.1080/0167482X.2020.1734789>

- Dusica M. & Stamenkovic, N. K. (2018). Preoperative anxiety and implications for postoperative recovery: What can we do to change our history. *Minerva Anesthesiologic*, 84(11), 1307-1317. <https://10.23736/S0375-9393.18.12520-X>
- Hantsoo, L., & Epperson, C. (2017). Anxiety disorders among women: A female lifespan approach. *Focus*, 15(2), 162-172. <https://10.1176/appi.focus.20160042>
- Kanwal, A., Asghar, A., Ashraf, A., & Qadoos, A. (2018). Prevalence of preoperative anxiety and its causes among surgical patients presenting in Rawalpindi Medical University and allied hospitals, Rawalpindi. *Journal of Rawalpindi Medical College*, 22(S-2), 64-67. <https://doi.org/10.54393/pjhs.v3i04.113>
- Leal, P., Goes, T., da Silva, L., & Teixeira-Silva, F. (2017). Trait vs. state anxiety in different threatening situations. *Trends in Psychiatry and Psychotherapy*, 39(3), 147-157. <https://10.1590/2237-6089-2016-0044>
- Ozdemir, K., Sahin, S., Guler, D., Unsal, A., & Akdemir, N. (2020). Depression, anxiety, and fear of death in postmenopausal women. *Menopause*, 27(9), 1030-1036.
- Rosiek, A. T. K. K. (2016). Evaluation of stress intensity and anxiety level in the preoperative period of cardiac patients. *BioMed Research International*, 22(S-2), 64-67. <https://10.1155/2016/1248396>
- Schwartz, D., Romans, S., Meiyappan, S., De Souza, M., & Einstein, G. (2012). The role of ovarian steroid hormones in mood. *Hormones & Behavior*, 62(4), 448-454. <https://10.1016/j.yhbeh.2012.08.001>
- Sener, E., Kocamanoglu, S., Cetinkaya, M., Ustun, E., Bildik, E., & Tur, A. (2005). Effects of menstrual cycle on postoperative analgesic requirements, agitation, incidence of nausea and vomiting after gynecological laparoscopy. *Gynecologic & Obstetric Investigation*, 59(1), 49-53. <https://10.1159/000081222>
- Sigdel, S., Ozaki, A., Basnet, M., Kobashi, Y., Pradhan, B., Higuchi, A., & Uprety, A. (2020). Anxiety evaluation in Nepalese adult patients awaiting cardiac surgery: A prospective observational. *Medicine*, 99(9). [https://journals.lww.com/md-journal/fulltext/2020/02280/anxiety\\_evaluation\\_in\\_nepalese\\_adult\\_patients.48.aspx](https://journals.lww.com/md-journal/fulltext/2020/02280/anxiety_evaluation_in_nepalese_adult_patients.48.aspx)
- Spielberger, C. D., & G. R. (1983). *Manual for the State-Trait Anxiety Inventory*. Consulting Psychologists Press.
- Uzun, S., Ozcan, H., & Jones, D. (2022). The psychological dimension of menopause: A phenomenological study. *Current Psychology*, 42(10), 1-10. <https://10.1007/s12144-022-03306-5>
- Virani, S. S., & Alonso, A., Aparicio, H. J.... Tsao, C.W. (2021). Heart disease and stroke statistics—2021 update. *American Heart Association*, 143, e254–e743. <https://doi.org/10.1161/CIR.0000000000000950>
- Xie, W., & Karan, K (2019). Predicting Facebook addiction and state anxiety without Facebook by gender, trait anxiety, Facebook intensity, and different Facebook activities. *Journal of Behavioral Addictions*, 8(1), 79-87. <https://doi.org/10.1556/2006.8.2019.09>
- Yuzkat, N., Soyalt, C., Demir, C. Y., Kılıç, M., & Gulhas, N. (2019). Effects of menstrual cycle phases on preoperative anxiety: A randomized prospective observational trial. *The Annals of Clinical & Analytical Medicine*, 11(2), 99-103.
- Zohra, K., Shaheena, A., & Arif, T. (2001). Menopause and Pakistani women. *Annals of King Edward Medical University*, 7(4). <https://doi.org/10.21649/akemu.v7i4.1920>

## PREOPERATIVE ANXIETY

Zubair, F., Nawaz, S. K., Nawaz, A., Nangyal, H., Amjad, N., & Khan, M. S (2018).  
Prevalence of cardiovascular diseases in Punjab, Pakistan: A cross-sectional study.  
*Journal of Public Health*, 26(5), 523-529.  
<https://link.springer.com/article/10.1007/s10389-018-0898-4>