JCN Journal of Clinical Nursing

Journal of
Clinical Nursing

PREOPERATIVE ANXIETY

Predictors of preoperative anxiety in surgical inpatients

Meryem Yilmaz, Hafize Sezer, Hesna Gürler and Mine Bekar

Aims and objectives. The aims of the present study were to identify the levels of preoperative anxiety in patients undergoing elective surgery and the relationship between preoperative anxiety and social support. In addition, predictors of preoperative anxiety were studied in surgical inpatients.

Background. Major life changes are significant factors that cause anxiety; hospitalisation and surgery are among such changes. Social support may decrease the anxiety associated with surgery.

Design. This is a descriptive study that included 500 patients in a surgery clinic.

Methods. The data collected included: A Patient Information Form, Multidimensional Scale of Perceived Social Support and the Surgical Anxiety Scale. The results were analysed using the Chi-square test and logistic regression analysis.

Results. Five hundred patients participated in this research: 59·6% were female, 54·6% were 65 years of age or older, 80·6% were married, 70·4% were literate and 62% of the patients had moderate level surgery. There was a significant relationship between the sociodemographic patient features, the level of preoperative anxiety ($p < 0{\cdot}05$), the presence of social support and the severity of anxiety ($p = 0{\cdot}001$). The age and level of anxiety were not significant factors. The mean anxiety score for all patients was 31·91 (SD 6·30) and the mean social support score was 66·38 (SD 13·69).

Conclusion. The results of this study showed that the preoperative anxiety of patients awaiting surgery was associated with demographic characteristics as well as social support resources.

Relevance to clinical practice. Anxiety testing is feasible during the preoperative period. Such testing allows for the detection of patients with high anxiety, and for clinicians to take the appropriate steps to ameliorate this problem. Identification of patient anxiety allows for providing a focus on social support in an attempt to reduce the level of anxiety.

Key words: anxiety, nurses, nursing, preoperative period, social support, surgery, Turkey

Accepted for publication: 28 March 2011

Introduction

Surgery is a major trauma and is associated with significant patient anxiety (Munafò & Stevenson 2001). Preoperative anxiety is defined as an unpleasant state of uneasiness or tension secondary to disease, hospitalisation, the planned use of anaesthesia and surgery (Maranets & Kain 1999). Preoperative anxiety is not considered an unusual patient reaction (Pierantognetti *et al.* 2002). However, an elevated preoperative level of anxiety increases the risks associated with surgery, including the morbidity and mortality (Frazier *et al.* 2003); delay in wound healing (Christian *et al.* 2006, Vileikyte 2007), longer hospital stays (Stirling *et al.* 2007) as well as the need for more anaesthesia and (Maranets &

Authors: *Meryem Yilmaz*, PhD, RN, Assistant Professor, Department of Surgical Nursing, Faculty of Health Sciences, Cumhuriyet University; *Hafize Sezer*, PhD, Associate Professor of Biostatistics, Department of Biostatistics, Faculty of Medicine, Cumhuriyet University; *Hesna Gürler*, MSc, RN, Research Assistant, Department of Surgical Nursing, Faculty of Health Sciences, Cumhuriyet University; *Mine Bekar*, PhD, RN, Assistant Professor, Department of Women's Health Nursing, Faculty of Health Sciences, Cumhuriyet University, Sivas, Turkey

Correspondence: Meryem Yilmaz, Assistant Professor, Department of Surgical Nursing, Faculty of Health Sciences, Cumhuriyet University, 58140-Sivas, Turkey. Telephone: +90 346 2191010-2508.

E-mail: sonmezmm01@hotmail.com

Kain 1999) analgesics after surgery have been reported (Munafò & Stevenson 2001).

Norris and Baird (1967) reported a significantly higher frequency of preoperative anxiety among patients. Currently, although surgery and anaesthesia are safer than ever, preoperative anxiety remains a common finding (Nishimori *et al.* 2002). Preoperative anxiety has been reported to range from 11–80% in adult patients (Agarwal *et al.* 2005). In a study of patients scheduled for neurosurgery, the frequency of preoperative anxiety was 89% (Perks *et al.* 2009). Kalkhoran and Karimollahi (2007) showed that the majority (66·7%) of patients had moderate anxiety. Studies reported from Turkey have shown that surgical patients have moderate to severe anxiety (Aykent *et al.* 2007, Yardakçı & Akyolcu 2004, Karanci & Dirik 2003, Akkaş Gürsoy 2001). The most common causes of anxiety reported, in patients that undergo surgery, include the following: waiting for surgery; concern about the physical/mental harm and results of the operation (Perks *et al.* 2009); anticipation of the postoperative pain; separation from family members; concern about incapacitation; loss of independence and fear of the surgery itself as well as death (Caumo *et al.* 2001). Concern about family members has been reported in 89·6% of patients, fear of complications in 87·0%, fear of the results of the operation in 82·4%, postoperative pain in 78·8%, fear of physical disability in 75·1%, and concern about awareness during the surgery in 38·3% (Jawaid *et al.* 2007), as factors that trigger symptoms of perioperative anxiety.

Background

The patient response to surgery has been of interest to investigators for many years. Cuthbertson (1932) described in detail the metabolic responses of four patients with lower limb injury. After the early work on the stress response to accidental injury, attention was turned to surgical trauma and responses to most types of surgery were documented (Desborough 2000).

Surgical trauma is a known body stress; it causes relatively specific psychophysiological stress responses (Munafò & Stevenson 2001, Bally *et al.* 2003). The psychological theories of stress include the competing hypotheses for the predictive relationship between preoperative anxiety and postoperative adjustment and recovery (Wallace 1986). It has long been argued that surgery is a form of psychological stress and that the response to this stress should therefore be modifiable by psychological intervention (Salmon 1991).

Psychological stress responses occur when individuals are faced with stressful situations such as surgery. In response to such stress, physiological resources are mobilised to respond to the situation as a reaction or response to stress, which includes the central nervous system (CNS), endocrine system and immunological system (Ramos *et al.* 2008). Release of corticotropin (CRH) induces the pituitary gland to secrete adrenal corticotrophin hormone (ACTH) into the circulation under stressful conditions; this acts at the level of the cortical area of the adrenal glands, causing glucocorticoid secretion, which has immunosuppressant effects. Thus, the physiological response to stress depresses the immune system through hyperactivation of the hypothalamic-pituitary axis; this, in turn, increases the vulnerability to diseases and, consequently, increases the risk of post-surgical complications (Ramos *et al.* 2008). The psychological stress response may impact physiological processes and/or behavioural patterns that influence health outcomes. Ramos *et al.* (2008) showed that recovery is more difficult in patients with a higher anxiety level. Therefore, higher anxiety levels and the subsequent physiological alterations can markedly influence the surgical outcomes (Frazier *et al.* 2003).

Visual images can induce anxiety and alter regional cerebral blood flow in the areas of the brain associated with cognition; this can affect behavioural responses and produce increased vigilance (Fredrikson *et al.* 1997). The results of these physiological alterations, in response to anxiety, may be significant morbid events (Frazier *et al.* 2003). Furthermore, negative emotions such as anxiety can affect immunomodulatory behaviours, causing poor sleep patterns, poor nutrition, and reduced exercising. For example, sleep disturbance and reduced physical activity can contribute to changes in the immune system that have been associated with slower wound healing (Vileikyte 2007).

Many studies have attempted to identify methods that decrease preoperative anxiety including religious and/or spiritual activity (Kalkhoran & Karimollahi 2007), 10 minutes of acupressure (Agarwal *et al.* 2005), as well as providing information (Kiyohara *et al.* 2004), music (Cooke *et al.* 2005, Twiss *et al.* 2006), and visits from relatives (Yardakçı & Akyolcu 2004). However, few studies have evaluated the effects of social support on preoperative anxiety (Kulik and Mahler 1989, Koivula *et al.* 2002, Krohne & Slangen 2005, Okkonen & Vanhanen 2006).

Certain factors have been associated with preoperative anxiety. These factors include: a low level of education (Chan *et al.* 2004, Aykent *et al.* 2007, Wang *et al.* 2008), female gender (Norris & Baird 1967, Karanci & Dirik 2003, Jawaid *et al.* 2007, Perks *et al.* 2009), age (Chan *et al.* 2004), extent and type of surgery (Jawaid *et al.* 2007), marital status (Karanci & Dirik 2003) and levels of social support (Elizur & Hirsh 1999, Yardakçı & Akyolcu 2004, Lincon *et al.* 2005).

Investigators have reported that social support has a positive effect on human life during difficult times such as the anxiety associated with surgery (Lincon *et al.* 2005, Karanci & Dirik 2003). However, the source and the type of social support are important determinants of coping effectiveness. Sources of support include coworkers, friends, spouses and supervisors (Patterson 2003).

Over the last three decades the role of social support has been studied as a coping mechanism and protection against disease (Elizur & Hirsh 1999, Hogan *et al.* 2002). Social support has been favourably associated with a variety of health outcomes, including mortality (Hogan *et al.* 2002). A well functioning social support system may increase an individual's sense of self-efficacy and control resulting in greater engagement in recovery activities (Kulik and Mahler 1989).

The literature on social support stresses the buffering role of perceived social support against stress. The 'stress-buffering' hypothesis suggests that social supports positively influence health and well being by protecting individuals from the pathogenic effects of stressors. Alternatively, the 'main effect' hypothesis suggests that social supports positively influence health regardless of whether persons are faced with stressful events (Cohen & Wills 1985). Thus, it can be expected that patients that perceive a high degree of social support are likely to experience lower levels of anxiety compared with patients that perceive low levels of social support (Elizur & Hirsh 1999). One study showed that patients that scored high on social support showed less anxiety, received lower doses of narcotics and had a shorter hospital stay than patients that perceived they had low levels of support (Krohne & Slangen 2005). Another study reported that patients with higher levels of family support had lower preoperative levels of anxiety (Okkonen & Vanhanen 2006). In a study carried out by Koivula *et al.* (2002), the patients waiting for coronary bypass grafting that had low emotional support from their social network had high anxiety. In addition, the findings of Chan *et al.* 2004 showed a link between social support and successful coping following cancer surgery. Moreover, a study on hamsters (Christian *et al.* 2006) showed that social contact might buffer the effects of stress on healing.

The reduction of preoperative anxiety in surgical patients is a routine part of nursing care. Alternative strategies can be implemented such as social support for psychological preparation. Preoperative psychological preparation of surgical patients should be regarded as experimental until more evidence is available on its effects on recovery. Furthermore, alternative methods for the reduction of anxiety are needed in all patient settings in addition to nurse-governed strategies; that is, patient-led strategies under nurse guidance.

In Turkey, studies have been performed with the goal of reducing the level of preoperative anxiety. In a study reported by Yardakçı and Akyolcu (2004), the effects of visitation on preoperative patient anxiety, and in the study reported by Karanci and Dirik (2003), the effects of social support on preoperative anxiety, were reported. In Turkey, which has social and cultural diversity, the 'modern' and 'traditional' ways of living are both present in society. Family ties are still strong (http://www.hips.hacettepe.edu.tr/tnsa2008-main report, retrieved 31 May 2010). Therefore, in Turkish society, there is a culture where patients are supported during difficult times such as illness and surgery. Determination of the effects of these supports, in the Turkish community, on the level of anxiety, in patients before surgery, can help guide patient management in surgical clinics.

Therefore, the aims of this study were:

1 To identify levels of preoperative anxiety in patients undergoing elective surgery
2 To identify the relationship between preoperative anxiety and social support
3 To identify the predictors of preoperative anxiety in surgical inpatients.

Methods

Design

A descriptive type design was used in this study. Data were collected from March–August of 2008.

Setting and subjects

There were 2665 patients that underwent surgery that were admitted to the surgical wards (general surgery, cardiovascular surgery, urology, neurosurgery, gynaecology, orthopaedics, thoracic surgery, ocular surgery and ear nose and throat surgery) of a university hospital in the Central Anatolia region of Turkey.

The study population included 500 (298 females and 202 males) patients that had elective surgery in the surgery clinics of a university hospital located in the Central Anatolia region of Turkey. The following criteria were used for selecting the patients to be included in the study sample: (1) age range between 18–65, (2) consent to participate in the study, (3) operation planned for one day later and (4) general anaesthesia used during the surgery.

The goal of this study was to determine the effects of certain variables (age, marital status, gender, education, operation extent and social support) on the patient's preoperative anxiety. In Turkey, 40 years of age is considered a

milestone for achieving knowledge and experience. Therefore, the patients were divided by age less than or greater than 40. In addition, the surgical procedures were classified as moderate or major surgery.

Ethical considerations

Prior to data collection, approval was obtained from the ethical committees of the hospitals where the study was conducted as well as the University President's office. All patients were informed of the study's purpose and the methods that would be used; verbal permission was obtained from all patients. The overall results are published as aggregated information.

Instruments

The research instruments included: the collection of sociodemographic information (gender, age, education, marital status, and magnitude of the operation); and the Anxiety Specific to Surgery Questionnaire (ASSQ). This questionnaire was developed by Karanci and Dirik (2003) and is composed of 10 items. A five-point scale is used for scoring (1 = strongly disagree and 5 = strongly agree). The total score is obtained by adding all scores and only responses to item 8 were reversed (5 = strongly disagree and 1 = strongly agree). All items were concerned with the anxiety about pain and death associated with the surgery and the possible complications and restrictions that might occur after the surgery. The goal of the ASSQ was to assess the specific patient concerns about what may happen during and after the surgery. The Cronbach Alpha value of the scale is 0·79 according to Karanci and Dirik and it was 0·73 in this study (see Appendix 1 for the items of this scale). (Karanci & Dirik 2003); finally, the Multidimensional Scale of Perceived Social Support (MSPSS) was used for assessments. This scale was developed by Zimet *et al.* (1988) and is used to determine elements of social support. Eker and Arkar tested the validity and reliability of this scale for the Turkish population in 1995 (see Appendix 2 for the items of this scale). This measurement tool includes 12 items rated by a seven point Likert scale (1 = absolutely no and 7 = absolutely yes). The scale has three subscales, that is, family support, support from friends and support from someone special. Each subscale involves four items. The lowest and the highest scores for each subscale are 4 and 28, respectively. The total lowest and highest scores for the scale are 12 and 84, respectively. The higher the score is the stronger the perceived social support is (Eker & Arkar 1995). The instruments were used during face-to-face interviews in the rooms of the patients.

Study design

The instruments were administered preoperatively, in the afternoon, one day prior to the surgery. All interviews lasted for 30 minutes. All patients approached to participate gave consent and were grateful for being asked about their anxiety. Thus, the patients were very positive about participating.

Statistical analyses

Statistical analysis was performed using SPSS version 15.0 for Windows. The ASSQ scores were calculated by summing up the responses to the 10 items. For the present study the median was defined as 32 and the anxiety mean score was 31·91, SD = 6·30. According to the ASSQ anxiety level, the dependent variable was ≤32 for a low anxiety level and > 32 for a high anxiety level (Karanci & Dirik 2003). The independent variables were: gender, marital status, education, magnitude of the operation, age and social support. For the model independent variables, social support was not translated into a categorical variable for the analysis. The categorical variables are reported as proportions. The associations between the preoperative anxiety and the independent variables were assessed using the Chi-square and *t* tests. The enter technique was used to generate a multivariable logistic regression model to determine the independent predictors of anxiety before surgery. The Nagelkerke *R* square value was 0·42. Logistic regression analysis was used to evaluate the correlation between the six independent variables and low or high anxiety levels in the surgery patients. A p-value ≤ 0·05 was considered statistically significant.

Results

Description of patient population

More than 50% of the patients in this study were 65 years of age or older. The study participants were 59·6% female, 80·6% were married, 70·4% were literate and 62% had moderate levels of surgery (Table 1).

Anxiety and social support scores

Female patients ($\chi^2 = 4{\cdot}196$, $p < 0{\cdot}05$), literate patients ($\chi^2 = 11{\cdot}592$ $p < 0{\cdot}05$) and patients living alone ($\chi^2 = 5{\cdot}068$, $p < 0{\cdot}05$) had significantly higher anxiety levels. However, the patients with high levels of social support had lower levels of anxiety than those with low levels of social

Table 1 Preoperative level of anxiety according demographic characteristics of patients

Characteristic	*n* (%)	Anxiety		Statistical significance	
		Lower *n* (%)	Upper *n* (%)	χ^2	*p*-value
Gender					
Female	298 (59·6)	133 (44·6)	165 (55·4)	4·196	< 0·05
Male	202 (40·4)	109 (54·0)	93 (46·0)		
Education					
Literate	352 (70·4)	153 (43·5)	199 (56·5)	11·592	< 0·05
High school-university	148 (29·6)	89 (60·1)	59 (39·9)		
Marital status					
Married	403 (80·6)	205 (50·9)	198 (49·1)	5·068	< 0·05
Single	97 (19·4)	37 (38·1)	60 (61·9)		
Operation extent					
Medium	31 0(62·0)	118 (38·1)	192 (61·9)	34·894	< 0·05
Major	190 (38·0)	124 (65·3)	66 (34·7)		
Age					
≤40	127 (25·4)	53 (41·7)	74 (58·3)	3·031	> 0·05
> 40	373 (74·6)	189 (50·7)	184 (49·3)		
Social support mean	500	242 (72·66 ± 12·43)	258 (60·50 ± 12·13)	11·068	< 0·05

support (t = 11·068 p < 0·05). There was no association between age and anxiety (χ^2 = 3·031 p > 0·05) (Table 1).

Independent predictors and quantitative results of the multivariable analysis are shown in Table 2. The logistic regression analysis showed that a model with the five independent variables: gender, education, marital status, magnitude of the operation and social support was correlated with the preoperative anxiety level (Table 2). Age and anxiety level were not associated. The mean anxiety score of the patients was 31·91 (SD 6·30) and the mean social support score was 66·38 (SD 13·69).

Discussion

Anxiety is an unpleasant emotion and may lead to patient avoidance of planned operations. Preoperative anxiety is a challenging problem in the preoperative care of patients (Jawaid *et al.* 2007). Most patients awaiting elective surgery experience anxiety (Cooke *et al.* 2005, Kalkhoran & Karimollahi 2007) and it is widely accepted as an expected response to this situation (Jawaid *et al.* 2007).

The findings of this study showed that most of the patients awaiting elective surgery experienced high levels of preoperative anxiety. A previous study, on surgical patients in Turkey showed that patients had moderate levels of preoperative anxiety (Akkaş Gürsoy 2001). One study found that the frequency of high preoperative anxiety was 23·99% (Caumo *et al.* 2001). In the present study, anxiety was found in 31·91 (SD 6·30); the mean preoperative anxiety scores were high and similar to the findings of a previous study carried out by Karanci and Dirik (2003) using the ASSQ.

Table 2 Preoperative level of anxiety and social support in surgery patients: logistic regression analysis with 95% confidence intervals (CI)

Variables	B	Wald χ^2	Exp(B)	Statistical significance	95% CI for Exp(B)	
					Lower	Upper
Gender	0·616	6·717	1·852	p = 0·010	1·162	2·951
Education	1·503	26·129	4·496	p = 0·001	2·526	8·000
Marital status	0·823	8·828	2·278	p = 0·003	1·323	3·920
Operation extent	1·341	26·859	3·822	p = 0·001	2·302	6·346
Social support	−0·095	93·537	0·910	p = 0·001	0·892	0·927
Age	−0·353	1·502	0·703	p = 0·220	0·400	1·235

Statistical significant (p < 0·05).

The demographic characteristics that were associated with preoperative anxiety were gender, marital status and education (Table 1). The anxiety scores were found to be higher among females than males ($\chi^2 = 4{\cdot}196$, $p < 0{\cdot}05$). These associations have also been demonstrated by previous studies (Karanci & Dirik 2003, Kiyohara *et al.* 2004, Aykent *et al.* 2007, Wang *et al.* 2008, Perks *et al.* 2009). However, one study showed no correlation between gender and anxiety (Nishimori *et al.* 2002). It has been suggested that women more easily express their anxiety than men and that separation from the family affects women more. Consistent with prior studies, the results of this study showed that the women had higher levels of anxiety (Karanci & Dirik 2003, Jawaid *et al.* 2007, Perks *et al.* 2009).

The results of this study showed that there was no correlation between preoperative anxiety levels and age. However, anxiety levels can be associated with the level of education. Several studies showed lower levels of anxiety among patients with more than 12 years of education compared with patients with fewer than 12 years of education (Caumo *et al.* 2001). However, other studies have not shown a correlation between education and anxiety (Kiyohara *et al.* 2004, Wang *et al.* 2008). One study from Turkey reported higher preoperative anxiety levels in patients with a high level of education (Aykent *et al.* 2007). In the present study, the patients with a low level of education had higher anxiety levels ($\chi^2 = 11{\cdot}592$, $p < 0{\cdot}05$). These results suggest that individuals with a high level of education may more accurately estimate the risk of surgery; however, individuals with low levels of education may fear the unknown and therefore have high levels of anxiety.

Marriage is the central relationship for most adults and has beneficial effects on health. One study reported that married persons have greater emotional support, which is positively related to their emotional state (decreasing anxiety). Married patients that received more hospital support required less pain medication and recovered more quickly than those with low social support. The perceived quality of the marital relationship was relatively insignificant (Kulik and Mahler 1989). A study reported by Elizur and Hirsh (1999) found that marital and social support promote psychosocial recovery for patients undergoing CABG procedures. Therefore, anxiety may be of particular importance in patients that are not married.

The magnitude of the operation influences the level of preoperative anxiety. Investigators have found a higher level of anxiety in patients undergoing moderate levels of surgery (Akkaş Gürsoy 2001, Caumo *et al.* 2001). The results of this study similarly found that patients undergoing moderate level surgery had higher anxiety levels than patients that had major operations (Table 1). These findings might be explained by negative feelings such as the fear of disability due to loss of organs and/or body functions rather than by the magnitude of the operation.

It is important in Turkish society that persons with an illness that have surgery planned receive visits from family and friends. Social support, defined as physical and psychological help provided by family, friends, neighbours and the hospital, has positive effects on adults in difficult times; such support protects against potential pathological effects of stressors by suppression of the hypothalamic-pituitary-adrenal axis (DeVries *et al.* 2003, Lincon *et al.* 2005).

In the present study, the patients had a mean score of 66·38 (SD 5·22) for social support and there was an inverse correlation between the preoperative anxiety scores and social support scores ($p = 0{\cdot}001$). These findings illustrate that as family support and support from friends and/or someone special increased, preoperative anxiety decreased. Yardakçı and Akyolcu (2004) reported that patients visited by their relatives and close friends had decreased levels of anxiety. The results of this study showed that surgical patients had moderate anxiety and that the patients without strong social support had higher levels of anxiety than the patients with strong social support.

Conclusion

The results of this study suggest that women, literate patients, and patients that receive only limited family support, or that live alone may need additional support and care for moderate levels of surgery. Therefore, nurses should identify patients that have high anxiety levels and facilitate more time with their families. In addition, nurses should evaluate preoperative anxiety and fear, and encourage patients to talk about their feelings while providing time to listen.

Relevance to clinical practice

Nurses use several strategies for anxiety management; however, such care has been primarily focused on providing information. The use of other techniques such as listening to music, the presence of the patients' family members or significant other might be useful. (1) Testing for anxiety levels is feasible during the preoperative period. It allows detection of patients with high anxiety, which can be followed by the appropriate steps to ameliorate this problem. (2) Consistent with the needs of patients, an increase in

the level of social support can reduce the level of patient anxiety. Also It is recommended that information is given to nurses by in-service training on this issue and further investigations.

Acknowledgement

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Contributions

Study design: MY, HG, HS, MB; data collection and analysis: HG, MY, HS and manuscript preparation: MY, HS, HG, MB.

Conflict of interest

The authors declare to have no conflict of interests.

References

Agarwal A, Ranjan R, Dhiraaj S, Lakra A, Kumar M & Singh U (2005) Acupressure for prevention of preoperative anxiety: a prospective, randomised, placebo controlled study. *Anaesthesia* **60**, 978–981.

Akkaş Gürsoy A (2001) To determine the anxiety levels and the factors which may cause anxiety in preoperative surgical patients. *Journal of Nursing Research Development(HEMAR-G)* **1**, 23–29.

Aykent R, Kocamanoğlu DS, Üstün E, Tür A & Şahinoğlu H (2007) The reasons and evaluation of preoperative anxiety: a comparison of APAIS and STAI scores. *Journal of Turkey Clinics Anaesteziyology Reanimation* **5**, 7–13.

Bally K, Campbell D, Chesnick K & Tranmer J (2003) Effects of patient-controlled music therapy during coronary angiography on procedural pain and anxiety distress syndrome. *Critical Care Nurse* **23**, 50–58.

Caumo W, Schmıdt AP, Schneıder CN, Bergmann J, Iwamoto CW, Bandeıra D & Ferreıra MBC (2001) Risk factors for preoperative anxiety in adults. *Acta Anaesthesiologica Scandinavica* **45**, 298–307.

Chan CWH, Hon HC, Chien WT & Lopez V (2004) Social support and coping in chinese patients undergoing cancer surgery. *Cancer Nursing* **27**, 230–236.

Christian LM, Graham JE, Padgetta DA, Glasera R & Kiecolt-Glaser JK (2006) Stress and wound healing. *Neuroimmunomodulation* **13**, 337–346.

Cohen S & Wills TA (1985) Stress, social support, and the buffering hypothesis. *Psychological Bulletin* **98**, 310–357.

Cooke EM, Chaboyer W, Schluter P & Hiratos M (2005) The effect of music on preoperative anxiety in day surgery. *Journal of Advanced Nursing* **52**, 47–55.

Cuthbertson DP (1932) Observations on the disturbance of metabolism produced by injury to the limbs. *Quarterly Journal of Medicine* **25**, 233–46.

Desborough JP. (2000) The stress response to trauma and surgery. *British Journal of Anaesthesia* **85**, 109–117.

DeVries AC, Glasper ER & Detillion CE (2003) Social modulation of stress responses. *Physiological Behaviour* **79**, 399–407.

Eker D & Arkar H (1995) The factorial structure, reliability and validity of the multidimensional social support scale. *Journal of Turkish Psychology* **34**, 45–55.

Elizur Y & Hirsh E (1999) Psychosocial adjustment and mental health two months after coronary artery bypass surgery: a multisystem analysis of patients' resources. *Journal of Behavioural Medicine* **22**, 157–177.

Frazier SK, Moser DK, Daley LK, McKinley S, Riegel B, Garvin BJ & An K (2003) Critical care nurses' beliefs about and reported management of anxiety. *American Journal of Critical Care* **12**, 19–27.

Fredrikson M, Fischer H & Wik G (1997) Cerebral blood flow during anxiety provocation. *Journal of Clinical Psychiatry* **58**, 16–21.

Hogan BE, Linden W & Najarian B (2002) Social support interventions: do they work? *Clinical Psychology Review* **22**, 383–442.

Jawaid M, Mushtaq A, Mukhtar S & Khan Z (2007) Preoperative anxiety before elective surgery. *Neurosciences* **12**, 145–148.

Kalkhoran MA & Karimollahi M (2007) Religiousness and preoperative anxiety: a correlational study. *Annals of General Psychiatry* **29**, 6–17.

Karanci AN & Dirik G (2003) Predictors of pre- and postoperative anxiety in emergency surgery patients. *Journal of Psychosomatic Research* **55**, 363–369.

Kiyohara LY, Kayano LK, Oliveira LM, Yamamoto MU, Inagaki MM, Ogawa NY, Gonzales PE, Mandelbaum R, Okubo ST, Watanuki T & Vieira JE (2004) Surgery information reduces anxiety in the pre-operative period. *Review of Hospital Clinical Faculty of Medicine Sao Paulo* **59**, 51–56.

Koivula M, Paunonen-Ilmonen M, Tarkka MT, Tarkka M & Laippala P (2002) Social support and its relation to fear and anxiety in patients awaiting coronary artery bypass grafting. *Journal of Clinical Nursing* **11**, 622–633.

Krohne HW & Slangen KE (2005) Influence of social support on adaptation to surgery. *Health Psychology* **24**, 101–105.

Kulik JA & Mahler IM (1989) Social support and recovery from surgery. *Health Psychology* **8**, 221–238.

Lincon KD, Chatters LM & Taylor RJ (2005) Social support, traumatic events, and depressive symptoms among African Americans. *Journal of Marriage and Family* **67**, 754–766.

Maranets I & Kain ZN (1999) Preoperative anxiety and intraoperative anesthetic requirements. *Anesthesia Analgesia* **89**, 1346–1351.

Munafò MR & Stevenson J (2001) Anxiety and surgical recovery reinterpreting the literature. *Journal of Psychosomatic Research* **51**, 589–596.

Nishimori M, Moerman N, Fukuhara S, Dam FSAMV, Muller MJ, Hanaoka K & Yamada Y (2002) Translation and validation of the Amsterdam preoperative anxiety and information scale

(APAIS) for use in Japan. *Quality of Life Research* **11**, 361–364.
Norris W & Baird WLM (1967) Preoperative anxiety: a study of the incidence and aetiology. *British Journal of Anaesthesia* **39**, 503–509.
Okkonen E & Vanhanen H (2006) Family support, living alone, and subjective health of a patient in connection with a coronary artery bypass surgery. *Heart and Lung* **35**, 234–244.
Patterson GT (2003) Examining the effects of coping and social support on work and life stress among police officers. *Journal of Criminal Justice* **31**, 215–226.
Perks A, Chakravarti S & Manninen P (2009) Preoperative anxiety in neurosurgical patients. *Journal of Neurosurgical Anesthesiology* **21**, 127–130.
Pierantognetti P, Covelli G & Vario M (2002) Anxiety, stress and preoperative surgical nursing. *Professioni Infermieristiche* **55**, 180–191.
Ramos MI, Cardoso MJ, Vaz F, Torres MD, García F, Blanco G & González EM (2008) Influence of the grade of anxiety and level of cortisol on post-surgical recovery. *Actas Españolas de Psiquiatría* **36**, 133–137.
Salmon P (1991) Surgery as a psychological stressor: paradoxical effects of preoperative emotional state on endocrine responses. *Stress and Health* **8**, 193–198.
Stirling L, Raab G, Alder EM & Robertson F (2007) Randomized trial of essential oils to reduce perioperative patient anxiety: feasibility study. *Journal of Advanced Nursing* **60**, 494–501.
Türkiye Nüfus ve Sağlık Arastırması (TNSA-2008) (http://www.hips.hacettepe.edu.tr/demog.shtml erisim tarihi: 29 Nisan 2010).
Twiss E, Seaver J & McCaffrey R (2006) The effect of music listening on older adults undergoing cardiovascular surgery. *Nursing in Critical Care* **11**, 224–231.
Vileikyte L (2007) Stress and wound healing. *Clinics in Dermatology* **25**, 49–55.
Wallace LM (1986) Pre-operative state anxiety as a mediator of psychological adjustment to and recovery from surgery. *British Journal of Medicinal Psychology* **59**, 253–261.
Wang YJ, Shen J, Lu JK & Yang XD (2008) Preoperative anxiety and depression in patients undergoing cardiac surgery and related influencing factors. *Zhonghua Yi Xue Za Zhi* **88**, 2759–2762.
Yardakçı R & Akyolcu N (2004) The effect of the visits made preoperative period on the patients'anxiety level. *Journal of Nursing Research Development (HEMAR-G)* **6**, 7–14.
Zimet GD, Dahlem NW, Zimet SG & Farley GK (1988) The Multidimensional Scale of Perceived Social Support. *Journal of Personal Assessment* **52**, 30–41.

Appendix 1. Anxiety Specific to Surgery Questionnaire (Karanci & Dirik 2003)

1 Thoughts of dying frequently come to my mind.
2 If something happens to me, my family and children will remain helpless.
3 I am afraid that I may not regain my consciousness after the operation.
4 I worry that I may die during the operation due to bleeding or other reasons.
5 I worry that I may not recover completely after the operation due to inflammation or other problems.
6 I am afraid that after the operation, I may not be able to walk again and/or I may not be able to care for myself as before.
7 I worry that I will have a lot of pain after the operation I will.
8 I believe that I will get rid of all my pains and problems after the operation.
9 I am afraid that I will be physically disabled by the operation.
10 I think I will feel pain during the operation.

Appendix 2. Multidimensional Scale of Perceived Social Support (Zimet *et al.* 1988, Eker & Arkar 1995)

1 There is a special person who is around when I am in need.
2 There is a special person with whom I can share my joys and sorrows.
3 My family really tries to help me.
4 I get the emotional help and support I need from my family.
5 I have a special person who is a real source of comfort to me.
6 My friends really try to help me.
7 I can count on my friends when things go wrong.
8 I can talk about my problems with my family.
9 I have friends with whom I can share my joys and sorrows.
10 There is a special person in my life who cares about my feelings.
11 My family is willing to help me make decisions.
12 I can talk about my problems with my friends.