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Using a 0-10 Scale for Assessment of Anxiety in Patients with Acute Myocardial Infarction

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Using a 0-10 Scale for Assessment of Anxiety in Patients with Acute Myocardial Infarction

Background: Patients with acute myocardial infarction (AMI) often experience anxiety, an emotion that predicts adverse physiologic outcomes. Critical care clinicians have not adopted an anxiety assessment instrument for widespread use, due in part to the unavailability of an easy-to-administer anxiety instrument that is not burdensome to either clinicians or critically ill patients.

Objectives: To determine whether a single–item anxiety assessment instrument, the Anxiety Level Index (ALI), is a valid alternative to the State Anxiety Inventory (SAI) or the anxiety subscale of the Brief Symptom Inventory (BSI) in assessing state anxiety for patients with AMI.

Methods: In this prospective multi-center study, 243 inpatients with AMI rated their anxiety using the SAI, the anxiety subscale of the BSI, and the ALI. Anxiety Level Index scores were compared to SAI and BSI anxiety subscale scores using Spearman's rho test and the Bland-Altman method.

Results: There were moderate, positive correlations between the SAI and the ALI ($r = .52$, $P < .001$) and between the ALI and the anxiety subscale of the BSI ($r = .45$, $P < .001$). However, the Bland-Altman method revealed a moderate bias between the ALI and the SAI and between the ALI and the anxiety subscale of the BSI. As anxiety scores increased, the level of disagreement became more pronounced in both comparisons.

Conclusions: Although ALI scores were moderately and significantly correlated with scores on the SAI and the BSI anxiety subscale, the results of the Bland-Altman method indicate a lack of construct validity of the single-item measure. The quest continues to construct a simple self-report measure of anxiety that is appropriate for critically ill patients with AMI.

Key Words: Anxiety, myocardial infarction, nursing assessment

Anxiety is an inherent human emotion and a common psychological response to acute myocardial infarction (AMI). In fact, 10–26% of hospitalized persons with AMI are more anxious than persons who have been diagnosed with a psychiatric disorder (Crowe, Runions, Ebbesen, Oldridge, & Streiner, 1996; Moser & Dracup, 1996). Anxiety associated with AMI is not unique to the United States; patients throughout the world experience anxiety after AMI (De Jong et al., in press).

Anxiety associated with AMI can be a dangerous phenomenon. Moser and Dracup (1996) reported that patients with higher state anxiety after AMI had a 4.9 times higher incidence of in-hospital ventricular fibrillation, ischemia, and reinfarction than patients with lower anxiety. High state anxiety has been shown to predict 3–month survival following AMI (Thomas, Friedmann, Wimbush, & Schron, 1997). Similarly, Frasure–Smith and colleagues (1995) reported that high state anxiety predicted recurrent cardiac events during the first year after AMI. Finally, for patients with recent AMI and a left ventricular ejection fraction $\leq 50\%$, elevated anxiety was associated with more frequent cardiac events and higher mortality 6–10 years after the acute event (Denollet & Brutsaert, 1998).

Given the above findings, it is easy to find nursing literature that emphasizes the need for clinicians to assess, document, and manage anxiety in patients with AMI (Bucher, 1999; Casey, Morrissey, & Nolan, 1998; Cunningham, Del Bene, & Vaughan, 2000; Kim et al., 2000; Malan, 1992; Webb & Riggin, 1994). What is missing, however, are specific guidelines for *how* clinicians should assess anxiety. Instead, recommendations for assessing anxiety are vague. For example, clinicians are instructed to "assess for verbal and nonverbal signs of anxiety and when level of anxiety changes…" (Martinez, 2004, p. 826), perform active listening, and encourage patients to verbalize their emotions (Casey et al., 1998). The assessment of anxiety after AMI is

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not standardized and no anxiety assessment tool has been recognized as the gold standard. Consequently, although reliable and valid anxiety instruments are available, clinicians often neither complete nor document a formal anxiety assessment. When nurses do assess anxiety, they do so using a subjective approach (O'Brien et al., 2001). For example, nurses documented that patients were anxious, restless, or shaky, but did not use objective measures to assess anxiety (O'Brien et al., 2001). Nurses also use tachycardia, tachypnea, elevated blood pressure, and increased diaphoresis as indicators of anxiety (Frazier et al., 2002b; Moser et al., 2003a). However, interpretation of altered physiologic parameters is difficult because many factors other than anxiety influence them (McKinley, Stein-Parbury, Chehelnabi, & Lovas, 2004).

The Spielberger State Anxiety Index [SAI] (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) and the anxiety subscale of the Brief Symptom Inventory [BSI] (Derogatis & Melisaratos, 1983) are two valid and reliable anxiety instruments that investigators have used to assess anxiety in patients with AMI. Clinicians often perceive that such anxiety instruments are too lengthy (Benotsch, Lutgendorf, Watson, Fick, & Lang, 2000; Boker, Brownell, & Donen, 2002), burdensome to acutely ill patients (McKinley, Coote, & Stein-Parbury, 2003), clinically irrelevant, and difficult to administer. O'Brien and associates (2001) reported that clinicians never used an objective instrument to assess anxiety for 101 patients with AMI. Although 45 of these patients' medical records contained a brief subjective anxiety assessment, there was no association between clinicians' assessment of their patients' anxiety and patients' assessment of their own anxiety. Furthermore, clinician assessments of the same patient during the same time period differed.

Others documented the need for a simple method of assessing anxiety in acutely ill patients (McKinley et al., 2004; O'Brien et al., 2001) and suggested that a single–item anxiety

assessment instrument may be the solution (O'Brien et al., 2001). Clinicians who care for patients with AMI routinely assess chest pain using a 0 to 10 numeric rating pain scale. Advantages of this pain scale are that clinicians require minimal training regarding its use, it is time efficient, and cardiac patients are familiar with it. If clinicians had a straightforward 0 to 10 numeric anxiety scale, they might assess and document anxiety more consistently. Furthermore, a 0 to 10 anxiety scale could eliminate difficulties with translating currently available anxiety instruments to non-English languages. Accordingly, the purpose of this study was to determine whether a single–item numeric rating scale for anxiety, the Anxiety Level Index (ALI), is a valid alternative to the SAI or the anxiety subscale of the BSI in assessing state anxiety for patients with AMI.

Methods

Design

In this prospective multi-center study, we assessed the state anxiety level of patients with AMI using the SAI, the anxiety subscale of the BSI, and the ALI. Subsequently, we compared the ALI scores with the SAI and BSI scores. The anxiety assessment was completed within 48 hours of the patient's admission for AMI.

Sample and Setting

The study was conducted in the cardiac care units of three large urban university medical centers located in the Midwest of the United States. Adult male and female patients were invited to participate in the study if they met the following inclusion criteria: 1) diagnosis of AMI confirmed by elevated cardiac enzymes and typical ECG changes; 2) pain free and hemodynamically stable at the time of assessment; 3) free of cognitive impairment; 4) free of

non-cardiac serious or life threatening co-morbidities; and 5) able to speak English. A total of 243 patients were enrolled.

Measurement

Sociodemographic and Clinical Data. Prior to the anxiety assessment, each patient provided his or her age, educational level, ethnicity, and marital status. Trained research assistants reviewed each patient's medical record to collect the following clinical data: peak cardiac enzyme levels, Killip classification, type of AMI, smoking status, and history of AMI, coronary artery bypass grafting, hypertension, and diabetes.

Anxiety. For purposes of this study, we measured state anxiety, which has been defined as a "transitory emotional state or condition of the human organism…that is characterized by subjective, consciously perceived feelings of tension and apprehension, and activation of the autonomic nervous system" (Spielberger, 1972, p. 39). Each patient completed three self-report instruments that reflect state anxiety: the SAI, the anxiety subscale of the BSI, and the ALI. The SAI is a 20–item instrument that enables persons to rate their anxiety at the present time. For each item, respondents indicate their agreement using a scale of 1 ("not at all") to 4 ("very much so"); thus, total scores range from 20 or 80. It takes 5–10 minutes to complete this instrument. The SAI has been used to assess anxiety in patients with AMI (Crowe et al., 1996; Frasure-Smith & Lesperance, 2003; Frasure-Smith et al., 1995; Frazier et al., 2002a; Kim et al., 2000; O'Brien et al., 2001; Rose, Conn, & Rodeman, 1994; Webb & Riggin, 1994) and previous research has supported its reliability and validity (Spielberger et al., 1983). The Cronbach's α reliability coefficient for our sample was .93. Normative values for healthy 50–69 year-old men, healthy 50–69 year-old women, medical-surgical patients, and general psychiatric patients are 34.51 ± 10.34, 32.20 ± 8.67, 42.38 ± 13.79, and 47.74 ± 13.24, respectively (Spielberger et al., 1983).

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The 6–item anxiety subscale of the BSI instrument includes brief descriptions of psychological symptoms that are associated with anxiety. Using a 0 ("not at all") to 4 ("extremely") scale, participants rate their level of distress concerning these symptoms. The six scores are totaled and averaged. The averaged score quantifies the patient's level of anxiety and can range from 0 to 4. Like the other two instruments, higher scores denote higher anxiety. This anxiety subscale is reliable and valid (Derogatis & Melisaratos, 1983), and investigators have used this instrument for patients with AMI (De Jong et al., in press; Kim et al., 2000; Moser et al., 2003b). For this sample, the Cronbach's α reliability coefficient was .84. Normative values for healthy persons, psychiatric outpatients, and psychiatric inpatients are .35 ± .45, 1.70 ± 1.00, and 1.70 ± 1.15, respectively.

The ALI is a 1–item, verbal, numeric rating instrument. The patient is asked to rate his or her current anxiety from 0 to 10, with 0 indicating "no anxiety" and 10 indicating the "most anxiety ever experienced." The reported score reflects the patient's state anxiety; no further calculations are necessary. This instrument was designed to resemble the 0 to 10 pain level scale that clinicians commonly use to assess pain in patients with AMI. It is impossible to calculate Cronbach's α on this 1–item instrument. Given the nature of state anxiety, it is also inappropriate to measure reliability of any state anxiety instrument using test-retest reliability analysis.

Procedure

The Institutional Review Boards at the three sites approved the study. Prior to data collection, all participants gave informed, written consent. Trained research assistants with cardiovascular nursing experience explained the study to potential participants, administered the anxiety assessment instruments, and obtained the patient's sociodemographic and clinical data.

Data were collected within 48 hours of the patient's arrival at the emergency department for symptoms of AMI. The anxiety assessments took place in the patient's cardiac care unit room.

Statistical Analyses

Sociodemographic and clinical data are presented as frequencies and means ± standard deviations. Because the anxiety data were skewed towards low scores, the nonparametric Spearman's rho test was used to examine the association between the SAI and the ALI, and the association between the BSI anxiety subscale and the ALI. A *P*-value of < .05 was considered statistically significant. Correlations only measure the association between two instruments. Correlations may be high even when two measurement techniques are in poor agreement (Bland & Altman, 1986). Therefore, we also used the Bland–Altman method to assess the degree of agreement between the instruments (Bland & Altman, 1986, 1999; Glantz, 1997). Although not endorsed by all (Streiner & Norman, 2003), the Bland–Altman method is the preferred method for evaluating whether a new instrument provides equivalent information to an existing instrument (Bland & Altman, 1986). In summary, this method provides an assessment of bias and precision between new and existing instruments. Bland–Altman plots are useful when comparing two measurement techniques. The bias (difference between the two measures) is plotted on the y axis; the mean of the two measures is plotted on the x axis. There is no statistical test to determine whether the amount of bias seen is acceptable; instead, clinical judgment is used to decide (Bland & Altman, 1986, 1999). Each scale had different metrics; therefore, before conducting Bland–Altman statistical analyses, we transformed the SAI and anxiety subscale of the BSI scores to a 0 to 10 scale.

Results

Sample Characteristics

A total of 243 patients with AMI agreed to participate in this study. Table 1 contains a summary of the sociodemographic and clinical characteristics of the sample. The mean age of the participants was 62.3 ± 13.5 years. Female patients accounted for nearly half (47.3%) of the sample. Nearly all (92.6%) patients were Caucasian and the majority (69.1%) were married. The mean education level was 12.6 ± 3.1 years. The peak creatine phosphokinase-MB isoenzyme level was 110.1 ± 139.0 ng/mL.

Level of Anxiety

The mean anxiety scores for the SAI, the anxiety subscale of the BSI, and the ALI were 36.76 ± 12.01, $.56 \pm .75$, and 3.08 ± 2.62, respectively. For the anxiety subscale of the BSI, 40.4% of patients reported higher anxiety than the normal reference mean, while 6.4% of patients were more anxious than the normal reference mean for patients with psychiatric disorders. In this sample, 42.2% of males and 72.1% of females reported anxiety levels that surpassed normal reference SAI values. Finally, 16.5% of patients had higher SAI anxiety scores than patients with neuropsychiatric disorders.

Intercorrelations Among the Anxiety Instruments

As shown in Table 2, there was a moderate, positive correlation between the SAI and the ALI ($r = .52$, $P < .001$). Similarly, the anxiety subscale of the BSI and the ALI were moderately correlated ($r = .45$, $P < .001$).

Agreement Between SAI and ALI Anxiety Instruments

Figure 1 shows the Bland–Altman plots of the differences between the SAI and ALI anxiety instruments against the mean of these instruments. The mean difference was 1.5 ± 2.2, indicating that there was a moderate degree of bias between the SAI and ALI anxiety instruments. The 95% confidence interval (CI) for the bias was 1.24 to 1.80. The limits of

agreement indicated poor agreement between these scales. That is, given the measure of agreement calculated, patients' ALI scores could fall between 5.9 points (CI 5.42 to 6.38) above and 2.9 points (CI –3.38 to –2.42) below their SAI scores. Figure 1 shows that although most differences fall within two standard deviations of the mean difference, the bias was more pronounced for higher anxiety scores.

Agreement Between Anxiety Subscale of the BSI and ALI Anxiety Instruments

Figure 2 shows the Bland–Altman plots of the differences between the anxiety subscale of the BSI and the ALI anxiety instrument against the mean of these instruments. The mean difference was –1.7 ± 2.3, indicating that there was a bias between the anxiety subscale of the BSI and the ALI anxiety instrument. The 95% confidence interval for the bias was –1.97 to –1.38. When examining the limits of agreement, patients' ALI scores may be 3.0 points above or 6.4 points below their anxiety subscale of the BSI scores. The 95% confidence interval for the lower limit of agreement was –6.86 to –5.84; the 95% confidence interval for the upper limit of agreement was 2.50 to 3.51. Figure 2 shows that the bias was more pronounced for higher anxiety scores.

Discussion

The results of this study suggest that the ALI is not a valid alternative to either the SAI or the anxiety subscale of the BSI. The ALI may be convenient for clinicians and patients because it parallels a frequently used numeric pain instrument and takes less time to complete than the SAI or the anxiety subscale of the BSI. However, although ALI scores were moderately and significantly correlated with SAI and anxiety subscale of the BSI scores, results of the Bland–Altman method indicate a lack of construct validity of the single–item numeric rating scale as a measure of anxiety.

When comparing the ALI anxiety score with the SAI anxiety score, the mean difference of 1.5 ± 2.2 indicates a moderate systematic bias between these methods. If the ALI and SAI scores had agreed perfectly, the mean difference would have equaled zero. As shown in Figure 1, the mean difference of 1.5 is well above zero and values are scattered above and below the mean value. Furthermore, as the anxiety scores increase, more values fall outside the 95% confidence interval, indicating increasing disagreement. Importantly, the data indicate that a patient's ALI score may differ widely from his or her SAI score. For example, an ALI score of 4.0 may be as high as 9.9 or as low as 1.1, a large range that nearly encompasses the range of possible ALI scores and thus is clinically unacceptable.

The mean difference of -1.7 reveals a moderate systematic bias between ALI anxiety and BSI anxiety subscale scores. Figure 2 shows values scattered above and below the mean with more widespread disagreement for higher anxiety scores. One cannot be confident of ALI scores, as they may fall 3.0 points above or 6.4 points below anxiety subscale of the BSI scores. This means, for example, that an ALI score of 7.0 may be as high as 10 or as low as 1.4.

Although neither the SAI nor the anxiety subscale of the BSI has been designated as the "gold standard," investigators often use these instruments to assess anxiety for patients with AMI (De Jong et al., in press; Frasure-Smith & Lesperance, 2003; Frazier et al., 2002a; Kim et al., 2000; Moser & Dracup, 1996; Moser et al., 2003b; O'Brien et al., 2001; Watkins, Blumenthal, & Carney, 2002). Yet, clinicians rarely use published instruments to assess patients for anxiety. Clinicians who receive vague instructions for assessing anxiety, who are unaware of published anxiety instruments, or who conclude that existing instruments are time-consuming, burdensome to patients, inaccessible, or clinically irrelevant may invent their own anxiety assessment instrument or adapt a similar scale to measure anxiety. For example, clinicians may assume that

the ALI is a valid anxiety measure because data have supported the validity of a similarly designed verbal 0 to 10 numeric pain instrument (Paice & Cohen, 1997). However, results of invalidated instruments may be misleading, as illustrated by our data.

A limitation of this study is that we measured anxiety one time while the patient was in the cardiac care unit. Perhaps patients would perform better on the ALI with repeated exposure to it. In addition, we did not control for how clinicians assessed patients for pain. Although patients were pain free at the time of anxiety assessment, it is possible that some patients had difficulty distinguishing between a 0 to 10 pain instrument and a 0 to 10 anxiety instrument. Finally, to promote ease of administration, we administered the ALI using a verbal approach. The ALI did not contain printed questions or statements; therefore, patients may have differed in their conceptions of anxiety. When patients completed the SAI, they responded, for example, to statements about feeling calm, tense, nervous, content, and steady. When using a more non-descriptive instrument such as the ALI, patients potentially may confuse anxiety with other emotions such as depression, hostility, or delirium. McCormack and colleagues (1988) pointed out that it is difficult to validate visual analogue scales for broad subjective concepts such as anxiety, and that not all patient groups respond alike to a particular anxiety scale.

Recommendations for Future Research

Anxiety has been shown to adversely affect physiologic and psychologic outcomes for patients with AMI; therefore, it is essential that clinicians use a valid and reliable instrument to assess anxiety. Further research is indicated to identify the instrument(s) most acceptable to clinicians and patients. Our analysis indicated that a verbal ALI instrument yielded unsatisfactory anxiety data. Future research using a printed ALI instrument with tic marks, numbers, or simple descriptors may yield more favorable results.

Recently, McKinley and colleagues (2003) introduced the Faces Anxiety Scale, a single–item anxiety instrument composed of five faces. The five faces range from a neutral face to a face showing extreme anxiety. Newly published data from a sample of intensive care unit patients support the validity of the Faces Anxiety Scale (McKinley et al., 2004). However, the Faces Anxiety Scale instrument has not been specifically tested with patients with AMI. Further research is necessary to evaluate whether the Faces Anxiety Scale is suitable for patients with AMI.

Conclusion

It is well known that many patients with AMI are anxious and that anxiety contributes to unfavorable patient outcomes. Critical care clinicians have not adopted a published anxiety instrument for widespread use. Based on the construct validity data from this study, we cannot recommend that clinicians use the ALI to assess anxiety in patients with AMI. The quest continues to construct a simple and valid self-report measure of anxiety that is appropriate for critically ill patients with AMI.

References

Benotsch, E. G., Lutgendorf, S. K., Watson, D., Fick, L. J., & Lang, E. V. (2000). Rapid anxiety

assessment in medical patients: Evidence for the validity of verbal anxiety ratings. *Annals*

of Behavioral Medicine, 22, 199-203.

Bland, J. M., & Altman, D. G. (1986). Statistical methods for assessing agreement between two

methods of clinical measurement. *Lancet, 1*, 307-310.

Bland, J. M., & Altman, D. G. (1999). Measuring agreement in method comparison studies.

Statistical Methods in Medical Research, 8, 135-160.

Boker, A., Brownell, L., & Donen, N. (2002). The Amsterdam preoperative anxiety and

information scale provides a simple and reliable measure of preoperative anxiety.

Canadian Journal of Anaesthesia, 49, 792-798.

Bucher, L. (1999). Acute myocardial infarction. In L. Bucher & S. Melander (Eds.), *Critical*

Care Nursing (pp. 227-257). Philadelphia: W.B. Saunders.

Casey, P. E., Morrissey, A., & Nolan, E. M. (1998). Ischemic heart disease. In M. R. Kinney, S.

B. Dunbar, J. O. Brooks-Brunn, N. Molter & J. M. Vitello-Cicciu (Eds.), *AACN's*

Clinical Reference for Critical Care Nursing (4th ed., pp. 319-381). St. Louis: Mosby.

Crowe, J. M., Runions, J., Ebbesen, L. S., Oldridge, N. B., & Streiner, D. L. (1996). Anxiety and

depression after acute myocardial infarction. *Heart & Lung, 25*, 98-107.

Cunningham, S., Del Bene, S., & Vaughan, A. F. (2000). Myocardial ischemia and infarction. In

S. L. Woods, E. S. Froelicher & S. U. Motzer (Eds.), *Cardiac Nursing* (4th ed., pp. 481-

540). Philadelphia: Lippincott.

De Jong, M. J., Chung, M. L., Roser, L. P., Jensen, L. A., Kelso, L. A., Dracup, K., et al. (in press). A five-country comparison of anxiety early after acute myocardial infarction. *European Journal of Cardiovascular Nursing.*

Denollet, J., & Brutsaert, D. L. (1998). Personality, disease severity, and the risk of long-term cardiac events in patients with a decreased ejection fraction after myocardial infarction. *Circulation, 97,* 167-173.

Derogatis, L. R., & Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychological Medicine., 13,* 595-605.

Frasure-Smith, N., & Lesperance, F. (2003). Depression and other psychological risks following myocardial infarction. *Archives of General Psychiatry, 60,* 627-636.

Frasure-Smith, N., Lesperance, F., & Talajic, M. (1995). The impact of negative emotions on prognosis following myocardial infarction: Is it more than depression? *Health Psychology, 14,* 388-398.

Frazier, S. K., Moser, D. K., O'Brien, J. L., Garvin, B. J., An, K., & Macko, M. (2002a). Management of anxiety after acute myocardial infarction. *Heart & Lung, 31,* 411-420.

Frazier, S. K., Moser, D. K., Riegel, B., McKinley, S., Blakely, W., Kim, K. A., et al. (2002b). Critical care nurses' assessment of patients' anxiety: reliance on physiological and behavioral parameters. *American Journal of Critical Care, 11,* 57-64.

Glantz, S. A. (1997). *Primer of biostatistics* (4th ed.). New York: McGraw-Hill.

Kim, K. A., Moser, D. K., Garvin, B. J., Riegel, B. J., Doering, L. V., Jadack, R. A., et al. (2000). Differences between men and women in anxiety early after acute myocardial infarction. *American Journal of Critical Care, 9,* 245-253.

Malan, S. S. (1992). Psychosocial adjustment following MI: Current views and nursing

implications. *Journal of Cardiovascular Nursing, 6*, 57-70.

Martinez, L. G. (2004). Coronary artery disease and acute coronary syndrome. In S. M. Lewis,

M. M. Heitkemper & S. R. Dirksen (Eds.), *Medical-Surgical Nursing: Assessment and*

Management of Clinical Problems (pp. 799-837). St. Louis: Mosby.

McCormack, H. M., Horne, D. J., & Sheather, S. (1988). Clinical applications of visual analogue

scales: A critical review. *Psychological Medicine, 18*, 1007-1019.

McKinley, S., Coote, K., & Stein-Parbury, J. (2003). Development and testing of a Faces Scale

for the assessment of anxiety in critically ill patients. *Journal of Advanced Nursing, 41*,

73-79.

McKinley, S., Stein-Parbury, J., Chehelnabi, A., & Lovas, J. (2004). Assessment of anxiety in

intensive care patients by using the Faces Anxiety Scale. *American Journal of Critical*

Care, 13, 146-152.

Moser, D. K., Chung, M. L., McKinley, S., Riegel, B., An, K., Cherrington, C. C., et al. (2003a).

Critical care nursing practice regarding patient anxiety assessment and management.

Intensive and Critical Care Nursing, 19, 276-288.

Moser, D. K., & Dracup, K. (1996). Is anxiety early after myocardial infarction associated with

subsequent ischemic and arrhythmic events? *Psychosomatic Medicine, 58*, 395-401.

Moser, D. K., Dracup, K., McKinley, S., Yamasaki, K., Kim, C.-J., Riegel, B., et al. (2003b). An

international perspective on gender differences in anxiety early after acute myocardial

infarction. *Psychosomatic Medicine, 65*, 511-516.

O'Brien, J. L., Moser, D. K., Riegel, B., Frazier, S. K., Garvin, B. J., & Kim, K. A. (2001).

Comparison of anxiety assessments between clinicians and patients with acute

myocardial infarction in cardiac critical care units. *American Journal of Critical Care,* *10,* 97-103.

Paice, J. A., & Cohen, F. L. (1997). Validity of a verbally administered numeric rating scale to measure cancer pain intensity. *Cancer Nursing, 20,* 88-93.

Rose, S. K., Conn, V. S., & Rodeman, B. J. (1994). Anxiety and self-care following myocardial infarction. *Issues in Mental Health Nursing, 15,* 433-444.

Spielberger, C. D. (1972). Anxiety as an emotional state. In C. D. Spielberger (Ed.), *Anxiety:* *Current trends in theory and research* (Vol. I, pp. 23-49). New York: Academic Press.

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for* *the state-trait anxiety inventory.* Palo Alto, CA: Consulting Psychologists.

Streiner, D. L., & Norman, G. R. (2003). *Health measurement scales: A practical guide to their* *development and use.* New York: Oxford University Press.

Thomas, S. A., Friedmann, E., Wimbush, F., & Schron, E. (1997). Psychological factors and survival in the cardiac arrhythmia suppression trial (CAST): A reexamination. *American* *Journal of Critical Care, 6,* 116-126.

Watkins, L. L., Blumenthal, J. A., & Carney, R. M. (2002). Association of anxiety with reduced baroreflex cardiac control in patients after acute myocardial infarction. *American Heart* *Journal, 143,* 460-466.

Webb, M. S., & Riggin, O. Z. (1994). A comparison of anxiety levels of female and male patients with myocardial infarction. *Critical Care Nurse, 14* (1), 118-124.

Figure Legends

FIGURE 1. Bland–Altman Plot of the Differences Against the Mean Responses for the State Anxiety Index and Anxiety Level Index
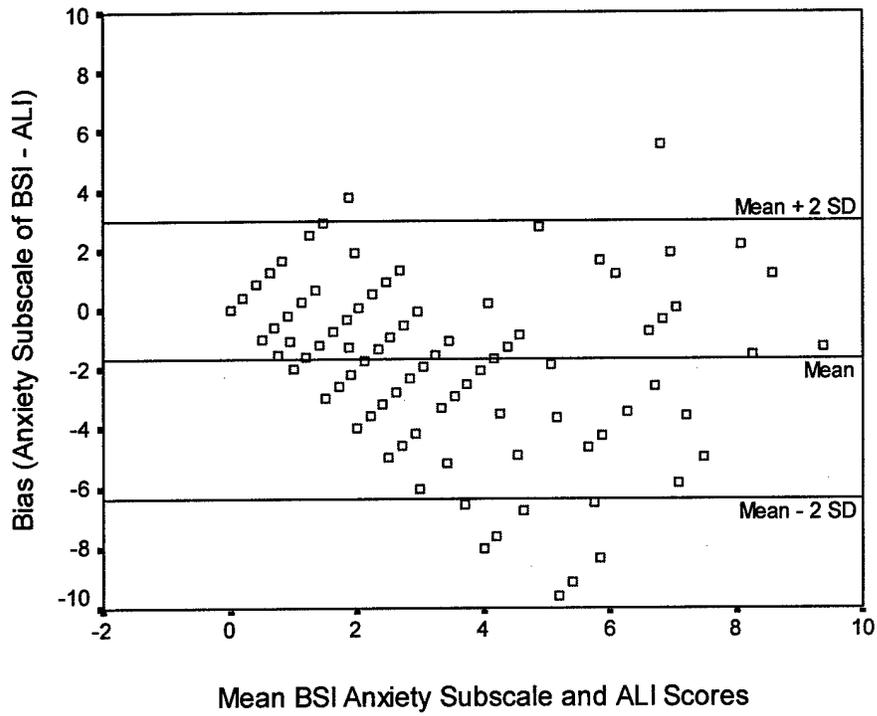
FIGURE 2. Bland–Altman Plot of the Differences Against the Mean Responses for the Brief Symptom Inventory Anxiety Subscale and Anxiety Level Index

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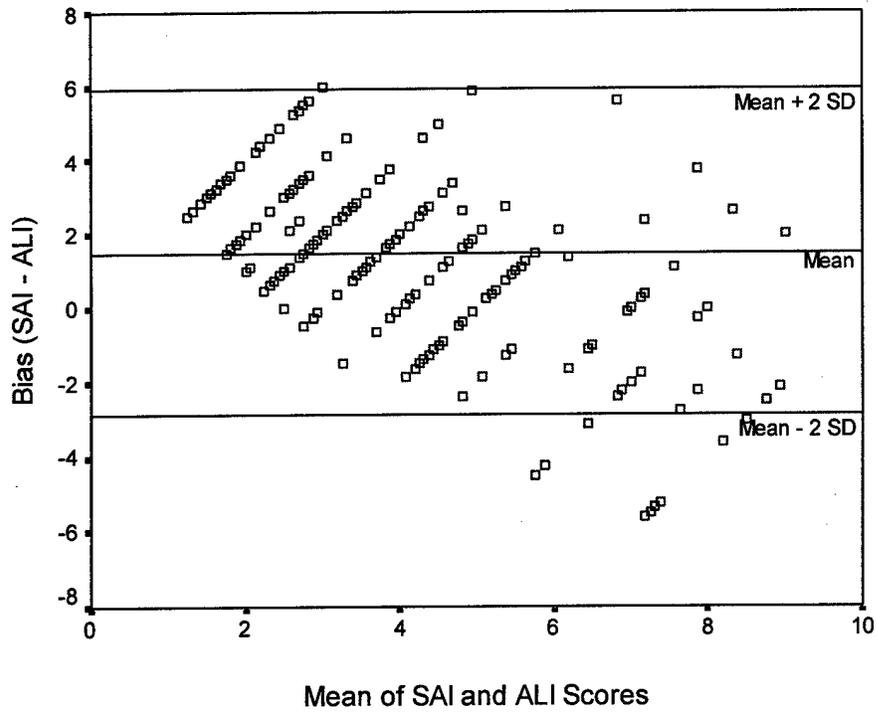
SAI = State Anxiety Index; ALI = Anxiety Level Index

FIGURE 2.

Mean BSI Anxiety Subscale and ALI Scores

BSI = Brief Symptom Inventory; ALI = Anxiety Level Index

TABLE 1. Sample Baseline Characteristics ($N = 243$)

Characteristic	n	%
Male gender	128	(52.7)
Ethnicity		
Caucasian	225	(92.6)
Black	14	(5.8)
Middle Eastern Caucasian	2	(0.8)
Hispanic	1	(0.4)
Marital status		
Married	168	(69.1)
Widowed	38	(15.6)
Divorced	23	(9.5)
Single	11	(4.5)
Separated	2	(0.8)
Cohabitate	1	(0.4)
History of AMI	71	(29.2)
History of CABG	24	(9.9)
History of HTN	132	(54.3)
History of diabetes	60	(24.7)
Current smoker	63	(25.9)
Location of myocardial infarction[‡]		
Inferior	111	(45.7)
Anterior	90	(37.0)
Lateral	48	(19.8)
Posterior	35	(14.4)
Apical	6	(2.5)
Killip classification on admission		
I	169	(69.5)
II	56	(23.0)
III	14	(5.8)
IV	1	(0.4)

Columns may not add to 100% because of missing data

AMI = acute myocardial infarction; CABG = coronary artery bypass grafting; HTN =

hypertension

‡ Some patients had more than one type of myocardial infarction

TABLE 2. Correlations between the Spielberger State Anxiety Index, the Anxiety Subscale of the Brief Symptom Inventory, and the Anxiety Level Index

	Anxiety Level Index	Anxiety Subscale of the Brief Symptom Inventory
Spielberger State Anxiety Index	.52*	.56*
Anxiety Subscale of the Brief Symptom Inventory	.45*	—

*$P < .001$ by Spearman's rho