Evaluation of Stress Factors in ICU and CCU Patients with Emphasis upon Their Religious Beliefs

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Abstract

Background- We sought to study stress, and in particular environmental, psychological and treatment-related stress factors, in coronary care unit (CCU) and intensive care unit (ICU) patients with particular emphasis upon their religious beliefs.

Method- Four hundred patients upon discharge from the CCU or ICU were asked to answer a standard questionnaire, composed of demographic data; 5 faith-based questions; 36 questions about treatment-related factors; 9 questions about environmental factors; and 3 questions about psychological factors. The data were analyzed with the SPSS software, as well as Chi-square, ANOVA and nonparametric correlations tests. Quantification of the severity of the said factors was done by allocating the number one for the non-provocation of the stress factors and the number 6 for the highest severity of the stress factors.

Result- Data having been collected and statistical analysis having been carried out, the severity of the stress factors was divided into the three categories of mild (mean: 1-2.99), medium (mean: 3-3.99) and severe (mean: 4-5.99). The results are as follows:

a) Treatment-related stress factors when treatment was administered by the same-sex hospital staff (mean: 1.38) were mild; whereas the severity of the same factors, when treatment was provided by members of the opposite sex, increased (mean: 1.73),
b) Environmental stress factors (mean: 2.08) were mild, and
c) Psychological stress factors (mean: 3.2) were medium.

Conclusion- In the management of stress factors, apart from concentration, relaxation, exercise, sleep, etc., patients' beliefs and faith warrant great emphasis in as much as they make an enormous contribution to a speedier recovery ***(Iranian Heart Journal 2006; 7 (3):25-37)***.

Key words: stress factors■ coronary artery disease■ religious beliefs

Stress is a reaction to pressure or strain, provoked by stress factors. Hans Selye defines stress as the non-specific response of the human body to its needs. The needs and demands that induce stress in the human body are called stress factors.

According to Selye, whatever causes the symptoms of general adaptation syndrome is a stress factor, which can be divided into hereditary, physical, chemical, psychological, cultural, environmental and social categories.

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Regardless of its type, the presence of a stress factor triggers a whole set of hormonal and nervous reactions, the result of which is a wide range of physiological changes including an increase in the heart rate, metabolism and oxygen consumption in the cardio-vascular system.

Generally speaking, the human body is inclined to adapt to stress-induced physical and psychological changes. However, a failure in the body's regulatory systems or the occurrence of a severe stress factor will prompt tension.

Tension exacerbates a great number of diseases such as high blood pressure, heart disease and cancer. Disease and hospitalization per se being severe stress factors, their combination is certain to subject the individual to severe physical and psychological tension.

Material and Method

In order to determine stress factors and their severity from the patients' point of view, we divided the factors into the following groups:

1) Treatment-related factors (Table I),
2) Environmental factors (Table II), and
3) Psychological factors (Table II).

The patients' religious beliefs were also taken into account in this descriptive study, in which the researcher seeks to describe the facts and compare unfalsified variables all through the recording, analysis and interpretation stages.

The overall objective of this study was to determine stress factors and their severity from the point of view of the patients with particular emphasis upon their cultural and religious beliefs. Four hundred patients, having been hospitalized in the ICU or CCU for one month in the year 2002, were questioned individually for 30 minutes before they were transferred to the wards. The questionnaire was comprised of the following sections:

a) Demographic data: This section consisted of age, sex, occupation, marital status, education, ethnicity, insurance status and number of hospitalization (Table III),
b) Religious beliefs (Table III), and
c) Treatment-related stress factors: This section was devised in order to quantify the subjects' levels of stress while in the CCU or ICU. On account of the fact that the majority of our subjects held strong religious beliefs, their comments on receiving treatment from members of the opposite sex were of significance in our study.

The validity and reliability of this questionnaire in its accurate measurements of the same characteristic and its consistency in repetitions were corroborated by the coefficients of Cronbach (Alpha: 55%). The data were collected and analyzed with the SPSS software, and statistical analysis was performed via Chi-square, ANOVA and Nonparametric Correlations tests (a=5%).

The severity of the aforementioned factors was quantified by allocating the number one for the non-provocation of the stress factors and the number 6 for the highest severity of the stress factors. The severity of stress was categorized into mild (mean: 1-2.99), medium (mean: 3-3.99) and severe (mean: 4-5.99).

Table I. Stress factors and their severity

	(Treatment-related factors)	Quite severe	Severe	Medium	Mild	Very mild	minimal
1	Treatment without explanation	☐	☐	☐	☐	☐	☐
2	Vital signs taken by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
3	Vital signs taken by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
4	Injections by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
5	Injections by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
6	IV line taken by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
7	IV line taken by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
8	Dressing changed by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
9	Dressing changed by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
10	Blood infusion by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
11	Blood infusion by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
12	Suction of the tracheal tube by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
13	Suction of the tracheal tube by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
14	Blood samples taken repeatedly everyday by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
15	Blood sample taken repeatedly everyday by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
16	ECG taken by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
17	ECG taken by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
18	Bed linen changed by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
19	Bed linen changed by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
20	Bedpan held by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
21	Bedpan held by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
22	Being accompanied to the toilet by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
23	Being accompanied to the toilet by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
24	Transfer to other wards or hospitals by the same-sex hospital staff	☐	☐	☐	☐	☐	☐

	(Treatment-related factors)	Quite severe	Severe	Medium	Mild	Very mild	minimal
25	Transfer to other wards or hospitals by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
26	Chest X-ray taken by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
27	Chest X-ray taken by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
28	Catheters inserted by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
29	Catheters inserted by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
30	Catheters removed by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
31	Catheters removed by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
32	Breathing physiotherapy by the same-sex hospital staff	☐	☐	☐	☐	☐	☐
33	Breathing physiotherapy by hospital staff of the opposite sex	☐	☐	☐	☐	☐	☐
34	Communication with the same-sex hospital staff to inquire about your medical condition	☐	☐	☐	☐	☐	☐
35	Communication with hospital staff of the opposite sex to inquire about your medical condition	☐	☐	☐	☐	☐	☐
36	Medical examination by the same-sex physician	☐	☐	☐	☐	☐	☐
37	Medical examination by physicians of the opposite sex	☐	☐	☐	☐	☐	☐

Table II. Stress factors and their severity

	(Environmental factors)	Quite severe	Severe	Medium	Mild	Very mild	Not at all
1	Unfamiliar environment of the ward	☐	☐	☐	☐	☐	☐
2	Lighting of the ward	☐	☐	☐	☐	☐	☐
3	Seeing strange machines	☐	☐	☐	☐	☐	☐
4	Noise of the machines	☐	☐	☐	☐	☐	☐
5	Noise made by other patients	☐	☐	☐	☐	☐	☐
6	Seeing critically ill patients in the ward	☐	☐	☐	☐	☐	☐
7	Limited visiting hours	☐	☐	☐	☐	☐	☐
8	Noise made by hospital staff	☐	☐	☐	☐	☐	☐
9	Dress code in the ward	☐	☐	☐	☐	☐	☐
	(Psychological factors)						
1	Concern about the consequences of the disease	☐	☐	☐	☐	☐	☐
2	Not having sufficient information about the disease	☐	☐	☐	☐	☐	☐
3	Concern about the cost of treatment	☐	☐	☐	☐	☐	☐

Table III. Faith – based questions and demographic data

Demographic data	Age:			
	Sex	□ male □ female		
	Ward	□ ICU □ CCU		
	Insurance status	□ insured □ free □ Charity		
	Occupation:			
	Marital status	□ single □ married □ widowed □ divorced		
	Number of hospitalization	□ first time □ second time □ third time and above		
	Education:			
Faith – based questions	1- Do you perform your religious rituals during hospital stay?	Yes	Sometimes	No
	2- Do you say your prayers during hospital stay?	□	□	□
	3- Do you observe religious edicts on relationship with strangers?	□	□	□
	4- Do you believe in making vows and votive offerings as a means to recovery?	□	□	□
	5- Do you feel more comfortable discussing your problems with same – sex hospital staff?	□	□	□

Results

Of 400 participants, 392 met our inclusion criteria. As expected, men outnumbered women in our study (237 vs. 155). In terms of age, the highest frequency was between 40 and 59 years. The majority of our patients (247) were hospitalized in the CCU and the rest (140) in the ICUs. Almost 95% of our subjects had some kind of insurance; only 4.3% were not insured. In terms of occupation, while the majority of the women were housewives (143 out of a total of 155 and 36% of all the subjects); almost 25% of the men were self-employed, 15% were blue-collar workers,14% were civil servants and the remaining 8% had unclassifiable jobs .

The queries on the participants' marital status showed that 84% were married; 10% were widowed; 3% were single; and 1% was divorced women. Most of the patients had been hospitalized for the first time. The majority of the subjects had an average level of education (22% had at least high school diploma), although those who were illiterate made up 39% of the patients. In terms of provincial distribution and place of residence, most of those questioned lived in Tehran but were of Azari origins. Over 95% of the subjects had strong religious beliefs, only 5% not having such strong faith.

We discovered that in the majority of our patients (over 95%) treatment-related stress factors were among mild factors and that only in 5% were the said factors of a medium degree. If treatment was provided to the patient by members of the opposite sex, the severity of stress was liable to change (an increase in medium stress levels from 5% to 17%).

Environmental factors were mild (almost 82%) and medium and above (almost 18%); psychological factors were mild (37%), medium (14%) and severe or quite severe (50%).

Discussion

The deleterious effects of stress factors on coronary artery disease have long been established. The severity of these effects, however, can vary depending on the individual's condition and the environment. In light of the said premise, we investigated three principal stress factors in CCU and ICU patients.

Basically, cardio-vascular patients are apt to suffer from palpable anxiety about the debilitating consequences of their disease and its effect on their livelihood. And if such patients suffer myocardial infarction or acute coronary syndrome (ACS) and find themselves in the CCU or ICU and on the verge of surgery, stress factors assume an even greater significance.

Stress- related gastric mucosal injury occurs in extremely sick patients: those who have experienced serious trauma, major surgery, burns covering more than one-third of the body- surface area, major intracranial disease and severe medical illness such as ventilator dependency and coagulopathy. Significant bleeding probably does not develop unless ulceration occurs. The mortality rate in these patients is quite high because of their serious underlying illness.[1]

Stress reduces body compartments metabolism, increases extracellular water and has variable effects on body fat. Stress is one of the etiologies of protein – calorie malnutrition.[2]

Patients may develop anxiety after exposure to extreme traumatic events. The reaction may occur shortly after the trauma (acute stress disorder) or be delayed and subject to recurrence. In both syndromes, individuals experience associated symptoms of detachment and loss of emotional responsivity.[3]

Patients with stress disorders are at risk for the development of other anxiety, mood and substance – related disorders. Women are more likely to be affected than men.

It is hypothesized that in post-traumatic stress disorders there is excessive release of norepinephrine from the locus coeruleus in response to stress. Increased noradrenergic activity at locus coeruleus projection sites in hyppocamus and amygdala theoretically facilitates the encoding of fear – based memories. In addition, greater sympathetic responses to cues associated with traumatic events occur in post-traumatic stress disorder.[4]

Psychological stress and depression predispose the individual to increased vascular risk; and from a clinician's perspective, they should be considered as modifiable risk factors. The adrenergic stimulation of psychological stress can augment myocardial oxygen requirements and aggravate myocardial ischemia. Psychological stress can cause coronary vasoconstriction, particularly in atherosclerotic coronary arteries, and hence can influence myocardial oxygen supply. Recent studies have further linked psychological stress to platelet and endothelial dysfunction,[5] metabolic syndromes[6,7]and the induction of ventricular arrhythmias.[8,9]

The magnitude of recent life changes in the realms of health, work, home and family, and personal and social factors has been related to myocardial infarction and sudden cardiac death (SCD).[10-14] Controlling for other major prognostic factors, risk of sudden and total deaths and other coronary events is affected by social and economic stresses.[15] Alteration of modifiable life-style factors has been proposed as a strategy for reducing the risk of SCD in patients with coronary heart disease.[16]

Another point of significance is that acute psychosocial stressors have been associated with the risk of cardiovascular events, including SCD.[17,18]

The present study limited its scope of investigating and comparing stress factors to the following remit:

a) The difference between stress factors in men and women,

b) The difference between stress factors in the CCU and ICU patients, and
c) The difference between stress factors in men and women when treatment was provided by members of the opposite sex or same sex.

An analysis of the 36 questions on treatment-related stress factors showed that such factors, when treatment was administered by the same-sex hospital staff in the CCU, induced a mild level of stress (mean: 1.38) in 98.6% of the men and 94% of the women, while the same factors caused medium levels of stress in 1.4% of the men and 6% of the women. When the subjects received treatment from members of the opposite sex, medium and severe levels of stress in the female subjects increased from 6% to 38% (mean <3.5), whereas there was no significant change in the stress levels in the men. It can be concluded that our female participants were more susceptible to treatment-related stress, not least when they were attended to by members of the opposite sex. Of all treatment-related factors, requesting a bedpan and having different catheters inserted or removed by members of the opposite sex were the most severe stress factors in the men and women alike.

A comparison between these factors in the ICU demonstrated that while 97.8% of the men and 84.9% of the women regarded receiving treatment from the same-sex hospital staff as a mild stress factor, the medium and severe levels of stress in the ICU increased in both groups, especially among the women (15.1% for women and 2.2% for men). If treatment was given by members of the opposite sex, there was a remarkable increase in the percentages among the female subjects (44% for women and 3.3% for men).

As demonstrated above, the three most severe stress factors were the same for men and women, the most severe ones being those induced by opposite-sex hospital staff. And although the stress factors were the same, the severity in all the three cases was higher in the women (almost twofold). Furthermore, the most severe of the aforementioned stress factors showed up to a threefold decrease if measured without taking account of gender.

Those factors causing the mildest levels of stress in the women were (1) chest radiography, (2) medical examination and (3) vital signs measurement; the mildest levels of stress were induced in the men by (1) chest radiography, (2) medical examination and (3) ECG.

It is worthy of note that the mildest stress factors were chosen by the selection of those stress factors that both exhibited the least difference and induced little stress for the patients when they were treated by members of the opposite sex, hence the difference between the male and female subjects' selection of the third factor. Having their ECG taken was reported by the women to be their third mildest stress factor, while the same procedure performed by members of the opposite sex was our women's fourth severe stress factor. For our male subjects, however, undergoing the same procedure performed by members of the opposite sex still had a mild level of stress-inducement.

Being accompanied to the toilet was reported by both men and women to be a mild stress factor. Nevertheless, while having a companion of the opposite sex for our female subjects was the fifth most severe stress factor, it was of no significance to our male subjects.

Men found injections to be a mild stress factor, but for them receiving the injections from members of the opposite sex alleviated stress even further.

An analysis of the 9 questions on environmental stress factors (mean: 2.08) classified them among mild stress factors. The fact that the arithmetical mean of environmental factors was higher than that of treatment-related factors was due to a higher number of our male and female subjects' reporting the former to be more severe in comparison with the latter. In the ICU and CCU, environmental stress factors, albeit

affecting men greatly, proved more severe in women.

There were three most severe stress factors for the men and women alike in the CCU, namely (1) seeing critically ill patients, (2) limited visiting hours, and (3) noise made by other patients. Three mildest stress factors for both male and female participants in this study were (1) lighting of the wards, (2) dress code in the wards, and (3) noise made by the staff.

The three most severe stress factors in the ICU were different in the opinion of our male and female subjects. Whereas for the men (1) seeing critically ill patients, (2) limited visiting hours, and (3) noise made by other patients were reported to have been the worst factors, the women said that they found (1) seeing critically ill patients, (2) dress code in the wards, and (3) noise made by other patients very stressful.

The three mildest stress factors in the ICU for the women were (1) lighting of the wards, (2) noise made by the staff, and (3) seeing strange machines. Our male subjects, however, reported the three mildest stress factors in the ICU to have been (1) lighting of the wards, (2) noise made by the staff, and (3) dress code.

Our analysis of the three questions on psychological stress factors (mean: 3.2) ranked them among medium stress factors. 36.3% of our patients rated these factors as mild; 14% medium; and almost 50% severe. The most severe stress factor in the CCU for both groups was the cost of treatment and the mildest stress factor was insufficient information about the disease. In the ICU, the cost of treatment was still the most stressful factor for both men and women; nonetheless, the female participants in our study reported worries about the disease as the mildest stress factor, while for the men not having sufficient information about their disease was the least stressful factor.

Stress factors, inasmuch as they exert an influence on the disease and increase the likelihood of the occurrence of unpleasant events, can themselves be regarded as risk factors.

Emotions and stressful experiences affect the heart directly through the autonomic nervous system and indirectly via neuroendocrine pathways. Intense emotions such as anxiety and anger are accompanied by a predictable increase in heart rate and blood pressure. Daily life offers ample empirical evidence of the relationship between the psyche and the heart, which according to many cultures is the seat of emotions.

Of course the personality of the individual should always be considered as an influential factor in any such study. Clinicians have long observed that many patients with coronary heart disease seem to be compulsive, driven over-achievers who are unable to relax and are quick to feel angry and frustrated when things do not proceed as planned. These observations were reinforced in the 1960s by Friedman and Roseman, who advanced the concept of type A behavior. Large scale, prospective studies conducted on initially healthy individuals have a significantly elevated rate of developing coronary heart disease (CHD) and myocardial infarction and have more extensive CHD at the time of angiography.[19-24]

The combination of anger and low social support may be particularly hazardous. Possible associations between anger and race, socioeconomic status and gender also represent potential confounds.[25]

Acute psychological stress has negative cardiovascular consequences. Experimental stress reliably increases heart rate, blood pressure and myocardial oxygen demands; such stress precipitates myocardial ischemia in 30-60 percent of CHD patients.[26] CHD patients who exhibit mental stress-induced ischemia appear to be at increased risk of subsequent fatal and nonfatal cardiac events.[27]

Acutely stressful events and sudden, intense emotions can precipitate fatal arrhythmias and sudden cardiac death (SCD), and there are many anecdotal case reports of SCD following immediately after severe

psychological stress and intense emotional arousal.

A careful psychiatric interview of patients hospitalized after ventricular tachycardia or ventricular fibrillation revealed that 21 percent of the subjects had undergone a major emotional disturbance as psychological trigger in the preceding 24 hours. These included interpersonal conflicts, bereavement, public humiliation, marital separation and business losses.

Psychosocial, cultural and environmental factors increase the risk of CHD, either independently or in combination. These include social isolation and lack of social support, life stresses (such as job strain) and sociodemographic characteristics.[28,29,30]

Psychosocial risk factors tend to be associated with each other and often co-occur.

Population-based, cross-sectional surveys reveal that social integration (e.g. being married, having regular contact with friends and membership in organizations) is associated with lower levels of CHD. Conversely, social isolation and low social support (living alone, having few friends or family members and not belonging to organizations) is associated with an increased incidence of CHD and poorer outcome following first diagnosis of CHD.[31]

In a recent prospective study of 430 CHD patients, those with fewer than four people in their social network had a 2.4 times greater risk of cardiac mortality after adjusting for differences in age, disease severity, psychological distress, smoking and income.[32]

Lower socioeconomic status (whether assessed by education, occupation or income) prospectively predisposes healthy people to an increased risk of CHD and CHD patients to a poorer prognosis.

A psychological stress factor, depression can not only cause CHD automatically but also have dire consequences in CCU and ICU patients.

Different pathophysiological mechanisms may link depression and CHD.[33]

First, depression results in autonomic arousal and hypothalamic, adrenocortical and sympathoadrenal hyperactivity. Depressed patients show hyperactivity of the hypothalamic-pituitary– adrenocortical axis and hypercortisolemia. Corticosteroids have atherogenic effects, including the induction of high blood pressure and increases in cholesterol and free fatty acids, [33] as well as possible effects on arterial endothelial function. [34] In addition, there is hypersecretion of norepinephrine in depression, and plasma catecholamines stimulate heart rate, blood pressure and myocardial oxygen consumption. Catecholamines are also proarrhythmic, and an increased incidence of ventricular tachyarrhythmias has been found in depressed patients. [35,36]

Second, depressed cardiac patients exhibit diminished heart rate variability, [37] resulting from a relative increase in sympathetic tone and/or a relative decrease in parasympathetic tone, which increases the risk of fatal arrhythmias.

Third, depression may be accompanied by changes in platelet aggregability. [33,38] Serotonin plays a major role in depression, and it is also known to influence thrombogenesis and enhance platelet activation and responsiveness to other thrombogenic agents.

In the present study, the 5 faith-based questions were indicative of the fact that our subjects (mean: 2.48 from 3) had deeply held religious beliefs. 90% of our patients believed that making a vow and giving votive offerings would improve their health, and 82% of them stressed the importance of observing religious rituals during the hospital stay. Indeed, almost 73% of the participants in our study dutifully said their prayers during their stint in the hospital. Moreover, 50% of those questioned found discussing their problems with a same-sex carer easier.

Koranic verses and Islamic traditions place emphasis upon the role of faith in the course of disease and recovery from it. “Those who

believe, their hearts being at rest in God's remembrance- in God's remembrance are at rest the hearts of those who believe and do righteous deeds." (Holy Koran: Thunder, 28).[39]

Whether recovery can be achieved through the patient's faith and beliefs has always been controversial. It is now, however, believed that there is a strong link between faith and recovery from disease. Recently, there have been over 200 studies carried out into the direct or indirect role of faith in health and recovery in different societies.

Our study demonstrated that of the three treatment-related, environmental and psychological stress factors, when taking account of such variables as age, sex, occupation, education, marital status, ethnicity, number of hospitalization and insurance status, there was a significant relationship between religious beliefs and treatment-related factors. Our results, however, found no significant relationship between environmental or psychological stress factors and religious beliefs.

Conclusion

There are of course many different ways such as concentration, relaxation, exercise and sleep to manage and control stress factors in cardio-vascular patients. What the present study sought to demonstrate was that patients' religious beliefs make an enormous contribution to their recovery and thus command as much attention. Our results also indicate the greater significance of stress factors in women cardiac patients in comparison with men, and in the ICU by comparison with the CCU. At the end, we suggest that dire health consequences be avoided by alleviating the burden of the cost of treatment for patients.

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