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Novelty-seeking and avoidant coping strategies are associated with academic stress in Korean medical students

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ABSTRACT

High levels of stress and depression in medical students is raising concern. In this study, we sought to identify coping strategies and other factors influencing academic stress in medical students. We enrolled 157 students from the University of Ulsan College of Medicine, Korea, in November, 2010. We used the Medical Stress Scale, Temperament and Character Inventory, Hamilton Depression Scale, Beck Depression Inventory, and Coping Response Inventory to assess psychological parameters. We used Pearson's correlation and linear regression analyses to analyze the data. Novelty-seeking, self-directedness, cooperativeness, coping strategy, and depression scale scores all correlated significantly with stress level. Linear regression analysis indicated that students who are novelty-seeking, likely to use avoidant coping strategies, and unlikely to use active-cognitive and active-behavioral strategies tend to have higher stress levels. Reduction of stress in medical students may be achieved through evaluation of coping strategies and personality features and use of interventions to promote active coping strategies.

1. Introduction

Medical students suffer from high stress levels (Dahlin et al., 2005; Compton et al., 2008) caused by financial difficulties and heavy workloads (Levey, 2001). Academic stress may also be associated with poor academic performance (Stewart et al., 1999), certain personality types (Vitaliano et al., 1989), and depression (Ang and Huan, 2006). Recent studies indicate that the prevalence of major depressive disorder in medical students is approximately 10%, with more than half of the depressed students exhibiting suicidal ideation (Goebert et al., 2009), and that medical students' health-related quality-of-life is quite poor (Paro et al., 2010). Numerous studies have sought to identify factors that cause or exacerbate academic stress (Guthrie et al., 1998; Levey, 2001; Compton et al., 2008; Goebert et al., 2009; Paro et al., 2010). Collectively, this body of research raises concerns about the well-being of medical students.

Coping is defined as a stabilizing process that aids individuals in stressful situations and facilitates psychological adaptation (Zeidner and Endler, 1996). Coping includes both cognitive and behavioral efforts to counteract the impact of stressful situations. Dispositional coping and contextual coping are two distinct views of coping that differ in terms of their assumptions regarding the primary determinant of coping responses (Zeidner and Endler, 1996). Dispositional coping considers individuals to have relatively stable preferences for specific coping styles as determined by personality type. Contextual coping considers coping to be a mutable process determined by situational factors. A coping strategy is a specific behavior or technique used to cope with a stressful situation (Folkman, 1984) and important for adaptation to stressful situtations as well as overall health (Lazarus and Folkman, 1984). There are several ways to classify coping strategies; in the current study, we use the system most often used in psychological research, which categorizes coping strategies as active-cognitive, active-behavioral, or avoidant (Zeidner and Endler, 1996). Active-cognitive coping strategies are internal processes such as positive reassessment, finding inner strength, and acceptance. Active-behavioral coping strategies are external behaviors such as seeking professional help or problem-solving. Avoidant coping strategies include ignoring the problem, use of drugs, or keeping worries to oneself. Avoidant coping strategies are associated with health problems, risky behavior (Steiner et al., 2002), depression (Nagase et al., 2009), and are less effective at protecting individuals from the adverse effects of high stress (Holahan and Moos, 1985; Armistead et al., 1990).

Several studies have examined the relationship between personality type and stress. In clinical populations, personality dimensions may be associated with the prevalence and severity of post-traumatic stress disorder (PTSD) (Ruchkin et al., 2002; Gil and Caspi, 2006; Yoon et al., 2009). In non-clinical populations, personality traits or characteristics may influence a person's

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perception of or reaction to stressful situations (Vollrath, 2001). Alexithymia in particular has been associated with poorer responses to stress (Fukunishi and Rahe, 1995).

We hypothesized that active coping strategies are more helpful in reducing academic stress in medical students than are avoidant coping strategies. In the present study, we examined the association of various factors, including personality dimensions and coping strategies, with academic stress in a cohort of Korean medical students.

2. Methods

2.1. Participants

We surveyed academic stress in medical students at the University of Ulsan College of Medicine, Seoul, South Korea, in November, 2010. South Korea has two medical education systems: students may enter a medical school immediately after high school graduation and take a 2-year pre-medical course before commencing a 4-year medical course, or college undergraduates may enter medical school and begin a 4-year medical course right away. Our institution is of the former type. During the pre-medical course, students study basic science and medicine (including genetics, organic chemistry, anatomy, and histology). Subsequently, during the first 2 years of their medical course, students study major organ systems. Finally, during the last 2 years of their medical course, students move on to clinical ward training.

The administrative committee of the University of Ulsan College of Medicine organized the survey. After providing a detailed explanation of the aims and methods of the study, we handed out questionnaires and asked the students to complete them. Subsequently, the students visited the outpatient clinic of the Department of Psychiatry on a specific day for an interview. The interviewers were experienced psychiatry residents in their third or fourth year. All interviewers were familiar with the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders-IV (SCID-IV) and Mini-International Neuropsychiatric Interview (MINI) and conducted the interviews according to the principles of these publications, although due to time constraints, the interviewers were unable to administer the structured interviews in full. Afterward, a psychiatrist met with the interviewers and discussed the results of the surveys and interviews. Students with potential mental health problems were identified and asked to return for a second interview, this time with a psychiatrist.

We surveyed all 157 students from the second year of the pre-medical course through the third year of the medical course. All students finished the questionnaire and were interviewed at least once. After the completion of the survey, we asked the students if they consented to the use of the results as part of a study. All students consented. None of the participants had any current relevant illness and all were included in the analyses, including those selected for a second interview. This study was approved by the Institutional Review Board of Asan Medical Center.

2.2. Measures

We used the Medical Stress Scale (MSS) (Vitaliano et al., 1989), Temperament and Character Inventory (TCI) (Cloninger et al., 1993), Hamilton Rating Scale for Depression (HAM-D-17) (Hamilton, 1960), Beck Depression Inventory-II (BDI-II) (Beck et al., 1996), and the Coping Responses Inventory (CRI) (Moos, 1993) to evaluate academic stress, personality type, depression severity, and coping strategy. After completing the four self-report questionnaires (MSS, TCI, BDI-II, and CRI), all participants underwent individual examinations by psychiatrists, who further assessed depression severity using the HAM-D-17.

The MSS is a self-report questionnaire that assesses stress in medical students (Vitaliano et al., 1989). The original version focuses on five areas: school curriculum and environment, personal competence/endurance, social/recreational life, financial situation, and future aspirations. There are 11 items, each of which is scored on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." Higher scores represent higher levels of stress. The Korean version of the MSS is modified to reflect cultural differences and consists of nine items focusing on three areas: school curriculum and environment (four items), personal competence/endurance (four items), and financial situation (one item) (Ahn et al., 2007). The Korean version is scored identically to the original version. We used raw MSS scores in all analyses. Both the original version and the Korean version of the MSS have been validated and are used widely (Vitaliano et al., 1989; Ahn et al., 2007).

The TCI is an instrument based on the psychobiological model of personality proposed by Cloninger et al. (1993). The model posits that personality consists of two major components, temperament and character. Temperament is the unconscious base that influences all learning processes, and is genetically determined. Temperament consists of four dimensions: novelty seeking (NS), harm avoidance (HA), reward dependence (RD), and persistence (PE). Character develops later than temperament, is based on the interaction of temperament and environment, and influences personal and social effectiveness. Character has three dimensions: self-directedness (SD), cooperativeness (CO), and self-transcendence (ST). The TCI questionnaire has 226 true/false items and evaluates the relative influence of the seven dimensions just described. We used a validated Korean version of this questionnaire (Sung et al., 2002). We used the *T*-scores of each dimension in the analyses.

The HAM-D-17 (Hamilton, 1960) and BDI-II (Beck et al., 1996) are questionnaires used to quantify depression. The HAM-D-17 has 17 items, is administered by a clinician, and focuses on somatic symptoms that may manifest with depression. The 21-item BDI-II is a self-report inventory that evaluates subjective feelings of depression. We used two measures of depression to ensure greater accuracy. We used validated Korean versions of both exams (Lee et al., 2005; Lim et al., 2011).

The CRI is a 48-item self-report designed to evaluate coping strategies (Moos, 1993). Each item consists of a statement of a specific response to a stressful situation. Participants are asked to describe the most distressing situation they have faced within the last three months and answer how likely they would be, if faced with the same situation again, to respond in the ways described in the items. Responses described in the items are categorized as "active-cognitive", "active-behavioral", or "avoidant". There are 12 active-cognitive items, 12 active-behavioral items, and 24 avoidant items. Responses are measured on a four-point Likert scale. Within each category, the responses are summed to yield a total score. Higher scores signify more frequent use of strategies in that category. We used a validated Korean version modified to reflect cultural differences (You and Kwon, 1997).

We assessed academic performance using school grades provided by the university with the students' consent. We used the grade point average ($A^+=4.5$; $A^0=4.0$; $B^+=3.5$; $B^0=3.0$; $C^+=2.5$; $C^0=2.0$; $D^+=1.5$; $D^0=1.0$, $F=0$) of the previous semester in our analysis.

2.3. Statistical analysis

We used Pearson's correlation analysis to identify associations between the various psychological factors and academic stress. We then constructed a linear regression model based on the correlation results to determine the independent contribution of each factor to academic stress. We used the Statistical Package for the Social Sciences version 15.0 for all statistical analyses.

3. Results

3.1. Demographic and psychological characteristics

Of the 157 students in our study group, 43 (27.4%) were female. The mean age was 21.8 years. The mean scores on the MSS, HAM-D-17, and BDI-II were 25.5, 3.1, and 3.9, respectively.

3.2. Association between demographic and psychological characteristics and stress

Table 1 presents the results of the Pearson correlation analysis. MSS scores were positively correlated with both depression scale scores (HAM-D-17: $r=0.34$, $P<0.01$; BDI-II: $r=0.38$, $P<0.01$), novelty-seeking scores ($r=0.32$, $P<0.01$), and avoidant coping strategy scores ($r=0.25$, $P<0.01$). MSS scores were negatively correlated with self-directedness scores ($r=-0.24$, $P<0.01$), cooperativeness scores ($r=-0.17$, $P=0.04$), active-cognitive coping scores ($r=-0.20$, $P=0.01$), and active-behavioral coping scores ($r=-0.32$, $P<0.01$). A separate *t*-test analysis showed that mean MSS scores did not differ by gender (male: 25.7, female: 24.8, $P=0.35$).

Further analyses focusing on the subcategories of the MSS yielded similar results (Table 2). "School curriculum and environment" and "personal competence/endurance" scores were both positively correlated with novelty-seeking scores ($P<0.01$ for both), HAM-D-17 scores ($P=0.02$ and $P<0.01$, respectively), BDI-II scores ($P<0.01$ for both) and avoidance coping strategy scores ($P<0.01$ for both) and negatively correlated with self-directedness scores ($P=0.02$ and $P<0.01$, respectively), and active-behavioral coping scores ($P<0.01$ for both). "Financial situation"