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Personality and Cardiovascular Disease:

Implications for Assessment

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Personality and Cardiovascular Disease:

Implications for Assessment

The term cardiovascular disease refers to several diseases of the cardiovascular system such as coronary heart disease (CHD), coronary artery disease, high blood pressure (HBP), and stroke. According to the American Heart Association (AHA, 2009), CVD has been responsible for more American deaths each year than any other cause of death since the year 1900. The most recent data suggests that 2400 Americans die of CVD per day, averaging to one death every 37 seconds. Furthermore, the AHA reports that 1 in 3 Americans are currently living with one or more forms of CVD. There has been vast research into the etiology and mediating factors of CVD. Type A Behavior Pattern (TABP) has historically been implicated however, more than 40 years of research has not led to conclusive agreement as to its role. The current paper reviews the available literature on the role of TABP as a risk factor for the development of CVD and also examines the potential of the Cook-Medley Hostility (Ho) scale of the Minnesota Multiphasic Personality Inventory, Second Edition (MMPI-2) in predicting cardiovascular disease. Special emphasis will be placed on the African-American population as this group continues to have the highest CVD mortality rates (AHA, 2009).

African-Americans and CVD

According to Clark et al. (2001) African-Americans have the highest CVD mortality rate of any ethnic group in the United States. In addition, this group suffers CVD at significantly younger ages than other ethnic groups. According to the 2000 U.S. Census, 34.6 million Americans identified as Black/African-American. The AHA (2009) reports that among African-Americans, 10.2% *have* heart disease (HD), 6% *have* coronary heart disease (CHD), 31.7% *have* hypertension, and 3.7% *have had* a stroke. Therefore, using the 2000 Census data one can estimate that almost 50% are living with cardiovascular disease. Several factors have been

identified that contribute to the high CVD rates among African-Americans; these include a higher prevalence of coronary risk factors coupled with limited access to appropriate healthcare.

Coronary Risk Factors

As noted previously, relative to the general population, African-Americans have a higher prevalence of known CVD risk factors. They include hypertension (high blood pressure), left ventricular hypertrophy (LVH--thickening of the muscle on the left ventricle of the heart), type 2 diabetes, cigarette smoking, and a general lack of physical activity. The onset of hypertension occurs at much earlier ages among African-Americans and is linked with 3 to 5 times higher cardiovascular mortality rates than in Caucasians (Clark et al., 2001).

Treatment Issues

According to Clark et al. (2001) low socioeconomic status (SES) is related to “higher cardiovascular morbidity and mortality, an increased in coronary risk factors and a decrease in access to healthcare services affecting prevention and early intervention measures. However, even when access to healthcare does not pose an issue African-Americans with CVD are “treated less aggressively than their white counterparts” (p. 103).

TABP and Cardiovascular Risk

Clinical observation of CHD patients led researchers to identify a shared set of personality traits among these individuals such as aggression, impatience, hypervigilance, and a proneness to anger (Eysenck, as cited in Strube, 1991, p. 25). Taken together these traits were termed TABP by two cardiologists who stated that this set of behavioral and emotional patterns had been observed in the majority of their CHD patients (Friedman & Rosenman, as cited in Strube, 1991, p. 25). Over the past 40 years there has been extensive research into TABP and its role in CHD. According to Rosenman (1991) TABP is “action-emotion complex involving

behavioral dispositions such as ambitiousness, aggressiveness, competitiveness, and impatience” (as cited in Strube, p. 2). As a result of the extensive literature linking TABP to CHD it was identified as a risk factor for CHD by the National Heart, Lung, and Blood Institute (NHLBI) in 1981 (Glass, as cited in Strube, 1991, p. ix).

Some researchers have attempted to deconstruct the concept of TABP into component parts in an attempt to identify the specific factors that relate to CHD. Many researchers have hypothesized that the personality factors of TABP responsible for the association with CVD are hostility and cynicism (some researchers refer to ‘cynical hostility’). There has been an abundance of research conducted in support this view (Barefoot, Dahlstrom, & Williams, 1983; Barefoot, Dodge, Peterson, Dahlstrom, & Williams, 1989; Dembroski, MacDougall, Costa, & Grandits, 1989; Shekelle, Gale, Ostfeld, & Paul, 1983). However, Rosenman (1991) argues that “it seems unlikely that highly intercorrelated emotional and behavioral aspects of a human being can ever satisfactorily be subdivided into single component parts such as hostility” (p. 248).

Hostility

Costa, Stone, McCrae, Dembroski, and Williams (1987) distinguish between ‘hot-blooded’ and ‘cold-blooded’ hostility stating that the former is at the extreme seen as rage while the latter is expressed as cynicism. Further, these authors suggest that contrary to intuition, it is the cynical form of hostility that is measured by the Cook-Medley Hostility (Ho) scale and therefore it is this form of hostility that is associated with cardiovascular health outcomes.

Cook and Medley developed the Ho scale in 1954 for the MMPI with the intent to measure one’s ability to get along well and function efficiently within a group. They administered the MMPI to school teachers that they had split into two groups based on their Minnesota Teacher Attitude Inventory scores (the high scoring group and the low scoring group).

The MTAI is used to determine the degree to which teachers differ in their ability to get along with their students. Low scores on the MTAI are associated with a hostile and cynical attitude toward students. The researchers identified 250 items that significantly discriminated against the MTAI high scoring teachers and the low scoring teachers. The items were further reviewed on content; upon completion of this review 50 items were obtained to form the Ho Scale (as cited in Han, Weed, Calhoun, & Butcher, 1995, p. 568).

The scale was not made popular until a study conducted by Williams et al. (1980) found a significant correlation between Ho scores and health outcomes; their data suggested that “Ho scores [are] more strongly related to severity of coronary artery disease (CAD) than measures of Type A behavior” (as cited in Han et al., 1995, p. 568). Since this study, research involving Ho has focused on 1 of 3 areas: studies related to the psychometric properties of the scale, studies that address health outcomes, and those related to physiological reactivity (Han et al., 1995).

Health Outcomes

Barefoot et al. (1989) found that Ho scores significantly predicted early mortality. This finding made a strong case for the potential health risks of the traits measured by the scale given that the sample was made up of only 128 participants. The data also suggested that the combination of items measuring cynicism, hostile affect, and aggression which comprise approximately half of the items on the full scale had a significantly higher health risk than did the full Ho score. Bunde and Suls (2006) performed a systematic, quantitative analysis to determine the relationship between Ho scale scores and traditional risk factors of CAD. They found that traditional risk factors such as body mass index (BMI), waist to hip ratio (WHR), lipid ratio, triglycerides (TG), IR, alcohol consumption, and smoking were consistently positively correlated to Ho scores. Thus, Ho scores increased alongside these factors. Furthermore, the

data suggests a negative correlation between socioeconomic status (SES) and Ho scores; that is, as one's socioeconomic status lowers, his/her Ho score increases. This data suggests that these factors may play a role in the documented relationship between Ho scores and CVD.

Psychometric Characteristics

The Ho Scale was revised with the along with the revision to the MMPI although there were relatively few changes. None of the original MMPI Ho items were deleted during the revision process. Forty-one of the 50 original items were unchanged; however, nine items were slightly reworded due to outdated, gender biased, or awkward language. Han et al. (1995) investigated the psychometric characteristics of the revised Ho scale in an effort to determine whether the previous body of literature could be generalized to the revised version of the scale. They found that the MMPI-2 norms for Ho to be very similar to those of the MMPI.

Han et al., (1995) examined the concurrent correlations and internal structure of the MMPI-2 Ho scale. In order to gather a general idea of the construct measured by Ho, the researchers correlated Ho scores with other MMPI-2 scales and found that regardless of sample (male or female), the four highest correlations were found between Ho and Cynicism (also referred to as RC3 or CYN), Defensiveness/Correction (K), Type A (TPA), and Antisocial Practices (ASP). They found a correlation of .90 between Ho and CYN indicating an almost perfect positive relationship but noted that this finding was largely due to item overlap. After removing the overlapping items however, the two scales remained highly correlated at .72. This data suggests that cynicism can have a significant impact on an individual's obtained Ho score. The intercorrelation results yielded four underlying dimensions of Ho including cynicism, hypersensitivity, aggressive responding, and social avoidance.

Physiological Reactivity

Williams, Barefoot, and Shekelle (1985) proposed the psychophysiological reactivity model which posits that hostility impacts cardiovascular health through its association with increased cardiovascular and neuroendocrine reactivity. The model suggests that hostile people experience increased blood pressure (BP), heart rate (HR), and stress-hormone activity in response to stressors. Further, because hostile persons are thought to be more prone to anger, they experience these reactions more frequently than their non-hostile counterparts. Thus, the researchers hypothesized that this frequent and intense reactivity plays a significant role in the development of CVD. Since this time, many researchers have investigated the role of physiological reactivity and hostility in an effort to identify underlying mechanisms that could be responsible for the relationship between hostility and increased risk of CVD. According to Vella and Friedman (2007), the Ho scale is perhaps the most widely used assessment measure used to investigate this relationship as those that score high on Ho tend to have elevated reactions to daily hassles.

Studies that have investigated physiological reactivity to non-social stressors (those not involving interpersonal or social relations) have found no correlation between Ho scores and cardiovascular reactivity (Kamarck, Manuck, & Jennings, 1990; Sallis, Johnson, Trevorrow, Kaplan, & Melbourne, 1987; Smith & Houston, 1987; as cited in Smith, 1992, p. 144). However, research that has examined interpersonal stressors has yielded results consistent with the psychophysiological reactivity model. Smith and Brown (1991) found that husbands who scored high on Ho exhibited increased BP reactivity during a task that involved trying to manipulate or control their spouse. Weidner, Friend, Ficarrotto, and Mendell (1989) found that regardless of gender, persons who scored high on Ho showed an increase in both systolic blood

pressure (SBP) and diastolic blood pressure (DBP) relative to their low scoring counterparts. Further, their data suggests that “arousal of suspiciousness and mistrust rather than anger may be responsible for the greater blood pressure reactivity” (Weidner et al., 1989, p. 43). It is also important to note that in this study, women as a group scored lower on Ho than men; this may indicate that women are at an overall lower risk of CVD or could indicate that Ho is not as sensitive a measure for women. In another study, Hardy and Smith (1988) found that the high scoring Ho group showed greater DBP reactions to interpersonal conflict consistent with other reports related to BP.

African Americans and Physiological Reactivity

Shapiro, Goldstein, and Jamner (1996) found that high scoring Ho African-American’s had “significantly elevated daytime and nighttime systolic blood pressure compared to subjects scoring low on this scale” (p. 362). This data adds support to the hypothesis that blood pressure may be a significant factor in CVD development.

Cooper and Waldstein (2004) examined the potential interactions between hostility and race on several physiological risk factors associated with CVD and found that hostility potentiated CVD risk in young African-Americans but had the inverse affect among young Caucasians. African-Americans in this study consistently scored higher on Ho than Caucasians. The results indicated a positive correlation between Ho scores and BP (both SBP and DBP), total peripheral resistance (TPR), insulin (INS), triglycerides (TG) and a negative correlation with cardiac output (CI) among young African-American adults. Furthermore, “hostility explained a substantial amount of the variance in DBP, CI, TPR, and INS (16-36%), as well as a notable proportion of the variance in SBP and TG (9-11%)” among African-Americans. These findings add to the extensive body of literature that links hostility to risk factors of CVD but offers new information about how race may mediate perpetuate these risks.

Cardiovascular Health and Racism: Are They Linked?

The disproportionately greater incidence of CVD among African-Americans has led some researchers to hypothesize that psychosocial factors mediate risk. According to Brondolo and Gallo (2008) racism be a major contributing psychosocial stressor stating that racism has both direct health effects (such as access to healthcare) and indirect effects (such as emotional and physiological reactions to stress). Of the limited research that has investigated the role of racism a noteworthy portion has examined its relationship to physiological reactions that been found to contribute to the development of stress-related disorders associated CVD development such as hypertension (Matthews et al., 2004)

Constitutional factors such as skin tone, occupation, and income have been hypothesized to impact one's exposure to discriminatory behavior (Clark et al., 1999). There is support that these factors act as moderators that interact with sociodemographic variables which promote negative health outcomes such as high blood pressure (Anderson & Armstead, 1995; Ernst, Jackson, Robertson, Nevels, & Watts, 1997; Harburg, Gleiberman, Russell, & Cooper, 1991, as cited in Clark et al., 1999, p. 807).

Forman, Williams, and Jackson (1997) suggest that the primary sociodemographic factor related to perceptions of racism is socioeconomic status (as cited in Clark et al., 1999, p. 807). However, there are few studies that have explored this relationship and those that have found inconclusive and often contradictory results; some researchers have reported a positive correlation between SES and discrimination while others have found a negative relationship (Sigelman & Welch, 1991, as cited in Clark et al., 1999, p. 807).

According to Clark et al. (1999) psychological and behavioral factors impact how an individual perceives and responds to his/her environment. It has yet to be determined if these

factors are connected to racism and health outcome. However, available research suggests that the many of the coping methods observed among many African-Americans used to combat perceived discrimination have been associated with cardiovascular reactivity.

Fang and Myers (2001) found that both African-Americans and Caucasian men experienced elevated BP in response to anger-provoking and racist stimuli as compared to a neutral stimulus. Contrary to the researcher's hypothesis, their data did not suggest a higher reaction among African-Americans than their Caucasian counterparts. Their data also suggests that high scoring Ho individuals experience sustained elevations in BP even after a stressor has been terminated. Although, African-Americans did not show more cardiovascular reactivity to racial stimuli than Caucasians, it should be noted that African-Americans are much more likely to experience exposure to racial discrimination than Caucasians and therefore, are more likely to be affected by the health consequences of repeated and prolonged cardiovascular reactivity.

Conclusion

In summary, there has been extensive research conducted over the past 40 years related to personality and health outcome, specifically cardiovascular disease. Researchers first identified a set of emotional and behavioral patterns found among many individuals with CVD to which they termed TABP. There was a significant amount of research that linked TABP to morbidity and mortality. After deconstructing TABP into its behavioral and emotional subcomponents, hostility emerged as the most likely contender in the relationship between TABP and CVD. A correlation between The MMPI Ho scale scores and cardiovascular health was identified and extensively researched however; no conclusive results have emerged as to the underlying cause of this relationship. Although, there is obviously a connection, it has been difficult for researchers to pin-point exactly what the underlying factors are and just how they interact with

physiological health. Ho appears to be a good predictor of health outcomes but this data should not be taken in isolation. Results from Ho should be considered along with collateral information obtained through various methods of data collection in determining someone's risk of developing CVD.

In addition to the research that has attempted to account for the relationship between personality and health, recently researchers have investigated the potential reasons behind the disproportionately higher incidence of CVD among African-Americans in comparison to other racial groups. Many of these studies have examined the physiological effects of perceived racism and discrimination; the hypothesis being that those subject to chronic discrimination would have more frequent and intense physiological stress reactions which may put them at increased susceptibility to developing CVD. Research in this area has just emerged and requires continued investigation.

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