AMERICAN INDIANS, STRESS, AND ALCOHOL

PATRICIA D. MAIL, M.P.H., M.S.

Abstract: American Indian drinking behavior is often attributed to stress. The causal relationship of stress to Indian drinking and alcohol's role as a stressor is explored. It is likely that some drinking behavior is a response to psychosocial stressors, and that rapid ingestion or large quantity alcohol consumption may also precipitate the psychogenic stress response, thereby exacerbating stress in the individual. Using alcohol to reduce stress increases opportunities for injury and illness.

Research increasingly reveals relationships between psychogenic stress and specific disease states. Because alcoholism is said to be exacerbated by stress, a review was undertaken to determine whether or not a causal relationship could be identified between psychogenic stress and alcohol abuse. Specifically, the focus is on American Indians and Alaska Natives (vs. Indian) because the literature on Indian drinking often cites stress as a precipitating or causal factor in Indian alcoholism.

What Is Stress?

Stress is a word commonly used to refer to a wide range of situations, conditions, states, and circumstances that are presumed to adversely affect people. The unabridged *Random House Dictionary* (Flexner & Hauck, 1987) defines stress variously as:

> ...physical, mental or emotional strain or tension, or a situation, occurrence, or factor causing this...
>
> and/or
>
> ...Physiol. a specific response by the body to a stimulus, as fear or pain, that disturbs or interferes with the normal physiological equilibrium of an organism...

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One of the earliest definitions of stress was promulgated by Hans Selye in 1946 in which he proposed that stress was the nonspecific response of the body to any demand made upon it to adapt whether that demand produced pleasure or pain (Allen, 1983). Allen goes on to note that most stress encountered by individuals in this culture is psychogenic (in which a biologically inappropriate fight or flight response is elicited within the body). This process itself can cause disease. But does this process cause alcohol abuse? And what are the links between alcohol abuse and stress?

Allen (1989) describes three types or subcategories of stress: psychogenic, psychomolletic, and psychosanatic. Psychogenic stress is the physiologic response to a perceived stressor, and is sufficient to cause disease by itself (e.g., such as hypertension or migraines). Psychomolletic stress is that in which the mind is not sufficient to cause a disorder but it can make it more likely for a disease to happen because resistance is weakened (e.g., cancer). Psychosanatic stress is that in which the mind plays a role in the healing process. It is a positive application of stress, and the one with which Indians in the past may have been familiar.

Stress is not apt to be a cause of most clinical disorders, but rather a mediating or exacerbating factor. Recent research in the neuroendocrine physiology of the stress response has demonstrated the extensive damage cause to a variety of organ systems through continued stimulation of the nervous system and prolonged exposure to the catecholamines. An excellent discussion of the physiology of stress can be found in Allen's *Human Stress, Its Nature and Control* (1983).

Where alcohol abuse is concerned, stress of one sort or another is widely attributed to be a factor in clinically-observed illness. An article by Hamburg (1980) noted that stress is viewed as a contributing factor to problem drinking and alcoholism. On the positive side, she suggested that stress points in life are likely to be teachable moments and times when educational interventions would be most likely to contribute to the learning of nondestructive ways of dealing with stress (Hamburg, 1980).

It is proposed that the stress commonly cited as a factor in Indian alcohol use is psychomolletic, with its origins derived from maladaptive psychosocial or sociocultural responses to circumstances of present existence. In the Indian alcohol literature, stress is variously described as both a contributor to as well as a result of alcohol abuse.

Stress Originating In Culture Change

Stress that contributes to abuse is often described as resulting from deviant cultural change, either too rapid acculturation, or to deculturation. Acculturation stress is the result of the demands to integrate into, and identify with, another, more dominant culture. Deculturation stress is that resulting from the loss or devaluation of historical tradition (Brod, 1975).

Examples of culturally derived stress can be found in a variety of studies. Hackenberg and Gallagher (1972), as well as Stull (1973), addressed the costs and negative consequences of modernization among the Papago Indians (now known as the Tohono O'odham), while Topper (1980) addressed the use of alcohol among Navajo male adolescents who were experiencing difficulty in adapting to white culture. Rotman (1969) described how the old, understood, and familiar ways of life for the Navajo were being replaced by something new, different, and often misunderstood. He proposed that alcohol was used to cope with feelings of inadequacy in the face of this rapid acculturation (Rotman, 1969).

Savard (1968) and Topper (1974) suggested that Navajo drinking was a response to the stress of acculturation and the inability of the culture to adapt to economic change. Dubbs (1975) and Graves (1971) reported on the maladaptive use of alcohol that is observed accompanying urban migration. In the case of the Alaskan Eskimo, Dubbs also noted that individuals can bring "preurban" personal experiences that were stressful in the villages with them to the cities, and these, coupled with and compounded by urban stresses, can create a new stress complex for the migrants. Berreman (1964) suggested that 200 years of domination, depopulation, and relocation caused the Aleuts to take refuge in apathy and alcoholism to deal with deculturation.

Berlin (1986) suggested that Indian adolescent males exhibit a greater vulnerability to the stress of culture change. They demonstrate a predisposition to a variety of biological-neurointegrative problems that may ultimately be manifested in psychoses, hyperactivity, or suicide. He also proposed that the forced acculturation on reservations resulting in subsequent loss of traditional family, clan, tribal roles, traditions, customs, and religion contributed to the rise of psychopathologies. And he explored the stress of value systems that pressure individuals to accommodate, compounded by the steady disintegration of both nuclear and extended families (Berlin, 1986).

Phillips and Inui (1986) observed that acculturation is the outcome of processes that are simultaneously occurring at multiple levels within a society, and that the acquisition of alien beliefs and values produces stress which may be alleviated by alcohol use. Savishinsky (1971) reported that acculturative influences were significant sources of stress for semi-nomadic Indians of Northern Canada. They released stress by chronic brewing and drinking, as well as frequent migration back into the bush from the towns and villages that were additional sources of stress.

Fewer authors address deculturative stress. Phillips and Inui (1986) identified high rates of substance abuse, family disruption, criminal behavior, and mental illness as attributes of deculturative stress. They defined deculturation as the loss of traditional beliefs and values. This is consistent with Brod (1975) and Berlin (1986), who suggested that loss/or devaluation of historical tradition is a major source of stress.

The loss of traditional culture and institutions that provided communal discipline and socialization are cited by several authors as significant sources of stress, especially for adolescents (Ackerman, 1971; Maynard, 1969; Whittaker, 1966). Accompanying role-loss for young men is proposed as a significant source of stress (Brod, 1975; Maynard, 1969).

Injuries Related to Stress

Accidental injuries and alcohol abuse have frequently been cited as indicators of the degree of stress and deterioration of mental health within Indian communities. Studies among the Alaska Native populations (Kraus & Buffler, 1979) and the Papago of Arizona (Hackenberg & Gallagher, 1972; Stull, 1973) were conducted to explore the relationship between modernization and stress. Maynard (1969) suggested that there was an Alcohol Adjustment Syndrome which included such characteristics as failure to support one's family and being involved in automobile accidents.

Topper (1973) suggested several diagnostic indicators of social pathology in response to stress that included: 1) higher rates of suicide and homicide; 2) higher incidence of alcoholic cirrhosis; 3) increased automobile accidents; and 4) high rates of arrest for public drunkenness, drunk driving, and drunk and disorderly. Ackerman (1971) postulated that loss of warrior status might be related to the extremely high number of fatal automobile accidents suffered by male Nez Perce.

More recently, life events scales have been administered in Indian communities to try to show relationships between stress, life events, and unintentional injury (Morigeau, 1979). His initial findings were inconclusive. A related scale that has not yet been reported as administered to Indians is the Children of Alcoholics Life Events Schedule (COALES) developed by Roosa and colleagues (Roosa, Sandler, Gehrig, Beals, & Cappo, 1988). With the increasing interest in children of alcoholics and associated therapeutic interventions, this scale might yield valuable planning and evaluative information.

While unintentional injuries are considered diagnostic indicators of alcohol misuse as well as an indicators for stress, Schuckit and Irwin (1988) observed that no single symptom or indicator establishes a diagnosis. However, the presence of one or more indicative factors should alert the clinician to conduct a more thorough history taking. The combination of alcohol and inattention due to stress can prove deadly not only in the operation of a motor vehicle, but for pedestrians or individuals in their homes.

If accidents are indicators of stress, more sensitive tools to assess or rank the influence of life events might be helpful screening instruments for community workers. Additional research will be needed to refine and connect stressful life and environmental events to measurable degrees of psychogenic stress.

Other Stressful Factors

While culture change is often postulated as a major stressor that precipitates or contributes to drinking, several authors have suggested other stressors in Indian life that may also contribute to alcohol abuse. Their observations include: 1) environmental stress due to scarce resources, physically demanding climates, and the need for adequate shelter (Savishinsky, 1971); 2) anger at social inequality between Natives and non-Natives, expressed through drinking and other deviant actions including job instability, sexual promiscuity, and major transgressions against society (Norick, 1970); 3) strife-induced stress within the family unit, some of which has been attributed to the stresses and strains of acculturation, and some attributed to the dissonance between role expectations and role fulfillment (Berlin, 1986; Fischler, 1985; Medicine, 1969; McNickle, 1968); and 4) the absence of natural parents in early life (Hoffman & Noem, 1975).

Family disruption and stress may also result in increased child abuse and neglect. Fischler (1985) surmised that the most common precipitating cause of abuse and neglect is the extreme social stress experienced by parents who lack effective supports and coping mechanisms. In one study of Indian child abuse and neglect, 50% of abuse cases and 50 to 80% of neglect cases were alcohol-related, compared to 17% among non-Indians. Observed patterns of maltreatment among Indians resulted from such factors as sibling caretaking, poverty, culture change, a generation of unparented parents, alcoholism, and situational stress with ineffective social support (Fischler, 1985). Social environments unable to provide adequate support mechanisms tend to foster feelings of powerlessness/helplessness and lack of personal control. Schinke and colleagues (Schinke, Moncher, Palleja, Zayas, & Schilling, 1988b) hypothesized a relatively strong link between substance use and emotional self-regulation, and developed coping skills training programs for Indian youth to build and improve survival skills (Schinke, Botvin, Trimble, Orlandi, Gilchrist, & Locklear, 1988a).

McKirnan and Peterson (1988), while not writing about Indians, developed a hypothesis that would fit Indian circumstances. They maintained that stress induces substance abuse among populations made vulnerable by specific attitudes or expectancies. Their stress vulnerability theory incorporated various sociocultural stressors as contributing to substance abuse. Chief among these were: discrimination, including stigmatization, employment difficulties, verbal harassment or even assault; and negative affectivity, an integrative construct characterized by moderate depression, low self-esteem, alienation, and trait anxiety. They hypothesized that discrimination and negative affectivity can result in substance abuse. Certainly these are conditions familiar to Indian populations, especially those residing in the border towns or on the smaller reservations surrounded by non-Indians.

Alcohol Abuse As A Response to Anxiety

The publication of the Health Field Concept in 1974 (Lalonde) raised public and professional awareness that lifestyle was a significant contributor to health and illness. The style and manner in which an individual eats, sleeps, plays, reproduces, works and socializes, combined with the influence of perceptions and resulting neuroendocrine responses, may account for much of the physical illness and psychic trauma in one's lifetime. Totman (1979) suggested that approaches to studying the social causes of illness could be divided into three main categories: 1) life events or circumstances that precede the onset or worsening of an illness; 2) personality traits linked to susceptibility; and 3) emotional states preceding to and concurrent with disease.

Totman (1979) identified a variety of circumstances in which research has demonstrated a link with disease onset. These include, but are not limited to: bereavement and loss; adjustment to a new job or role; social and geographic mobility; status incongruity; immigration; rapidly changing social environment; and social support.

For Indian populations, all of these sociocultural and psychosocial factors have been identified at one time or another as stressors contributing to alcohol abuse. An additional factor that has appeared in the Indian alcohol literature suggests that anger, anxiety, and feelings of stress that cannot be adequately expressed under normal social and cultural conditions, can be given vent when an individual becomes drunk enough to overcome culturally-mandated repression of such expression. Here, liquor serves as the reliever of tension, frustration, and anxiety.

May (1982) suggested that individual as well as community susceptibility to substance abuse might be predicted by determining the degree of sociocultural integration, the level of acculturative stress, and the level of individual acculturation and integration. Reviewing life events in the context of culture and assessing the degree to which that culture's level of social integration either mitigates or exacerbates individual and community stress, one begins to appreciate the complexity of designing appropriate interventions for different Indian communities.

One of the first psychosocial elements to be nominated as a contributing factor in alcohol abuse was anxiety. In 1943, Horton proposed drinking as a cultural means of reducing anxiety, and postulated that the primary function of alcoholic beverages in all societies was for the reduction of anxiety.

Twenty-five years later, Ferguson (1968) classified Navajo drinkers into two types: the recreational drinker and the anxiety drinker. These styles of drinking were related to lifestyle and the degree of individual social integration, or what Ferguson identified as a "stake" in society (1968). Several authors have explored the role of heavy drinking as a means of reducing anxiety, relieving stress, and overcoming the cultural mandates for proper behavior (Dubbs, 1975; Geertz, 1951; Savard, 1968;

Savishinsky, 1971; Savishinsky & Frimmer, 1973; Whittaker, 1966). Drinking that provided relief from the expectations and proscriptions of a culture has been identified as taking "time out" from the culture's usual behavioral expectations (MacAndrew & Edgerton, 1969). This style of drinking may actually serve as a stabilizing factor for some individuals and communities.

Geertz (1951) described young Zunis as using alcohol to both identify with the white man as well as an expression of hostility against him. This theme is echoed by Lurie (1971) in her discussion of Indian alcohol use as a form of protest movement. Whittaker (1966) noted that anxiety induced by the basic insecurities of life, coupled with contact with other more powerful groups, produced high degrees of insobriety among the Sioux. Drew (1988) identified several acculturative stressors that could precipitate drinking to escape the anxiety and discomfort of stress among urban migrants to Toronto. She classified these as extrapersonal stressors (e.g., financial management, transportation, employment, housing, etc.); intrapersonal stressors (e.g., concern about being on time, amount of sleep, religious practices, etc.); and interpersonal stressors (e.g., non-native understanding of natives, family size, etc.).

The relationship of drinking to spiritual experiences and the manipulation of power within Indian societies is less well understood. Carpenter (1959) proposed a changing role over time for alcohol among Iroquoian peoples, in which alcohol initially served as a means of seeking a higher spiritual experience, such as in a vision quest or search, or discovery of self. In the 17th Century, alcohol was believed to be a dream-maker, while in the 18th Century, alcohol came to be understood as the releaser of tension and aggression. In the 19th Century, during the messianic revitalization of Handsome Lake, alcohol was defined as an evil and destroyer of culture (Carpenter, 1959). It was left for the 20th Century to define alcoholism as a disease entity, although for many Indian peoples, alcohol still has the moralistic overtones of evil and violence (Mail, 1985). One hypothesis suggested that alcohol use permitted expression of hostility as a substitute for witchcraft and ghost belief (Geertz, 1951). Another is that alcohol and drug abuse have become more culturally acceptable as outlets for aggression and frustration as the practice of witchcraft retreats before non-Indian skepticism and the onslaught of acculturation (Mail, McKay, & Katz, 1989).

Proposed causal factors contributing to the use and abuse of alcohol within Indian communities are many and varied. Misuse of alcohol may derive from one or more elements within the individual's universe, from internal community discordance to external pressures. The major studies cited are summarized in Table 1.

Table 1

Alcohol and Stress in Indian Populations:
Major Hypotheses Regarding Use of Alcohol

Author	Year	Stress Observation or Hypothesis
Ackerman	1971	Stress from loss of traditional institutions
Berreman	1964	Seeking refuge from stress due to culture conflict
Brod	1975	Response to sociocultural stress
Carpenter	1959	Vision-seeking as refuge from change
Drew	1988	Response to acculturation stress in urban settings
Dubbs	1975	Response to acculturation stress in urban settings
Ferguson	1968	Recreational vs. anxiety drinkers
Fischler	1985	Response to stress contributes to child abuse & neglect
Geertz	1951	Alcohol highlights and relieves stress
Graves	1971	Drinking to relieve stress in urban settings
Hackenberg & Gallagher	1972	Drinking & accidents as indicators of stress
Hoffman & Noem	1975	Absence of natural parents early in life causes stress relieved by drinking
Horton	1943	Drinking as response to anxiety
Kraus & Buffler	1979	Response to sociocultural change
Kunitz & Levy	1986	Hypertension as indicator of acculturative stress

Table 1
(Continued)

Author	Year	Stress Observation or Hypothesis
Lurie	1971	Drinking as a form of protest demonstration
MacAndrew & Edgerton	1969	Drinking for "time out" from institutional expectations
McNickle	1968	Reaction to stress
Mail & Palmer	1985	Availability of stress management programs
May	1982	Loosely integrated tribes have higher risk for stress & substance abuse
Maynard	1969	Drinking as a means of coping with intolerable stress
Medicine	1969	Changes in the family that contribute to excessive drinking
Morigeau	1979	Life stress contributes to unintentional injury
Norick	1970	Response to culture conflict
Phillips & Inui	1986	Reflection of maladaptive adjustment exacerbated by alcohol
Rotman	1969	Response to culture change
Savard	1968	Response to culture change
Savishinsky	1971	To relieve stress and express anger in response to culture change
Savishinsky & Frimmer	1973	To release stress due to culture change
Shore & Stone	1973	High prevalence of psycho-physiological disorders including peptic ulcer

Table 1
(Continued)

Author	Year	Stress Observation or Hypothesis
Stull	1973	Accidental injury & alcoholism as social indicators of psychological stress
Topper	1973/1974	Drinking as a response to stress because culture cannot adapt rapidly enough
Whittaker	1966	Drinking due to high stress and deculturation

The Role of Psychogenic Stress

Thus far, all of the reports cited have discussed stress as having sociocultural or psychosocial origins. Stress has been widely used to explain why and under what circumstances Indians use and abuse alcohol. But none of these studies have considered stress in its physiological context. In asking "what is stress" at the beginning of this paper, two definitions were presented: one psychological, one physiological. The vast majority of the Indian alcohol literature addresses psychological, or psychosomatic stressors.

Is it important then to consider psychogenic stress as it relates to Indians? Definitely yes. With an increasing life expectancy (U.S. Indian Health Service, 1984) and culture change inevitable medical care providers for Indian people should increasingly anticipate diseases that can result from psychogenic stress. Only a few studies to date appear to have explored this area either directly or indirectly. Kunitz and Levy (1986), exploring the prevalence of hypertension among elderly Navajo who had been subjected to acculturative stressors, reported a slight but significant trend for blood pressure to increase with age, weight, and alcohol use in men. Shore and Stone (1973) looked at prevalence of peptic ulcer among the Makah, but found no direct relationship between peptic ulcer, alcoholism, and psychiatric impairment.

No studies of Indians have been reported that look at the specific relationship between stressful life events and alcoholism, although many studies infer this. One study (Morigeau, 1979) investigated the relationship between stressful life events and injury, but the results were inconclusive. Alcohol use was not a variable in the study design, but one could infer its potential impact as an underlying factor because the general risk exposure

scale asked about the number of celebrations attended as one measure of risk.

High mean blood pressure among young men, the same age group experiencing high accident, homicide, suicide, and cirrhosis mortality rates, may be an indicator of a population that is especially vulnerable to acculturation stressors that result in chronic stress.

Indians, Stress, and Alcohol

Many authors have postulated a series of events within the social and psychological environment of Indians that cause stress. And while these stressors are believed to contribute to or promote alcohol abuse, there are also individuals in the population who--when subjected to the same stressors--do not drink. Nowhere does the Indian alcohol literature report that when exposed to one or more stressors, 100% of the population at risk proceeded to use alcohol. While the current research does not provide strong evidence for a real association between stress and drinking, an association could be inferred from the social integration model postulated by May (1982). Cohesive and well-integrated communities provide mitigating influences on stress, while poorly-integrated communities tend to demonstrate high levels of stress and concomitant substance abuse.

Evidence of disease in those who use alcohol is well established for non-Indians. There are fewer reports of research in the Indian literature where rigorous research methodology, such as quantity, frequency, and dosage over time, have been applied. Exceptions include research among the Apache, Hopi, and Navajo conducted by Kunitz and associates (Kunitz, Levy, Odoroff, & Bollinger, 1971; Kunitz, Levy, & Everett, 1969; Levy & Kunitz, 1974; Whittaker, 1962), and the Fetal Alcohol Syndrome (FAS) survey conducted by May and associates (May, Hymbaugh, Aase, & Samet, 1983). It has been well established that chronic alcohol ingestion will, in many individuals, result in the development of cirrhosis of the liver, greater susceptibility to cancers and degenerative conditions. However, the majority of research on Indians consists of self-reports and retrospective data drawn from clinical, psychological, and law enforcement records.

Do difficult circumstances of living create stress and cause Indians to drink? For long-term and complex disorders, this is often difficult to demonstrate, particularly for behavioral or emotional problems.

The Indian alcohol literature discusses both a variety of things which are presumed to cause drinking, as well as drinking behavior that is cited as the cause of problems following drinking bouts. The causes are multiple and complex, and culturally-appropriate screening methodologies for assessment of individual risk are not yet well developed. McKinan and Peterson (1988) observed that so-called objective stressors such as unemployment have substantially different meanings to different people, so that what is stressful to one individual is not to another. The various

components of these complex stressors have not been completely identified and ranked by degree of ability to invoke the stress response.

An additional confounding factor is the recent evidence for biological susceptibility for alcoholism (Cloninger, Bohman, & Sigvardsson, 1981; National Institute on Alcohol Abuse and Alcoholism, 1987; Schuckit, 1987). While repeated ingestion of alcohol can cause addiction, there is evidence that, there is also a genetic susceptibility to alcoholism for some individuals. When susceptible individuals are exposed to alcohol, they will develop the disease of alcoholism. These findings have not been linked to studies of stress, nor have there been studies reporting levels of perceived stress in susceptible vs. non-susceptible individuals. Research should consider whether or not high stress environments might contribute to the acceleration of the disease process in susceptible individuals.

Alcohol As A Stressor

In addition to the stress-alcoholism equation, is there evidence for alcohol abuse as a cause of stress? Here, evidence is beginning to accumulate. Blum and Trachtenberg (1988) report brain receptor sites for the metabolic products of alcohol (e.g., tetrahydroisoquinolines). A craving for alcohol may be related to a deficiency of the naturally-occurring opiate-like substance, as well as other neurotransmitters. This deficiency can occur genetically or as a result of prolonged stress or long-term heavy drinking. These researchers proposed that by treating the imbalance chemically, it might be possible to alleviate the craving for alcohol. A therapeutic intervention of this nature, coupled with strong counseling and aftercare programs, might yield sobriety maintenance rates considerably higher than current levels. Certainly this is an area that health care providers to Indian people might wish to explore, as many clients of Indian alcohol programs seem to experience frequent relapses, and the counseling staff is spread thinly in high-prevalence communities.

Other evidence is being published suggesting that alcohol ingestion may induce psychogenic stress. A recent report in the *New England Journal of Medicine* reaffirms that excessive ethanol consumption is probably responsible for most of the medical disorders associated with alcohol abuse, and that malnutrition potentiates the adverse effects of ethanol (Diamond, 1989). Thus, such problems as alcoholic cardiomyopathy may be the result of malnutrition, ethanol ingestion, and chemicals released within the body as a response to the stressors of inadequate diet and drinking. As cardiomyopathy has been observed in individuals who were not malnourished but alcoholic, ethanol is implicated as a major cause for this condition.

Schuckit and colleagues (Schuckit, Gold, & Risch, 1987) used the pattern of change in plasma cortisol levels following ethanol challenges to help characterize differences in response to alcohol in sons of alcoholics and controls. While these researchers were looking for neuropsychological

attributes to distinguish individuals at risk from normal, non-risk controls, they were also assessing a product of the stress response: cortisol.

Allen (1983) identifies cortisol as one of the most potent hormones of the entire stress process. Schuckit and colleagues (1987) report that with rare exceptions, human and animal studies indicate that cortisol level increases after ethanol ingestion if the dose is high enough and/or the rise in blood alcohol concentrations is rapid enough. This strongly suggests that ingestion of ethanol in and of itself is a stressor. High ethanol consumption triggers the stress response as well as increasing the risk of addiction. Equally important from a clinical standpoint, it contributes to immunosuppression (Jerrells, Marietta, Bone, Weight, & Eckhardt, 1988). As components of the stress response also contribute to impairment of the immune system, the combination of alcohol ingestion and neuroendocrine response to stress can leave an individual extremely vulnerable to infection.

Allen (1983) attributes the risk to the immune system as a result of elevated levels of cortisol. Cortisol is one of the glucorticoids released from the adrenal cortex as a part of the stress response. Cortisol's main action is to accelerate gluconeogenesis, the creation (genesis) of new (neo) somatic fuel (gluco). Protein-based gluconeogenesis can draw on muscle tissue for fuel if there is insufficient supply of fatty acids available. The drawing down of the body's protein supply means that protein is not available to manufacture and replace cells that die. Muscular atrophy and cellular immunity are the result. Allen (1983) notes that the white blood cells or lymphocytes, are particularly affected. By mobilizing proteins, cortisol decreases the production of lymphocytes, decreasing the ability of the body to generate an immune response.

Additional evidence is reported by Swartz and colleagues (Swartz, Drews, & Cadoret, 1987). Their research sought to validate the stress-reduction theory (Powers & Kutash, 1985; Stockwell, 1985). They set out to determine if alcohol would diminish the stress-induced release of epinephrine, presumably through disinhibition or sedation. When subjects were given alcohol and stressed, a pattern of epinephrine, but not norepinephrine elevation, was observed. This suggests that alcohol is not just a central nervous system depressant, but creates stimulant effects like elevation of blood pressure. Swartz, Drews, and Cadoret (1987) postulate that central nervous system stimulation might contribute to alcoholic behavior and strongly suggests that alcohol ingestion is, by itself, able to produce a stress reaction.

Other evidence for alcohol as a stressor is observed in the alcohol withdrawal syndrome. This is characterized by increased anxiety, tremulousness, paroxysmal sweats, increased diastolic and systolic blood pressures, increased heart rate, and reduced sleep. Linnoila (1987) reports that most of these are symptoms of sympathetic nervous system over activity, and may be alleviated by pharmacological manipulation. Linnoila suggests that enhanced norepinephrine turnover that is causally associated

with the severity of the withdrawal symptoms. This stress-related reaction is also a result of having ingested alcohol.

Implications for Health Care Workers

This paper started with the hypothesis that Indian alcoholism is caused by stress. The Indian alcohol literature presents a number of suggestions about the types of stress that might initiate or contribute to alcohol abuse. But no studies actually discuss stress from a physiological frame of reference. Stresses identified have all been perceived as external to the individual, or have been described in terms of psychological and emotional reactions rather than a physiological stress response. Several studies have suggested that rather than drinking in response to stress, some Indians drink for recreation or religious reasons, with the resulting drunken behavior producing stress.

In looking at alcohol ingestion itself as a cause of stress, there is some evidence that rapid or copious ingestion does trigger the body's stress response system. And the provocative report by Peris and Cunningham (1986) suggests that consumption of alcohol under stressful conditions (e.g., those that trigger the stress response in the body) may actually reinforce alcohol's perceived euphoric properties.

If Indian people exist under circumstances that are stressful, as many authors postulate, and these conditions in one way or another repeatedly trigger the body's stress response, then the ethnographic observations that stress causes the alcohol abuse may actually have physiological validity.

The elements underlying Indian drinking are complex, but fall into three major categories: biological, psychological, and sociocultural. Biologically, some individuals may have a degree of genetic susceptibility. Psychologically, failure to master good coping skills or to exhibit behaviors consistent with community norms may lead to abusive drinking. Finally, an association may be observed between the degree to which the society is integrated and structured, and the degree to which its members misuse alcohol. Many factors in reservation and urban environments have been identified that, to a greater or lesser degree, contribute to or reinforce destructive drinking patterns. The challenge lies in developing ways to counter, avoid, intervene, and protect against the negative elements, while reinforcing the positive attributes existant within Indian communities.

For the providers of medical care to Indian people, it is clear that research to clarify the nature of alcohol abuse and addiction will help in improving and refining prevention, treatment, and rehabilitation approaches and programs. The contribution of psychogenic stress to illness and lowered immune levels has implications for counseling and patient education.

If stress is a factor, then what resources are available to ameliorate stress in Indian communities? A national survey conducted in 1985 found

that 59.9% of Indian reservations had access to some form of stress management class. The availability varied greatly from area to area, with the lowest availability being in the Billings Area (38.4%) and the highest availability in the Alaska Area (81.8%) (Mail & Palmer, 1985). However, it was not possible to assess the quality of these programs, and one suspects that none of them actually established a physiological baseline against which to evaluate mastery of stress-reducing techniques. Throughout the U.S., there is no standard or qualifying certification for instructors, no quality assurance guidelines for courses, and no assurance of the consistency or cultural appropriateness of stress management approaches. If stress does contribute to alcohol abuse, then one can construct strong arguments for increasing the availability and maintenance of stress reduction and training in coping skills. Models for coping skills to reduce and manage stressors in life are being adapted to various ethnic groups to help prevent drug and alcohol abuse (Schinke et al., 1988b). This type of work needs to be encouraged, expanded, replicated, and evaluated. These approaches should be coupled with physical exercise programs, as there is evidence that exercise has both preventive and rehabilitative contributions toward recovery (Palmer, Vacc, & Epstein, 1988).

Conclusion

Environmental, sociocultural and psychosocial factors may serve as stressors and/or coping strategies for American Indians. Research suggests that the physiological stress response evoked by complex, multiple stressors may, in fact, exacerbate alcohol abuse. Although there is no clearly demonstrated cause and effect relationship between the current alcohol abuse and psychosocial stress, there is evidence that the physiological stress response itself may enhance the effects of the alcohol, contribute to the development of tolerance, exacerbate abusive use of alcohol, and impair the immune response. Alcohol use may have become the primary coping response for some individuals and communities. A drinking peer group may be as powerful an influence as a genetic susceptibility.

Better understanding of the human stress response and personal skill in coping with stress may determine whether an individual becomes ill or is able to live a whole, well and productive life as a member of a traditional or modern community. Continued efforts at prevention, intervention, treatment, and rehabilitation need to be developed, with increased emphasis on stress reduction and bicultural coping skills. Directions suggested by recent research should be incorporated into therapeutic program planning and implementation. Primary prevention of alcohol abuse is simple: don't start. Secondary prevention is far more complex, but answers from the disciplines of education, psychology, biology, anthropology, and medicine are coming together to provide a better understanding of the complex disease known as alcoholism.

Department of Health & Human Services
Public Health Service
Office of the Surgeon General
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