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Use of Humor as a Complementary
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Definition

Use of humor as a complementary therapy involves providing humorous stimuli to produce mirth and laughter. Mirth and laughter have long been viewed as having healing potential.

History and Theoretical Base

In ancient days, a connection between emotion and health was recorded in the Bible in a "cheerful heart is good medicine, but a crushed spirit dries up the bones" (Proverbs 17:22, New International Version). In more modern times, use of humor as a healing modality can be traced back to the Shriners' use of clowns in the 1930's to cheer up children hospitalized with infantile paralysis. The holistic or alternative medicine movement began in the 1950's. Humor was not initially considered a part of this movement, but was subsequently added as the movement widened to embrace more non-traditional modalities {Fry 1994}.

How humor might affect health can be partially explained using a relatively new field of science, Psychoneuroimmunology (PNI). This theory was developed by George Solomon {Solomon 1964}, and includes the influence of stress on the immune system in the development of disease. The term "psychoneuroimmunology" was coined by Robert Ader and Nicholas Cohen (1981), to describe the basic phenomena of this theory: interactions between the nervous system, the neuroendocrine system, and the immune system {Ader 1981}. These interactions may play a part in subsequent disease development/progression. Use of PNI theory could explain how humor and laughter, which may lead to changes in neurotransmitters in the CNS and changes in hormone levels in the endocrine system, could also induce changes in immune functioning, which ultimately can influence susceptibility to disease. Because PNI theory acknowledges the multifactorial nature of wellness and illness, it is particularly useful as a guide for complementary research and practice {Zeller 1996}.

Use of Humor to Improve Health

In 1979 *Anatomy of an Illness* was published, a widely popular book in which Cousins credited humor and laughter with his recovery from a serious collagen disease {Cousins 1979}. Since then, many small and large humor projects have been initiated in an attempt to utilize the hypothetical benefits of humor (Fry, 1994). According to a study of cancer patients in the rural Midwest {Bennett in press}, more

than 87% were currently using at least one complementary intervention to cope with the stress of cancer. The majority of the patients were using prayer, which was not surprising given the conservative nature of many persons in the rural Midwest. Use of humor was the next most popular intervention, with 50% of the sample already using humor, and an additional 13% stating they would definitely try it. This popularity is easy to understand. Humorous stimuli are relatively easy to introduce into a person's life, because the use of humor does not require large amounts of time or money to implement, and produces few, if any, harmful side effects.

According to PNI theory, it is possible that humor and/or sense of humor act to reduce the effects of negative life events on the emotional and physiological stress responses. Unfortunately, research data concerning the effect of humor and laughter are just beginning to emerge. According to Fry, (1994) "as with most grass-roots movements, there is little laboratory, statistical, analytic, or otherwise scientific evidence to justify scientifically the huge degree of enthusiasm for uses of humor in this context" (p. 119).

Research Base

Laughter, Stress, and Pain Perception

In a study of the effect of laughter on stress in persons undergoing dental surgery, it was found that those persons who laughed and joked more frequently before the dental procedure reported less stressful subjective experiences following the procedure {Trice 1986}. Another study examined the effect of laughter on both mood and pain perception in a sample of elderly persons living in a long-term care facility. The subjects exposed to the humorous videos subsequently reported decreased pain and improved mood, compared with those who were exposed to the non-humorous videos {Adams 1986}. These findings concerning the effect of laughter on pain perception were supported by a later study that used college students to examine the effect of laughter on pain tolerance. The results indicated that subjects who were exposed to a humorous video had increased pain tolerance to TENS unit stimulation compared with the control group, who watched a non-humorous video {Hudak 1991}.

Physiological Effects of Laughter

A study by Fry and Savin (1988), demonstrated that hard laughter leads to increased heart-rate, respiratory rate, and oxygen consumption. Laughter affects the cardiac system by temporarily increasing

heart rate, circulation, and blood pressure, followed by a recovery state in which blood pressure and heart rate drop below resting levels {Fry 1988}.

Research examining the effect of laughter upon stress hormones has generated conflicting results. One early study looked at the effect of viewing four different films on urinary excretion of epinephrine and norepinephrine in a sample of 20 women {Levi 1965}. The four films were chosen to elicit different emotions. The first was a natural-scenery film, which was expected to be very bland and not to elicit any strong emotions. A second film was funny and was expected to produce mirthful laughter. A third film was a war movie, devised to be tragic and agitating. The fourth film was chosen to elicit anxiety, being a gruesome ghost story. Urinary epinephrine levels decreased significantly during the natural-scenery film ($p < .01$). Urinary epinephrine levels increased significantly during the war film ($p < .05$). Urinary epinephrine and norepinephrine both increased significantly during the humorous film ($p < .05$). Urinary epinephrine increased most during the anxiety provoking film ($p < .05$); norepinephrine levels also increased significantly during this film (Levi, 1965). The conclusion of the authors was that there is a correlation between increased urinary excretion of epinephrine and strong emotional arousal, independent of the type of emotion being elicited.

A more recent study also examined the effect of a humorous film on a wider variety of stress hormones, using direct testing of hormone levels in serum. Berk, et al., (1989a) exposed 5 male experimental subjects to a humorous video, while 5 men in the control group were kept in a quiet room for the same amount of time. The results demonstrated that serum cortisol ($p = 0.011$), growth hormone ($p = 0.0005$), and plasma dopac, a metabolite of dopamine ($p = 0.025$), decreased with laughter. There was no significant change in serum prolactin, beta-endorphins, plasma epinephrine, or plasma norepinephrine in either the experimental or the control group. The control group demonstrated no significant changes in any of the endocrine measures used {Berk 1989a}.

Laughter and Immune Function

In an effort to determine the effect of laughter on the immune system, one article reports the results of three separate studies of humor and immune response in college students {Lefcourt 1990}. This report documents that in all three studies ($n = 45$, $n = 34$, $N = 62$) subjects' salivary IgA levels

increased significantly after a brief humorous stimulus ($p < .005$).

However, it should be noted that the use of salivary IgA as a measure of immune function has been challenged by some due to the effect of variations in individual saliva flow rate and the use of stimulated and non-stimulated samples in some studies. In addition, the clinical significance of increased levels of salivary IgA in cancer patients is questionable. Therefore, the effect of humor and sense of humor on immune function needs further documentation using more valid and reliable measures of immune function.

Many studies examining the effects of stress and coping on the immune system are now using natural killer (NK) cell cytotoxicity as an indicator of immune system functioning. NK cells are lymphocytes which have demonstrated effectiveness against a variety of viruses and tumor cell lines [Levy 1987a]. NK cell assays give some of the clearest and most replicable results in this type of research. Unfortunately only three studies are available which document the effect of laughter on NK cytotoxicity.

The first study used 22 breast cancer patients to determine the effect of viewing both a humorous video and a distressing video on NK activity and number of NK cells [Wise 1989]. Contrary to what was expected, no significant changes were noted in NK numbers or cytotoxicity at the end of either video or during the recovery period. However, as NK levels are known to be reduced in patients with cancer, using cancer patients as the subjects in this investigational work may have led to an additional confounding factor.

In a controlled experimental study of ten male subjects, NK cell cytotoxicity was significantly increased following a humorous video [Berk 1989b]. The experimental group displayed significantly increased NK cell cytotoxicity from baseline to recovery ($p < .008$), while the control group did not. Additional work by this same group has demonstrated that male subjects exposed to a humorous video have a significant increase in IgA ($p = 0.015$), interferon ($p = 0.024$), the number of activated T cells ($p = 0.007$), and number of NK cells ($p = 0.013$) [Berk 1993; Berk 1995].

In a recent study by our group, the effect of laughter on stress and NK activity in 33 female subjects was determined. Data revealed that stress scores decreased more in the humor group than in the distraction group ($U = 215.5$ $p = 0.004$); Humor Response Scores (a quantitative measure of laughter) correlated with post stress for persons in the humor group ($r = -0.655$ $p = 0.004$). Persons who laughed more had less

stress following the video. Viewing a humorous video, in and of itself, did not significantly change NK activity ($t = 1.52$ $p = 0.138$), however, subjects who scored 25 on the HRS had significant increases in NK cytotoxicity over their baseline values ($t = 2.52$ $p = 0.037$), and as compared to the remaining participants ($t = 2.1$ $p = 0.04$). HRS scores significantly correlated with changes in NK cytotoxicity ($r = 0.744$ $p = 0.001$). Persons who laughed more had greater improvement in NK cytotoxicity {Bennett 1997}.

Summary

The data so far indicates that laughter has the potential to reduce feelings of emotional stress, as well as reduce stress hormones, and subsequently reduce the effect of stress on immune function. As low NK activity has been linked to increased incidence of viral infections, this mechanism could explain one link between humor and health. In addition, as low NK activity has been linked to metastases and poorer prognosis, it is plausible that humor may be a useful complementary therapy in the care of persons with cancer.