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Maharishi Ayur-Veda

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Health Promotion With A Traditional System of Natural Health Care: Maharishi Ayur-Veda

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We investigated Maharishi Ayur-Veda, a traditional system of natural health care derived from the ancient Vedic science of India. In the current studies, we evaluated effects on self-reported mental and physical health of one such program which has become widely available for scientific clinical study—the Maharishi Ayur-Veda Panchakarma program. This program includes a set of physiological

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therapies that are recommended on a periodic basis for enhancement of physiological homeostasis and promotion of mental and physical health. In a first pilot study, 142 subjects were surveyed after a 1-2 week Maharishi Ayur-Veda Panchakarma program for changes in health symptoms compared to 60 control subjects who participated in a didactic class for the same period of time. In the second follow-up study, 62 consecutive subjects were tested before and after a similar Maharishi Ayur-Veda Panchakarma program with the Profile of Mood States POMS and compared to 71 controls participating in a didactic class. The results for the pilot study showed that the experimental subjects reported significantly greater improvements in well-being, energy-vitality, strength-stamina, appetite and digestive patterns, previous complaints generally, and rejuvenation and youthfulness than control subjects ($p = .05$ to $< .00001$). Sleep patterns changed nonsignificantly. In the second study, the experimental subjects decreased significantly more than controls on overall distress ($p = .003$). On the POMS subscales, anxiety, depression, and fatigue decreased, and vigor increased significantly more for the experimental group than the controls ($p = .03$ to $.003$). Confusion decreased marginally ($p = .06$) and anger decreased nonsignificantly. These preliminary findings suggest that the Maharishi Ayur-Veda Panchakarma program is associated with improvements in mental and physical health symptoms, at least in selected subjects. This traditional program of natural health care may help to address current public health demands for efficacious and practical health promotion and disease prevention programs.

INTRODUCTION

Rationale

The Center for Disease Control (1982) recently concluded that conventional medical care is currently capable of treating only 12% of all known disease-causing factors that contribute to mortality. The Carter Center Report (1985) found that about two thirds of all deaths in the United States are premature and about two thirds of all the years of life lost before age 65 were preventable. Because of this relatively low effectiveness in preventing ill health and mortality, the U.S. Surgeon General and the Department of Health and Human Services have both called for a redirection of American health care strategy to emphasize, explore, and implement new approaches for prevention of disease and promotion of health (USDHHS, 1980; USDHEW, 1979).

The Role of Traditional Medicine

The World Health Organization (WHO) and other health authorities have also recognized these deficiencies in modern health care (Blair & Smith, 1986; Blum, 1981; McKinlay & McKinlay, 1977; Tahzib & Daniel, 1986). In response, the World Health Assembly of the WHO has

officially recognized the role that traditional medicine can play in the treatment of various diseases, prevention of illness, and promotion of health for achieving the goal of "health for all by the year 2000" (Akerle, 1985; Mahler, 1983). In Resolution WHA 30.49, the World Health Assembly strongly encouraged the United States and other member countries to investigate the utility of traditional systems of medicine (Akerle, 1985) and to incorporate their useful elements into the national health system (Akerle, 1984).

Traditional medicine is a heterogeneous term that refers to a broad range of ancient and natural health care practices which existed before the application of the modern scientific method to health care in what we now call allopathy or modern medicine. Bannerman et al. (1983a) of the WHO observe that:

Until the beginning of the 19th Century all medical practice was what we now call traditional. It was then that the great scientific upheaval of the renaissance began to introduce Cartesian scientific materialism into all human activities and notably into the theory and practice of health care. Its method was to break up complex phenomena into their component parts and deal with each one in isolation. In diagnosis this approach resulted in a search for a single cause; in pharmacology the search was for an active principle that could be isolated; and in the doctor-patient relationship, the search for an efficient treatment of the physical cause of symptoms that tended to exclude any serious interest in the complexity of the life situation in which the patient was immersed (p. 11).

By contrast, traditional medicine attempts to embody a holistic approach—i.e., that of viewing an individual in his totality within society and the ecological system. It emphasizes the viewpoint that ill health or disease is brought about by an imbalance or disequilibrium of man's physiological, psychological, behavioral and ecological environments and not just by an external pathogenic agent, be it micro-organism or otherwise (World Health Organization, 1978). Currently traditional systems of health care are widely practiced in India, China, Africa, Latin America, Moslem Asia and native North America (Bannerman et al., 1983b). Similarities between these systems and the ancient roots of modern Western medicine have been suggested (e.g., Dubey & Singh, 1970). In fact, traditional medicine has been practiced to some degree in all cultures (Bannerman et al., 1983a).

According to the Director-General of the World Health Organization, there is now widespread interest among modern health care professionals in traditional health care (Mahler, 1983). According to a WHO Committee Report, there are three main reasons why traditional medicine may be valuable to contemporary society (World Health Organization, 1978). These are:

1. *Intrinsic utility (usefulness)*: Since traditional medicine has been shown to be efficacious and useful on the basis, in some cases, of thousands of years of experience, its potential should be developed for the wider use and benefit of mankind. For example, dozens of modern pharmaceuticals were first discovered and used for centuries or millennia by traditional systems of medicine (Farnsworth et al., 1985). Thus, it is warranted to take fuller advantage of traditional systems of medicine's efficacy, safety, availability, and potential wide scale application. An additional major benefit is the relatively low cost compared to modern medicine.

2. *Unique and holistic*: The approach of traditional medicine is based on principles which distinctly differ from the materialistic assumptions of modern allopathy. As mentioned above, traditional medicine views people and their health as being integrated and interdependent with the larger ecology of the universe. Ill-health is considered to be a sign of imbalance in physiological, psychological, or behavioral homeostasis. This is a loss of functioning in accord with the laws of nature that govern health. Health can be regained and maintained by the restoration of balance of physiology, psychology, and behavior by natural means.

3. *Operational factor (practicality)*: The last decade has seen a considerable increase in popular, professional, governmental, and commercial interest in the use of traditional systems of medicine. For the majority of the world's population, traditional approaches have always been and still remain the predominant systems of health care. Therefore, from a pragmatic point of view, traditional medicine is viewed as one of the surest means to achieve total health care coverage of the world population, using acceptable, safe, and economically feasible methods, by the year 2000.

Ayurveda

Traditional systems of medicine are very heterogeneous. They range between all-embracing and sophisticated systems of health care such as Ayurveda on the one hand and simple home remedies on the other (Bannerman et al., 1983). The present research investigated Ayurveda because it has been reported to be the most sophisticated, comprehensive, and well-established traditional system of natural health care (Thatte and Dahanukar, 1986). Ayurveda has its origins in the Vedic tradition of knowledge of India which is more than 5000 years old and may have been the original source of other traditional systems of medicine (Kurup, 1983; Sharma, 1984; Thatte & Dahanukar, 1986).

Systematic clinical observations (Averbach et al., 1989; Central Council, 1978; Dash & Kashyap, 1981; Kurup, 1983; Ojha & Kumar,

1978; Sharma, 1984) and modern empirical studies (Glaser, 1988; Maharishi World Center for Ayurveda, 1987; Nair et al., 1980; Pillai et al., 1980; Thatte & Dahanukar, 1986; Udupa et al., 1970; Wallace, 1986) have reported that various therapeutic strategies of Ayurveda have been effective in the treatment of a variety of diseases, the prevention of illness, and the promotion of well-being and longevity. The mental procedures of Ayurveda for stress management, including the Transcendental Meditation and TM-Sidhi program, have been widely studied for their effects on health promotion (Chopra, 1989; Kanellakos, 1978; Wallace, 1986).

Maharishi Ayur-Veda

While Ayurveda includes a system of curative medicine, its main focus is on prevention of disease, preservation of health, and promotion of well-being and longevity (Averbach et al., 1989; Chopra, 1989). Until recently, Ayurvedic care was not widely available in the West, and even in India many of the preventive and health promotion approaches of Ayurveda were not widely practiced (Chopra, 1989; World Plan Executive Council, 1986). However, the preventive and health promotion procedures of Ayurveda have recently become widely available for clinical research and application through Maharishi Ayur-Veda programs (Averbach et al., 1989; Chopra, 1989; World Plan Executive Council, 1986). Maharishi Ayur-Veda includes the traditional knowledge and health care technologies of Ayurveda which have been revived, reorganized, and restored into a comprehensive and holistic health care system by Maharishi Mahesh Yogi with the collaboration of leading Indian Ayurvedic physicians (Chopra, 1989; Rigby, 1988). These approaches have been implemented in the US and other developed and developing countries around the world through Maharishi Ayur-Veda Medical Centers. (Averbach et al., 1989; World Plan Executive Council, 1986) The four main approaches of Maharishi Ayur-Veda include:

- 1) *Mental*—stress management with the Transcendental Meditation program of Maharishi Mahesh Yogi (Chopra, 1989; Kanellakos, 1978; Wallace, 1986).

- 2) *Physiological*—Maharishi Ayur-Veda Panchakarma program (Averbach et al., 1989; Schneider et al., 1985), diet and nutrition (Glaser, 1988), and exercise (Averbach et al., 1989).

- 3) *Behavioral*—daily and seasonal routines taking into account chronobiological rhythms (Averbach et al., 1989; Chopra, 1989)

- 4) *Environmental*—collective health measures to reduce sociological stress and promote world peace (Dillbeck et al., 1987; Orme-Johnson et al., 1988).

Maharishi Ayur-Veda Panchakarma Program

A group of physiological procedures from Ayurveda which have been suggested to promote physical and mental health are traditionally known as "panchakarma" or purification procedures (Ojha & Kumar, 1978). The Maharishi Ayur-Veda Panchakarma program includes Panchakarma or purificatory procedures that have been revived from the classical tradition by Maharishi and adapted for widespread use in a systematic program (Averbach et al., 1989; Schneider et al., 1985). The Maharishi Ayur-Veda Panchakarma procedures have been suggested to restore basic homeostatic physiological mechanisms which promote ideal physiological and psychological health (Averbach et al., 1989; Schneider et al., 1985). The program includes a set of physical therapies for stress-management and health promotion that are recommended on a periodic seasonal basis (Averbach et al., 1989).

Extensive clinical experience has been gathered with many of these procedures in their traditional use in India, especially for chronic diseases (e.g. Nair et al., 1980; Ojha & Kumar, 1978; Pillai et al., 1980). In terms of modern applications of Maharishi Ayur-Veda, two independent research groups in the United States and West Germany have recently reported effects of the Maharishi Ayur-Veda Panchakarma program in normal participants on certain aspects of health promotion. In a randomized, controlled clinical trial, Chandler et al. (1987) reported improvements in short- and long-term memory, alertness and general intelligence in Maharishi Ayur-Veda Panchakarma treated subjects. Waldshütz (1988) reported decreased cholesterol, increased HDL/LDL cholesterol ratio, and mental health changes in the Freiburg Personality Inventory in subjects participating in a Maharishi Ayur-Veda Panchakarma program. Many of these latter changes persisted at posttesting 6-8 weeks after completion of the intervention program.

Objectives

Based on the above background, the objectives of the present research were to empirically explore some effects of the Maharishi Ayur-Veda Panchakarma program on self-reported mental and physical health. Our primary objective was to begin to evaluate the hypothesis that this traditional health care program implemented in a modern American setting might improve self-reported health status and well-being in a selected group of subjects. A secondary objective of the work was to investigate some effects of this program on self-reported health parameters that are related to aging. This is because Maharishi Ayur-Veda has classically been predicted to benefit physical and mental correlates of the aging process (Chopra, 1989; Sharma, 1984) and previous research on the mental procedures of Maharishi Ayur-Veda have supported this

hypothesis (Alexander et al., 1989; Wallace et al., 1982).

The present studies employed self-report instruments for estimating some parameters of mental health and physical health. Previous studies have established the validity of self-evaluation of health status using somewhat similar instruments. For example, substantial correlation has been found between self-reported mental and physical health status and physicians' diagnoses of morbidity, functional status, and mortality (Brodman et al., 1939; reviewed in Kaplan et al., 1988; Suchman et al., 1958; Valliant, 1979). In a recent study, a simple self-rating of health independently predicted survival in older adults after controlling for age, sex, ethnic group, number of medical conditions and medications reported, heart disease, and activities of daily living (Kaplan et al., 1988).

METHODS

The first systematically gathered data were from a preliminary survey to detect possible changes in a broad range of symptoms related to general health and well-being. This pilot study employed a posttest comparison design to compare mean responses of subjects in experimental and control groups on a measure of self-perceived change in health status. The limitations of this design are well known (Campbell and Stanley, 1963), but this initial pilot study provided data which was subsequently further explored and evaluated in Study II which used a more refined experimental design, an improved measurement instrument, and a different sample of subjects.

PILOT STUDY

Subjects

The treatment subjects for the preliminary survey were 142 consecutive participants in the Panchakarma program at the Maharishi Ayur-Veda Medical Center in Fairfield, Iowa in 1984. There were 74 males and 68 females within an age range of 25-65 years and with an approximate mean age of $35 + 10$ (SD) years. The subjects were normally healthy by medical history, physical examination, screening blood panel, and urinalysis. These individuals were clients at the Maharishi Ayur-Veda Medical Center who self-selected to participate in the Maharishi Ayur-Veda Panchakarma program. They were all practicing the mental technology of Maharishi Ayur-Veda, the Transcendental Meditation (TM) program for an approximate average of 11 years. Most subjects also practiced the advanced TM-Sidhi program for an estimated average of 5 years. Subjects who practiced the TM program were included in this study because at the time of the original study (1984), the majority of participants in the Maharishi Ayur-Veda Panchakarma program became

introduced to the program through their participation in other Maharishi Ayur-Veda programs, especially TM. Subjects were surveyed for their responses to the questions described below without being informed that they would be compared to a control group.

The control subjects were 60 individuals (31 males, 29 females, mean age 34.7 ± 7.8 (SD) years) who also practiced the mental technologies of Maharishi Ayur-Veda, Transcendental Meditation (for an estimated average of 11 years) and the TM-Sidhi program (for approximately 5 years). They resided for the most part, in Fairfield, Iowa. The control subjects voluntarily chose to participate in a series of evening lecture classes on Maharishi Ayur-Veda for their own didactic education. As was the case with the experimental group, control subjects were not informed that their responses would be compared to another group.

Materials

All study participants answered a written series of questions which were originally constructed for clinical use only by the staff of the Maharishi Ayur-Veda Medical Center to evaluate participants' self-perceived responses to the intervention. The questions covered hypothesized areas of improvement derived from classical predictions of Maharishi Ayur-Veda (Sharma, 1984) and preliminary clinical observations at the center. These health areas were: 1) general well-being, 2) energy/vitality, 3) strength/stamina, 4) appetite and digestive patterns, 5) sleep patterns, 6) general state of mind and emotions, 7) signs and symptoms of youthfulness and rejuvenation, and 8) previous complaints generally. On the questionnaire, subjects were simply asked to rate their degree of self-perceived change after completing the Maharishi Ayur-Veda Panchakarma program in the above health areas on a three-point scale: 1) not improved, 2) somewhat improved, or 3) much improved. Responses for worsening of symptoms were not included in this instrument by its original developers because their clinical observations indicated that this option was rarely reported. The reliability and validity properties of the survey instrument were unknown. These methodological limitations of the preliminary questionnaire were later remedied in the follow-up study.

Testing Procedures

Experimental subjects were administered the questionnaire within an average of 2-3 days after completing the 1-2 week intervention program. Control subjects completed the questionnaire after an equivalent time period, that is, after two weeks of the didactic class.

Treatment

Each experimental subject participated in a Maharishi Ayur-Veda Panchakarma program according to a standardized protocol. The proto-

col allowed for the prescription of a treatment program for each individual according to Maharishi Ayur-Veda psychosomatic type (Averbach et al., 1989; Schneider et al., 1985). A physician trained in both Maharishi Ayur-Veda and modern medicine prescribed and supervised the intervention. The treatment program consisted of a two-hour session each day for 7 - 13 consecutive days. These daily sessions consisted of a combination of specialized herbal oil massage, external heat applications by herbalized steam baths and oil applications, and gastrointestinal elimination therapies. These were based on traditional Ayurvedic recommendations which have been described in detail elsewhere (Averbach et al., 1989; Ojha & Kumar, 1978).

Data Analysis

The pilot data were analyzed according to recently published recommendations for ordered categorical data in biomedical studies (Moses et al., 1984). That is, the three possible subject responses were converted to numerical scores (0, 1, or 2). The mean responses for each question were determined for the experimental and control groups and the results then statistically compared with two-sample t-tests. Because our stated hypotheses were directional, one-tailed tests were employed. The test statistics were computed using the BMDP statistical package, module 3D (Dixon, 1985).

RESULTS

While the preliminary survey included a total of 142 experimental subjects, for certain questions a few subjects had missing data. The resultant N's on these scales were: energy/vitality, 138; strength/stamina, 126; appetite and digestive patterns, 133; state of mind and emotions, 134; youthfulness and rejuvenation, 104; and previous complaints, 119. The results of the survey are shown in Table 1 and Figure 1. As can be seen from Table 1, experimental subjects compared to control subjects reported significantly greater improvements in well-being ($p=.0004$), energy-vitality ($p=.05$), strength-stamina ($p < .02$), appetite and digestive patterns ($p=.01$), state of mind and emotions ($p < .001$), previous complaints generally ($p < .00001$), and symptoms of youthfulness and rejuvenation ($p = .00001$). Sleep patterns showed nonsignificant improvement in the experimental subjects ($p < .2$).

STUDY II

Subjects

The experimental subjects were 62 consecutive participants in the Maharishi Ayur-Veda Panchakarma program at the Maharishi Ayur-Veda Medical Center in Fairfield, Iowa in late 1984 and 1985. There

TABLE 1 Improvements in Health Symptoms after the Maharishi Ayur-Veda Panchakarma Program

	<i>Experimental Group</i>	<i>Control Group</i>	<i>t</i>	<i>df</i>	<i>p</i>
	(<i>n</i> = 142)	(<i>N</i> = 60)			
Well-being	1.42 (0.44)	1.05 (0.59)	3.20	97.7	.0004
Energy-Vitality	1.14 (0.54)	0.95 (0.67)	1.61	196.0	.05
Strength-Stamina	0.97 (0.54)	0.72 (0.58)	2.15	184.0	< .02
Appetite-Digestion	1.04 (0.61)	0.75 (0.70)	2.32	191.0	.01
Sleep Patterns	0.72 (0.51)	0.62 (0.67)	9.92	192.0	< .2
State of Mind & Emotions	1.24 (0.44)	0.88 (0.67)	9.92	192.0	< .001
Youthfulness & Rejuvenation	0.78 (0.17)	0.40 (0.49)	3.81	83.2	< .00001
Previous Complaints	1.03 (0.54)	0.50 (0.68)	4.25	107.1	.00001

Scores are means (SD) from a health symptom survey and reflect subjects perceived change after the intervention control period. P values are from one-tailed, two-sample t-tests as described in the text.

were 36 males and 26 females with a mean age of 36.1 ± 10.3 (SD) years. The experimental subjects were normally healthy—that is, they were without major illnesses by medical history, screening physical examination, biochemical blood test battery and urinalysis.

The control subjects were 71 normal participants drawn from the same demographic community in Fairfield, Iowa as the experimental subjects. There were 37 males and 34 females with a mean age of 34.5 ± 6.7 (SD) years. There was no significant difference in age between the experimental and control subjects. As in the pilot study, controls participated in a didactic class on the principles of Maharishi Ayur-Veda but did not receive Panchakarma treatments. They were unaware of the purpose of the study. Again, as in the pilot study, both groups, experimental and control subjects, practiced the Transcendental Meditation program for an estimated average of 11 years and, in most cases, the advanced TM-Sidhi program for an estimated average of 5 years.

Materials

The Profile of Mood States (POMS) was used. It is a standardized and validated psychometric instrument for assessing six mood states associated with mental health (McNair et al., 1971). Its scales include

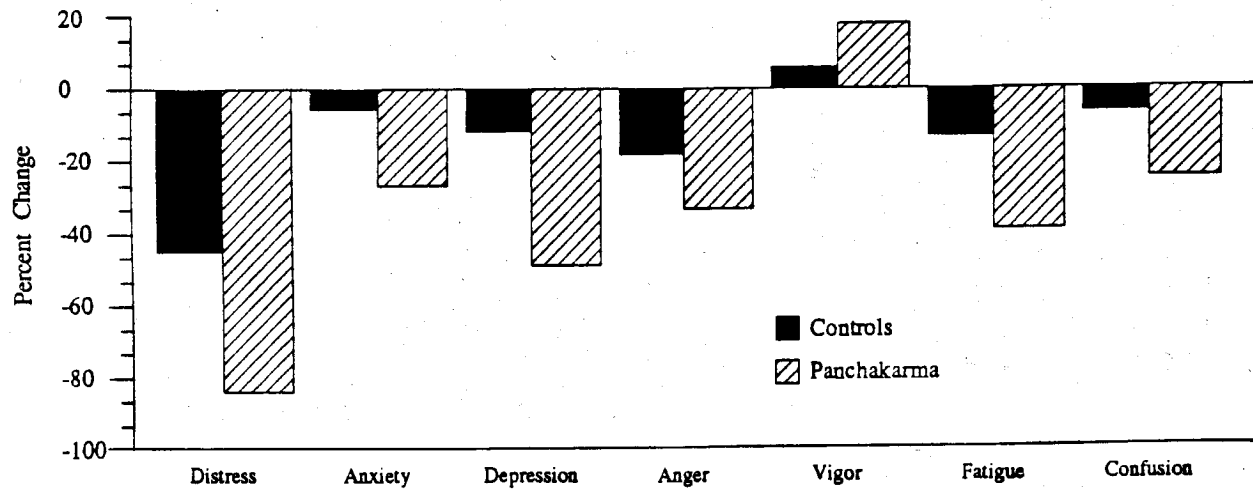


FIGURE 1 Health Symptom Changes Reported After Treatment by 142 Maharishi Ayur-Veda Panchakarma Participants Compared to 60 Controls from a Didactic Class

Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor, Fatigue, and Confusion-Bewilderment. In addition, a total mood disturbance or "Distress" scale was calculated according to published procedure by summing the scores across all six factors (weighing Vigor negatively) (McNair et al., 1971). The instrument itself consists of sixty-five descriptive adjectives which are rated by the subject on a 5-point Likert scale of 0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, 4 = extremely. The standard printed instructions asked the subject to rate how he felt "during the past week, including today."

The POMS has demonstrated highly adequate internal consistency (McNair et al., 1971; McNair, & Lorr, 1964), relatively high test-retest reliability (McNair et al., 1971; McNair, & Lorr, 1964), concurrent validity (Lorr & McNair, 1963), sensitivity to short-term changes induced by stressful stimuli (Pillard & Fisher, 1967; Pillard et al., 1967) and stress-reduction therapies (Haskell et al., 1969; McNair et al., 1970). Previous investigators have successfully employed the POMS to assess changes in health symptoms in normal subjects participating in health promotion programs (Berger & Owen, 1983).

Treatment

The experimental intervention was the Maharishi Ayur-Veda Panchakarma program as described above for the pilot study, although with a different group of subjects at a later date.

Testing Procedures

The pre-treatment POMS was administered to the experimental subjects within several days of beginning their Maharishi Ayur-Veda Panchakarma treatment (described below) and the posttest within 1-3 days of completing their treatment. The average time between pre- and posttesting for these subjects was approximately 14 days. The same length of time separated pre- and posttesting in the control subjects. Controls completed the POMS before and after 14 days of participation in a Maharishi Ayur-Veda didactic class as described for the pilot study.

Data Analysis

Subject responses for Study II were also analyzed according to the recommendations of Moses et al. (1984) for ordered categorical data. That is, subject responses were converted to numerical scores (0, 1, 2, 3, or 4). The mean responses for each scale on pre- and posttesting were determined for the experimental and control groups and analyzed by 2 x 2 repeated measures analysis of variance (ANOVA) with BMDP software Module 2V (Dixon, 1985). The between-subjects factor was given by the treatment groups (experimental vs. control) and was denoted as

the "Treatment" factor. The pretest and posttest scores were the two levels of the within subjects factor, labeled as the "Trials" factor.

Results

Table 2 reports the pretest and posttest means and standard deviations for the overall Distress scale and the six POMS subscales for both the experimental and control groups. Also presented in Table 2 are the *F* ratios for the interaction between the Treatment factor (experimental group vs. controls) and the Trials factor (pretest and posttest). In this 2 x 2 split plot, repeated measures design, the interaction *F* ratio is identical to that which would be obtained in a test of the difference between the pre-post change scores for the two treatment groups (Huck and McClean, 1975). Thus, the test for a significant Treatment x Trials interaction in this repeated measures design indicates whether significant differences exist between experimental and control treatments (Huck and McClean, 1975).

The significant interaction *F* for the Distress scale ($p = .003$) indicates that the decline from the pretest to posttest on this measure was significantly larger for the experimental group than the control group. An analysis of simple main effects was used to explore the interaction between the Trials and Treatment factors. As shown in Table 3, the analysis of simple main effects using a *t*-test for related samples indicates that for the experimental group the mean change score (pretest minus posttest) was significantly different from zero ($p < .001$) using a one-tailed test and nonsignificantly different from zero for the controls ($p = .08$) using a two-tailed test. The pretest mean Distress score for the experimental group was significantly higher than controls ($t[131] = 2.14$, $p = .04$) using a two-tailed test, while the posttest mean was not significantly different from controls ($t[131] = -0.36$, $p = .72$).

Figure 2 presents the results as change scores, calculated as a percentage of pre-treatment baseline. The percent change for the Distress scale and POMS subscales was defined as $100 \times (\text{posttreatment score} - \text{pretreatment score}) / \text{pretreatment score}$. Although the interaction *F* ratios provided a test for the significance of the difference between ordinary change scores, not percent change scores, the percent change scores shown in Figure 2 allow more ready comparison of the magnitude of changes relative to the level of the pretest scores. Using this metric, subjects treated with the Maharishi Ayur-Veda Panchakarma program showed about twice as much reduction in overall distress as the controls (-84% vs. -44%).

Although the primary focus of interest in Study II was the change in overall Distress for the two groups, the results for specific POMS sub-

TABLE 2 Changes in Mental Health (POMS) with the Maharishi Ayur-Veda Panchakarma Program

	<i>Experimental Group</i> (N=62)		<i>Control Subjects</i> (N=71)		<i>F(1,131)</i>	<i>p</i>
	<i>Before</i>	<i>After</i>	<i>Before</i>	<i>After</i>		
Distress						
(Total Mood Disturbance)	17.71 (30.01)	2.81 (21.64)	7.73 (23.61)	4.30 (25.56)	9.21	.003
Tension-Anxiety	7.08 (5.61)	5.19 (4.32)	6.03 (5.21)	5.70 (4.72)	5.31	.02
Depression-Dejection	6.66 (7.26)	3.48 (4.63)	5.53 (5.19)	4.97 (6.77)	6.11	.01
Anger-Hostility	5.37 (5.97)	3.48 (4.49)	4.90 (6.19)	4.11 (5.77)	1.65	.20
Vigor	16.90 (6.23)	19.58 (6.31)	20.31 (5.89)	21.03 (5.94)	4.60	.03
Fatigue	8.81 (7.18)	5.07 (5.43)	6.31 (5.56)	5.58 (5.43)	9.34	.003
Confusion-Bewilderment	6.69 (4.84)	5.16 (3.92)	5.27 (4.06)	4.94 (3.75)	3.57	.06

Results are means (SD) on the Profile of Mood States (POMS) administered before and after approximately two weeks of intervention or control condition. P values are from 2 x 2 repeated measure ANOVAs.

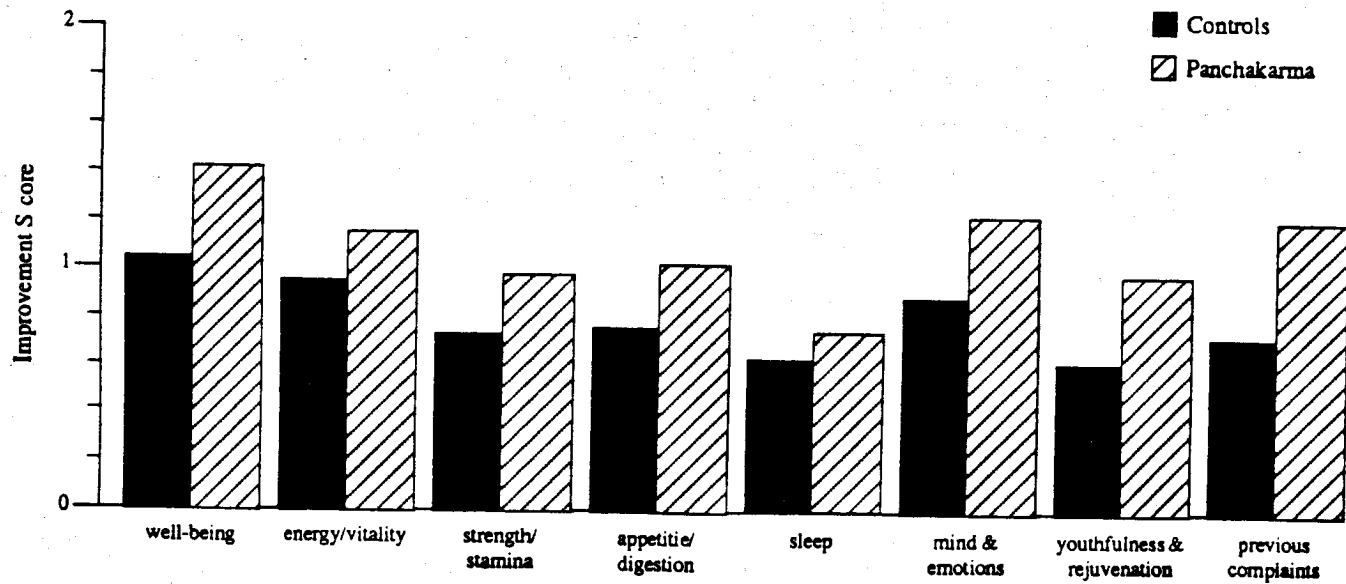


FIGURE 2 Mental Health Changes on the Profile of Mood States for 62 Experimental Subjects Participating in the Maharishi Ayur-Veda Panchakarma Program Compared to 71 Controls in a Didactic Class

scales may also be of interest. These results help to identify those specific subscales which contributed substantially to the change in overall Distress. As shown in Table 2, significant interaction F ratios were found for four of the six POMS subscales, with a fifth being nearly significant. Because of the generally high correlation between subscale scores (most correlations range between 0.4 and 0.8 in absolute value), the tests of significance for the subscale measures are obviously not independent. Significant interactions were found for Tension-Anxiety ($p = .02$), Depression-Dejection ($p = .01$), and Fatigue ($p = .003$), indicating greater declines in these variables for the experimental group as opposed to controls. A significant interaction was also found for the Vigor scale ($p = .03$), indicating a significantly larger increase in this measure for the experimental group compared to controls. As shown in Figure 2, experimental subjects compared to the controls showed greater proportionate reductions in Tension-Anxiety (-27% vs. -5%), Depression-Dejection (-48% vs. -10%), and Fatigue (-43% vs. -12%). Likewise, Vigor increased more for the Maharishi Ayur-Veda Panchakarma group than for the controls (+16% vs. +4%).

The interaction for a fifth scale, Confusion-Bewilderment, was nearly significant ($p = .06$), while that for Anger-Hostility ($p = .20$) was nonsignificant. Although the interactions for these two variables were nonsignificant, the treatment group decreased proportionately more than the controls on the Confusion-Bewilderment scale (-23% vs. -6%), and Anger-Hostility (-35% vs. -16%) (see Figure 2).

As shown in Table 3, an analysis of simple main effects for the subscales indicates that, for the experimental group, the mean change score was significantly different from zero for all subscales. Tension-Anxiety ($p < .001$), Depression-Dejection ($p < .001$), Anger-Hostility ($p = .008$), Vigor ($p < .001$), Confusion-Bewilderment ($p = .003$), and Fatigue ($p < .001$). Also as shown in Table 3, for the control subjects the mean change from the pretest to posttest did not differ significantly on any of the subscales using two-tailed tests.

Further analysis of simple main effects indicates that the pretest mean was significantly higher for the experimental group than the controls on the Fatigue subscale ($t[131] = 2.26$, $p = .03$), and significantly lower than the controls on the Vigor subscale ($t[131] = 3.24$, $p = .002$), using two-tailed tests. For none of the other subscales did the pretest or posttest means for the experimental and control subjects differ significantly.

In sum, the results of Study II indicate that the experimental group improved significantly more than controls on the overall POMS Distress scale. Specific POMS subscales showing the most significant improve-

TABLE 3 Analysis of Simple Main Effects: T-Test of Mean Change Scores for both the Experimental and Control Groups

Measure	Experimental Group		Control Group	
	t(61)	p	t(70)	p
Distress	-4.44	.00002	-1.76	.08
Tension-Anxiety	-3.28	.0008	-0.84	.41
Depression-Dejection	-3.51	.0004	-0.95	.34
Anger-Hostility	-2.47	.008	-1.78	.08
Vigor	3.47	.0005	1.37	.18
Fatigue	-4.24	.00004	-1.45	.15
Confusion-Bewilderment	-2.87	.003	-0.87	.39

The results shown above are for t-tests of the hypothesis that the mean change scores (posttest minus pretest) are zero for the experimental and control groups on the POMS Distress scale and subscales. Degrees of freedom are in parenthesis. For the experimental group, the reported p values are for one-tailed tests, while those for the control group are for two-tailed tests.

ments in the experimental group were Tension-Anxiety, Depression-Dejection, Fatigue, and Vigor.

DISCUSSION

Overview

The findings of the present studies suggest that a traditional and natural system of health promotion—the Maharishi Ayur-Veda Panchakarma program—was associated with self-reported improvements in several areas of mental and physical health in selected participants. While there were limitations to the experimental design, the changes observed are consistent with classical predictions of Maharishi Ayur-Veda for the enhancement of mental and physical health, well-being, and longevity (Chopra, 1989; Sharma, 1984).

Study I

The preliminary survey provided pilot data which suggested that Maharishi Ayur-Veda Panchakarma participants experienced significantly greater improvements than controls in general well-being, strength-stamina, appetite and digestive patterns, energy-vitality, state of mind and emotions, previous complaints generally, youthfulness and rejuvenation. Yet, these findings must be considered preliminary for the following reasons. The questionnaire was administered at posttreatment only and is therefore subject to the bias of retrospective reporting. The questions did not utilize a balanced Likert scale, and the reliability and validity of the survey questionnaire were unknown. Further, subjects

were not randomly assigned to treatment and control conditions. Subjects self-selected for the groups, although follow-up clinical observations after completion of the study suggested that most control subjects eventually participated in the Maharishi Ayur-Veda Panchakarma program. Therefore, it may be that the control subjects were similar to the experimental subjects with respect to their predisposition to participating in the intervention program. Many of these methodological concerns were addressed in the follow-up study, Study II.

Study II

In the more rigorously controlled Study II, subjects who participated in the Maharishi Ayur-Veda Panchakarma program showed significant improvements in mental health as measured by the Profile of Mood States. Overall distress decreased, as did anxiety, depression, fatigue, and confusion. Simultaneously, vigor significantly increased. The Profile of Mood States is a standardized, validated, and widely utilized psychometric instrument and it was administered in a pre-post experimental design. Confounding influences of time and practice effects of test-retesting were controlled for by assessing control subjects from the same demographic community with the same frequency of testing over the same length of time. Expectancy and placebo effects were partially controlled for in that the control subjects participated in an educational class, although it was lecture only. The controls did improve on the mood scales, although significantly less than the experimental subjects on all but one scale. The experimental group scored higher than controls at pretest on three of seven POMS scales assessed. Because of this finding, the phenomenon of regression towards the mean cannot be ruled out as an explanation for these results. However, given that the control subjects tended to decrease on the same scales as the experimental group, and that for most of the scales (four of seven) there were no pretest differences between the groups, this explanation is not sufficient to explain the results as a whole.

It was not possible to use analysis of covariance to compare the posttest means for the experimental and control groups, covarying for the pretest scores, due to rejection of the hypothesis of equal slopes. Higher initial levels on some of the POMS scales may have been related to some subjects' participation in the Maharishi Ayur-Veda Panchakarma program. As with the pilot study, follow-up clinical observations suggested that the majority of control subjects eventually participated in Maharishi Ayur-Veda Panchakarma program. This indicates some similarity between the experimental and control groups in basic predisposition towards the intervention. Yet, only a study with random assignment of subjects to groups would eliminate the possible bias of subject self-

selection. One such randomized study was reported by Chandler et al. (1987, see below) with results that support the present findings. In evaluating the validity of these early results, it should be noted that the literature on the validity and reliability of self-report health instruments indicates a high degree of reliable correlation between subjective reports of health status and objective measures of health such as morbidity and longevity (Kaplan et al., 1988). In future studies, a more closely-matched placebo control—while difficult to construct—would aid in further confirming these putative effects.

The present studies measured short-term effects of the Maharishi Ayur-Veda Panchakarma program over two weeks. However, in the clinical setting, participation in a Maharishi Ayur-Veda Panchakarma program is recommended seasonally or every 3-4 months for health promotion and prevention (Averbach et al., 1989). Since long-term effects after completion of the program have been predicted, it may be fruitful for future studies to evaluate longer-term, carry-over effects of the Panchakarma program on health states up to several months after completion of the program.

Other Studies on the Maharishi Ayur-Veda Panchakarma Program

The results from two other independent clinical trials using the Maharishi Ayur-Veda Panchakarma program corroborate the present findings of improved self-reported health status. Chandler, et al. (1987) conducted a randomized, blinded, and controlled study of the effects of Panchakarma on cognitive performance. These investigators reported that the experimental group scored significantly higher on factors of general intelligence, short-term memory, long-term memory and alertness. In Europe, Waldschütz (1988) conducted a study on effects of Maharishi Ayur-Veda Panchakarma program on personality, mental health, and serum cholesterol in approximately 100 subjects. Serum cholesterol is positively correlated with the aging process and ranks as a major risk factor for coronary heart disease. In this prospective clinical trial, the experimental group showed significant increases in emotional stability and extroversion, and decreases in irritability, aggressiveness, strain inhibition and physical complaints. Some of these mental health changes persisted at a second posttest performed 6-8 weeks after completion of the intervention program. Total cholesterol decreased 10-15% after treatment and the LDL/HDL cholesterol index decreased 13%. These changes in serum cholesterol occurred while diet was held constant and corresponded to a 17% decrease in coronary risk for the experimental group.

Relationship to Aging

One of the central predictions of classical Ayurveda is the enhancement of longevity (Sharma, 1984). Beneficial effects of other Maharishi Ayur-Veda programs on physiological, psychological, and behavioral correlates of aging, as well as longevity directly, have been previously reported (Alexander et al., in press; Wallace et al., 1982; Wallace, 1986). The present studies were not direct examinations of an anti-aging hypothesis. Yet implications of the Maharishi Ayur-Veda Panchakarma program for factors relating to aging are of interest here. In the modern medical literature, signs of aging—notably, morbidity, and mortality—have been correlated with levels of mental health (Valliant, 1979) and physical health symptoms (Brodman et al., 1939; Suchman et al., 1958). Kaplan et al. (1988) reported that self-rated health status predicted longevity independent of demographic and medical variables. The current studies utilized measures of self-reported mental and physical health which were somewhat similar to the measures of self-rated health status employed in the above validation studies. Because of the reported improvements in self-rated health, including youthfulness and rejuvenation, it is conceivable that more objective markers of aging might improve with the Maharishi Ayur-Veda Panchakarma program. Further studies are suggested to evaluate this hypothesis.

Mechanisms of Action—Vedic Science and Modern Science Explanations

While the objective of the present studies was to evaluate the efficacy of the experimental program and then in subsequent studies to investigate possible mechanisms, brief consideration will be given here to possible mechanisms of these effects from the viewpoints of both Maharishi Ayur-Veda and modern science. First, Maharishi Ayur-Veda itself provides a conceptual framework for understanding its own effects (Chopra, 1989; Wallace, 1986). A fundamental viewpoint distinguishes this framework from the modern materialistic view of human physiology and consciousness. Yet, this viewpoint is consistent with the latest advances in quantum physics and neuroscience (Chopra, 1989; Hagelin, 1987 in press; Pert, 1986). Maharishi's revival of Ayurveda reconnects the ancient Ayurvedic principles and practices with their foundation in the knowledge of the unified field of all the laws of nature, which was known to the ancient founders of Ayurveda as a field of consciousness (Chandler, 1987; Maharishi Mahesh Yogi, 1986; Rigby, 1987). In the post-Newtonian era of physics, Einstein predicted that all the laws of nature would be found to have a simple unified foundation (Barnett, 1968). Contemporary unified field theories in physics postulate that all of the force and matter fields of nature are modes of vibration of a single,

underlying unified field (Hagelin, 1989). According to these unified field theories, a supersymmetric unified field underlies, gives rise to, and therefore unifies all of the matter and force fields which form the basis of the whole universe, (Hagelin, 1987, in press). All of the laws of nature therefore have their unified basis in the unified field. Maharishi suggests that the unified field described by quantum physics is identical to the unified field of intelligence and consciousness described by the ancient science of Ayurveda (Chandler, 1987; Hagelin 1987; Maharishi Mahesh Yogi, 1986).

The concept of a unified field at the basis of the diversity of the universe is analogous to the modern biological view that the diversity of individual physiology is an expression of the underlying biological intelligence contained in the single molecule of DNA. Thus, DNA can be thought of as the unified ground state of all the laws of human physiology (Wallace et al., 1988). According to Maharishi, the improvements in health symptoms found in this study can be explained by referring to the unified field at the basis of both body and mind. The technologies of Maharishi Ayur-Veda restore balance on this most fundamental level of physiology and consciousness—thereby restoring balance and more optimal functioning to body and mind, physical health and mental health (Chopra, 1989; Rigby, 1988; Wallace, 1986).

In the modern medical literature a holistic systems approach has been applied to health by Brody (1973) and, to some extent, others (Sheldon et al., 1970). Brody proposed a comprehensive hierarchy of natural systems, including man, that begins at the quantum mechanical level of physics and extends to the biosphere. This modern systems view is remarkably similar to the ancient systems views described by Maharishi Ayur-Veda. Regarding the present status of health and disease from the point of view of modern systems theory, Brody (1973) concludes that modern allopathic medicine falls short in its comprehensiveness and completeness when compared to more holistic traditional systems of medicine, including Ayurveda.

Based on the systems approach of Brody and others, modern models of preventive medicine and health promotion have been developed (Zisman, 1989). Perhaps the most prominent modern holistic model of public health has been propounded by Blum (1981). In Blum's model there is broad acknowledgement of a wide variety of factors in man's internal and external environment that affect health. However, each one of these factors is treated individually and separately. With the lack of understanding of a unified basis for all these factors that affect health, a unified systematic approach to modifying these factors has also been lacking. The modern holistic health approach dramatically differs from Maharishi

Ayur-Veda which does offer a unified conceptualization of physiology and pathophysiology, as well as a systematic set of technologies to promote health. One of these approaches, the Maharishi Ayur-Veda Panchakarma program was investigated in this study.

There are presumably physiological mediators and correlates of these homeostatic, restorative processes suggested above. From the point of view of modern physiology, a few limited speculations on mechanisms of action of Maharishi Ayur-Veda Panchakarma may be offered. The specialized massage procedures may decrease muscle tension and increase overall muscular and psychological relaxation (Woole & Becker, 1981). Additionally local blood flow and lymphatic drainage may be augmented (Woole & Becker, 1981). Increased blood flow could enhance circulatory removal of metabolic waste products (Guyton, 1981). The effects of herbal substances in the Panchakarma massage lubricant have yet to be evaluated, but transdermal absorption of nutritional and medicinal substances has been well-documented and utilized for therapeutic effects (e.g., Press et al., 1974). Salerno and Smith (1989) and Stevens et al. (1989) have reported evidence that topically applied sesame oil (of the type used in the Maharishi Ayur-Veda Panchakarma program) may reduce infectious and cancerous pathology in certain experimental conditions. External heat application may result in vasodilatation, increased local blood flow, and relaxation (Guyton, 1981). Recent gastroenterologic findings have highlighted the contributions to systemic health of metabolic processes and products of the large intestine (Horan & Fox, 1984; Walker, 1978). These processes have even been linked to aging (Horan & Fox, 1984). Neuropeptides discovered in the gastrointestinal tract may serve to integrate the nervous system and gastrointestinal tract (Hadley, 1984). Thus, the gastrointestinal elimination therapies of the Maharishi Ayur-Veda Panchakarma program may exert effects on local and systemic functioning through these or other physiological processes.

CONCLUSION

Blum (1981, p. 43) observes that, "beyond some basic minima, (modern) medical care seems to add only modestly to wellness or to survival. It also adds its own disturbances of wellness in the form of iatrogenic illness." Further, modern health care has been particularly ineffective in reducing the high prevalence of stress and stress-related disorders which account for 60% - 90% of all visits to health care professionals (Cummings and VandenBos, 1981; Elite, 1986). In response to these and other perceived deficiencies in modern health care, we have begun to evaluate a traditional system of natural health care—Maharishi Ayur-Veda. This was done in two series of selected healthy

subjects and controls in order to test the hypothesis that mental and physical health would be beneficially affected by the physiological procedures of Maharishi Ayur-Veda Panchakarma. Tending to support this hypothesis were findings of significant reductions in overall distress, anxiety, depression, fatigue, and increased vigor, as well as suggested improvements in confusion, well-being, energy/vitality, strength/stamina, appetite and digestive patterns, other previous complaints, and youthfulness and rejuvenation. Replication of these preliminary findings using more rigorous experimental designs is necessary. The precise physiological mechanisms of action for these putative effects remain to be elucidated. However, these and other data begin to suggest that Maharishi Ayur-Veda may help to fulfill needs identified by the Surgeon General and the World Health Organization for more effective and practical health promotion and disease prevention strategies.

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