

Medical Care Utilization and the Transcendental Meditation Program

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This field study compared 5 years of medical insurance utilization statistics of approximately 2000 regular participants in the Transcendental Meditation (TM) program with a normative data base of approximately 600,000 members of the same insurance carrier. The benefits, deductible, coinsurance terms, and distribution by gender of the TM group were very similar to the norm, yet the TM group had lower medical utilization rates in all categories. Inpatient days per 1000 by age category were 50.2% fewer than the norm for children (0-18), 50.1% fewer for young adults (19-39), and 69.4% fewer for older adults (40+). Outpatient visits per 1000 for the same age categories were, respectively, 46.8%, 54.7%, and 73.7% fewer. When compared with five other health insurance groups of similar size and professional membership, the TM group had 53.3% fewer inpatient admissions per 1000 and 44.4% fewer outpatient visits per 1000. Admissions per 1000 were lower for the TM group than the norm for all of 17 major medical treatment categories, including -55.4% for benign and malignant tumors, -87.3% for heart disease, -30.4% for all infectious diseases, -30.6% for all mental disorders, and -87.3% for diseases of the nervous system. However, the TM group's admissions rates for childbirth were similar to the norm. The issue of self-selection is addressed in terms of previous medical research in this area.

The U.S. Public Health Service's Centers for Disease Control estimates that half of the mortalities from the ten leading causes of death can be linked to behavior and life-style (1). A review of 25 studies concludes that treatment for alcohol abuse, drug abuse, or mental treatment (ADM impact) generally reduces medical care utilization (2). Although none of these studies used randomized clinical trials, 13 studies did use a comparison group, indicating reduced medical care utilization by about 20% in the treatment group compared to controls. These studies focused

primarily on outpatient psychotherapy, mostly in organized health maintenance organizations (HMOs) or in alcoholism treatment provided for employees or provided by HMOs.

A more recent review of 58 studies found reductions in use of medical services associated with inpatient rather than outpatient mental health care, particularly for persons over 55 years of age (3). Twenty-two random assignment studies reviewed indicated a 10.4% mean reduction in inpatient hospitalization compared with 33.1% mean reduction in 26 time series studies in which patients had self-selected psychotherapy treatment. Both changes were statistically significant, indicating that self-selection studies yield reliable information, albeit a larger effect size. A meta-analysis of 49 experiments on the effects of psychoeducational interventions with surgical patients indicated that method of subject assignment was not systematically

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related to effect size, i.e., the outcomes were similar for random assignment and self-selection studies (4).

The present study analyzes 5 years of medical care utilization statistics from a major health insurance carrier on a self-selected group of approximately 2000 participants in the Transcendental Meditation (TM) program of Maharishi Mahesh Yogi (5). There are about two million TM meditators worldwide and the TM technique is not a therapeutic modality per se but is offered to the general public as a means of self-actualization (5). It is taught in seven systematic steps, which include introductory and preparatory lectures, personal interview and personal instruction, and verification and validation of experiences of the first 3 days of meditation (6, p. 6). The technique is taught by qualified teachers trained by Maharishi and it is described as "an effortless procedure for allowing the excitations of the mind gradually to settle down until a least excited state of mind is reached" (6, p. 123).

The TM program consists of the regular practice of the TM technique 15–20 min twice a day. It is practiced at home, in the office, or wherever is convenient. It does not require any special treatment setting, and although a quiet place is best, it can also be practiced successfully in noisy environments such as a bus, commuter train, or airplane.

Physiologic research shows that the TM technique produces a state of "restful alertness" (7, 8). Rest is indicated by reduced minute ventilation, respiration rate, plasma lactate levels, and spontaneous skin resistance responses and increased basal skin resistance relative to eyes-closed rest in nonmeditating control subjects (7–9). Alertness or inner awareness is indicated by increased alpha band EEG power (7, 8) and coherence (10). Subjective experi-

ences of a "least excited state of mind," also referred to as transcendental consciousness, are highly correlated with slowing of respiration and increased EEG coherence over all frequencies and derivations (11, 12).

It has been proposed that the state of restful alertness gained during the TM technique optimizes the efficiency of the innumerable intrinsic self-repair mechanisms of the body (9). Subsequent normalization of accumulated physiologic imbalances through the technique could thus be expected to help maintain good health. A number of experiments using random assignment as well as other research designs have demonstrated that the TM program does have an impact on alcohol use (13–15), drug abuse (13, 14, 16, 17), and cigarette smoking (13, 14, 18), as well as on mental health (17, 19, 20).

For example, Brooks and Scanaro (19) randomly assigned 18 Vietnam veterans seeking treatment for post-Vietnam adjustment symptoms to either the TM program or psychotherapy. After 3 months the TM group showed significant improvements relative to the psychotherapy group, as indicated by reductions in emotional numbness, alcohol abuse, insomnia, depression, anxiety, and severity of delayed stress syndrome, and improved employment status. In addition, habituation of the skin resistance response to a loud tone (a physiologic measure of stress reactivity) was faster in the TM group on post-test relative to pretest, whereas no change was observed in the psychotherapy group, indicating more rapid recovery from stress in the meditators.

A meta-analysis of 66 longitudinal and cross-sectional studies on anxiety and other affective outcomes, controlling for population, experimental design, duration of treatment, demand characteristics, pay-

ment of fees, experimenter attitude, type of publication, and attrition, found that the TM program had twice the effect size as other meditation or relaxation techniques, whether or not the studies were matched on possible confounding variables (20).

"Sense of coherence" is a personality factor that has been found to have an impact on health. It is defined as the ability to make cognitive sense of stimuli, to perceive resources as adequate and to make emotional sense of the environment (21). Several studies indicate that the TM program increases these factors. One study randomly assigned 60 high school students to either the TM technique or the TM technique plus SCI (Science of Creative Intelligence, a course on the display of intelligence in nature), or SCI alone, and another 20 subjects served as a no-treatment control group (22). After a 14-week experimental period those participating in the TM technique (with or without SCI) showed a significant improvement relative to SCI alone or the no-treatment control group on intelligence (Raven Progressive Matrices), creativity, ability to work with complex and abstract situations, energy level, innovation, self-esteem, tolerance, and anxiety.

One measure of perceptual and cognitive coherence is field independence, the ability to disembed target stimuli from high "noise" backgrounds. In one study, 40 subjects were randomly assigned to either the TM program or a control group. After a 3-month experimental period the TM group significantly improved on three indices of field independence, indicating increased perceptual and cognitive structuring ability (23).

Another study demonstrating increased "sense of coherence" found support for the hypothesis that the TM technique reduces habitual patterns of perceptual activation,

resulting in 1) more effective application of schemata to new information and 2) less distracting mental activity during performance (24). Signal detection analysis indicated that in contrast to two control conditions (ordinary relaxation or reading) the TM technique had immediate and longitudinal effects of improving detection of novel stimuli that could not be attributed to response bias.

These studies demonstrating ADM impact and increased sense of coherence suggest that the TM program might engender successful aging, which is perhaps the ultimate test of well-being. A cross-sectional study (25) showed a lower level of biologic aging in TM participants ($n = 84$, mean age 53 years) relative to controls as measured by systolic blood pressure, auditory threshold, and near point vision. Another study (26) extended this finding by randomly assigning 73 residents of homes for the elderly to either a no-treatment condition, or to one of three treatments designed to be equivalent in external structure and expectation-fostering features—the TM program, an active thinking procedure, and a relaxation program. After a 3-month experimental period the TM group had significantly improved in comparison to one or more treatment conditions on three measures of cognitive flexibility, on word fluency, systolic blood pressure, self-report measures of behavioral flexibility, aging, and in nurse's rating of mental health (the last after 18 months). The most striking finding is that all members of the TM group were still alive 3 years after the program began, in contrast to other groups and to the 62.5% survival rate for the remaining population in the homes for the elderly.

Other medical research indicating that the TM program improves health has shown decreased bronchial asthma (27), de-

creased blood pressure in hypertensive subjects (28–30), decreased serum cholesterol levels in normal and hypercholesterolaemic patients (31), and reduced insomnia (32).

The present study complements this previous laboratory research by being the first large-scale field study of the effects of the TM program on general health.

METHODS

This study examined the medical care utilization statistics over a 5-year period for the SCI Insurance Group, which is based in Fairfield, Iowa, but whose membership is 80% out of state, distributed throughout the United States. The only requirement for membership in the SCI health insurance group is that the individual (and all family members of age 10 and older) have practiced the Transcendental Meditation technique regularly for at least 6 months prior to enrollment. In order to remain eligible for participation in the health insurance plan and its benefits, SCI members are required to continue to regularly practice the TM technique. Participation in the TM program in no way biased the availability of any types of medical treatment; it was only the criterion of membership in the SCI health insurance group.

SCI is one of many health insurance groups belonging to a major health insurance carrier of Iowa hereafter referred to as "MIC."¹ MIC's total membership numbered from 600,000 to 700,000 during the period of the experiment. MIC is not an HMO, but a health insurance carrier whose member companies, such as SCI, offer prepaid health insurance plans for the usual medical, surgical, and obstetric services. Sixty percent of the health insurance policies offered by the different groups with MIC have a \$100 to \$200 deductible, and 80% of MIC's business is with an 80/20 coinsurance plan.

Semiannually the MIC actuarial services send each group in its membership a standard report on ac-

count-specific utilization and charge indicators for that group compared to all other groups with MIC. The statistics reported in this article were taken from the MIC's standard reports sent to the SCI health insurance group from 1981 to 1985. In these reports, SCI's medical utilization rates in different categories were compared with the mean of all other groups. These normative data for all other groups is based on MIC's 600,000 plus membership and is referred to as Group Business. In addition, MIC's actuarial services provided statistics comparing the SCI group with five other health insurance groups specifically selected to be of similar size and professional membership as SCI.

SCI's membership enrollments were 694, 1123, 1395, 2119, and 2011 for 1981 to 1985, respectively. The terms of SCI's insurance policy were typical or better than the other groups represented by Group Business. For the majority of the study, SCI members had a \$100 deductible with a 80/20 coinsurance level in force. The lowest deductible range offered by MIC is \$100 to \$200. SCI does screen potential applicants for current major illnesses, but this is also implicitly done by almost all medical insurance groups either through their not enrolling high health risk individuals or through a waiting period (SCI does not have a waiting period).

SCI and Group Business were compared on standard medical care and charge indicators, including hospital inpatient, outpatient, inpatient procedures (medical, surgical, and obstetric procedures performed by the physician, and x-ray and laboratory procedures) and outpatient procedures (physician's procedures performed at the office, emergency room, outpatient department, ambulatory surgery center, at home, and ambulance trips and independent labs).

As a control for age, and to see whether the TM program has a differential impact on different age groups, MIC of Iowa actuarial services kindly provided utilization statistics comparing SCI and Group Business in three age categories (0–18, 19–39, 40+). Because of small numbers, the utilization indicators for SCI were derived as averages over 2 years (1982–1983) and relatively broad age categories had to be used. For the SCI group there were 80, 975, and 218 in the 0–18, 19–39, and 40+ categories, respectively.

Since these age categories are broad, it was of interest to compare the distributions by decades that fall within the broader age categories. For the oldest decade (60–69), which would be expected to have the highest medical utilization, SCI and Group Business had similar percentages (18.47% and 17.8%, re-

¹More detailed information about the SCI health insurance group and MIC can be obtained from Dick Alexander, President, SCI Insurance Group, 2nd and Broadway, Fairfield, IA 52556.

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spectively). However, in the next oldest decade (50–59), the SCI group had 12% fewer and they had 11.3% more in the 40–49 decade.

For the 19–39 age group, SCI members tended to be older than Group Business, with 87.4% in the 30–39 decade compared to 49.8% in the 30–39 decade for Group Business. In the 0–18 bracket, SCI had proportionally fewer school age children from 5–18 than Group Business (53.9% vs. 73.2%).

The distribution of gender by age was found to be very similar for SCI and Group Business, with 46.5% males in the SCI group in 1982 and 1983 combined, compared with 47% males in Group Business.

The medical and surgical hospital admission per 1000 were also compared for SCI and Group Business for 18 standard treatment categories. The categories, ordered by frequency of admissions for the normative data (Group Business) are

1. *Pregnancy and childbirth*—including shortly before and after childbirth
2. *Intestinal diseases*—ulcers and disorders of the stomach, hernia, functional digestive disorders, chronic liver disease, gastroenteritis/colitis, appendicitis, and gallbladder disorders
3. *Nose, throat, and lung*—tonsils, adenoids, bronchitis, emphysema, pneumonia, and asthma
4. *Heart and blood vessels*—hypertensive disease, ischemic heart disease, hemorrhoids, angina, atherosclerosis, congestive heart failure
5. *Genital and urinary*—kidney/urinary tract stones, hyperplasia of prostate, benign mammary displasia
6. *Injuries and poisoning*—accidents, wounds, burns, fractures, internal head injuries
7. *Benign and malignant tumors*—malignancy of the oral cavity/stomach, colon/rectum/anus, throat/lung, skin, female breast, cervix/ovary/uterus, prostate, thyroid, benign tumors of various sites, carcinoma of breast/genitourinary and leukemia
8. *Bones and muscles*—intervertebral disc disorders, bone infections, arthritis
9. *Ill defined condition*—convulsions, chest pain, abdominal pain
10. *All mental disorders*—psychoses/neuroses, drug/mental disorders, alcohol/mental disorders, other mental disorders
11. *Nervous system*—migraine, glaucoma and cataract, disorders of ear

12. *Irregularities of metabolism*—thyroid disorder, diabetes mellitus, pituitary/adrenal gland ailment, nutritional deficiencies, obesity
13. *All infectious diseases*
14. *Other*
15. *Medical carveout*—services covered by Medicare
16. *Skin*
17. *Congenital*
18. *Blood*

Data aggregated into this system of treatment categories could be calculated from the available information for 3 years (1983–1985) for Group Business and for 5 years (1981–1985) for SCI. The means of three years for Group Business and 5 years for SCI are reported. The following formulas were used to calculate this data from the available information:

$$\text{SCI hospital admissions/1000} = \frac{\text{number of admissions in a treatment category for SCI in that category} \times 1000}{N} \quad (1)$$

where N = group membership of SCI that year.

Group Business hospital admissions/1000 in a treatment category = $\frac{\% \text{ charged for that category}}{\% \text{ charged for that category}}$

$$\frac{\text{total charges} \times \text{charges per admission in that category}}{1000} = \frac{\text{charges per admission in that category}}{N} \quad (2)$$

The accuracy of these values was checked by showing that the sum of the admissions per 1000 calculated for the 18 categories equalled the total admissions per 1000 given in the MIC report.

Other Accounts

As a control for profession, MIC actuarial services selected five other insurance accounts with comparable policies that were of similar size and professional membership as SCI for utilization indicators for 1982 incurred. None of the Other Accounts se-

TABLE 1. SCI Utilization Rates Compared with Other Accounts of Similar Professional Membership*

	Other Accounts				SCI	P SCI vs. Average	P SCI vs. Low
	Average	High	(ID)	Low			
Admissions per 1000 members							
Medical	45	48 (1,2)	28 (5)	20	<0.0001	0.1042	
Surgical	38	43 (5)	32 (4)	9	<0.0001	<0.0001	
Obstetric	22	28 (1,4)	14 (3)	20	0.6477	0.0870	
Total	105	116 (1)	90 (3)	49	<0.0001	<0.0001	
Patient days per 1000 members							
Medical	282	305 (2)	178 (5)	126	<0.0001	<0.00001	
Surgical	200	209 (2)	120 (4)	32	<0.0001	<0.00001	
Obstetric	88	105 (1)	46 (3)	62	0.0021	0.0105	
Total	570	615 (2)	456 (5)	221	<0.0001	<0.00001	
Average length of stay							
Medical	6.3	6.3 ^b	5.6 (1)	6.4	0.9893	0.9098	
Surgical	5.2	5.5 (3)	3.8 (4)	3.7	0.8255	0.9863	
Obstetric	4.1	4.3 (2)	2.9 (4)	3.0	0.8555	0.9843	
Total	5.4	5.6 (2)	4.5 (4)	4.5	0.8967	0.9999	
Outpatient visits per 1000 members							
Medical	99	141 (5)	63 (3)	55	0.0001	0.2698	
Surgical	40	56 (4)	35 (3,5)	23	0.0036	0.0287	
Obstetric	6	12 (4)	4 (5)	4	0.3855	0.9999	
Total	145	180 (5)	103 (3)	82	0.0001	0.0206	
	ID Number	Type of Account	Membership				
	1,2	Banking Industry	15,413				
	3	School System	4,802				
	4	Computer Firm (High Tech)	1,029				
	5	City/Government Unit	1,196				
		Total	22,440				

*1982 Incurred, Paid through March 31, 1983

^bTie: 2,3,4 & 5

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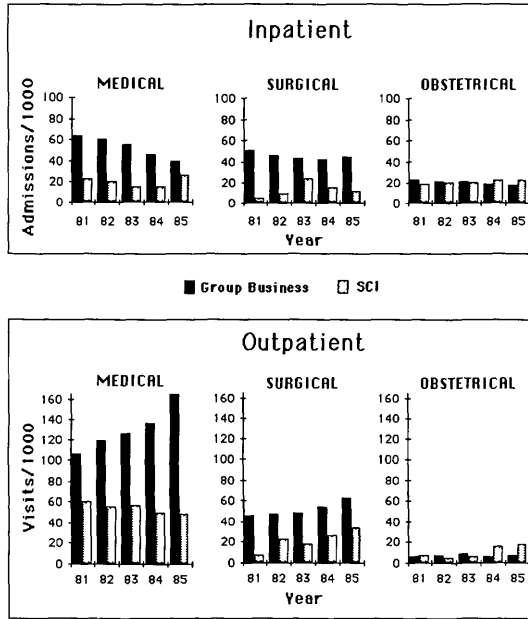


Fig. 1. Levels of inpatient and outpatient medical care utilization in major treatment categories over 5 years for SCI (TM group) and Group Business (normative data).

lected for the comparison with SCI exactly matches the SCI group, which was difficult to match because its membership is not based on a common profession, although most of its membership can be characterized as "white collar" and many are teachers. The Other Accounts do, however, cover a variety of professions typical of the SCI members, including two banking groups, a school system (teachers and administrators), a computer firm (high technology), and a city government unit (see bottom of Table 1 for *N* for each of these groups). The terms of the health insurance policies of the Other Accounts were comparable to SCI's.

Statistical Analysis

The hypothesis that the medical utilization indicators for SCI and Group Business were significantly different over the 5 years was tested using the chi-

square statistic for a 2 × 5 table representing the two groups (SCI and Group Business) for the 5 years (1981–1985). The utilization rates for the normative data (Group Business) were used as the expected values and the rates for SCI were the observed values. A separate chi square was calculated for each indicator—inpatient admissions per 1000, inpatient days per 1000, outpatient visits per 1000, inpatient procedures (e.g., x-rays etc.) per 1000, outpatient procedures per 1000, and total health charges.

The data on the different age categories were analyzed by calculating a 2 × 3 chi square table representing the two groups (SCI and Group Business) and the three different age categories, testing the hypothesis that the two groups were different over the age categories. This was done for hospital inpatient days per 1000 and outpatient visits/1000 (*p* values from these analyses are shown in Figure 2).

The critical ratio test (33) was used to compare SCI and Other Accounts (data presented in Table 1). This

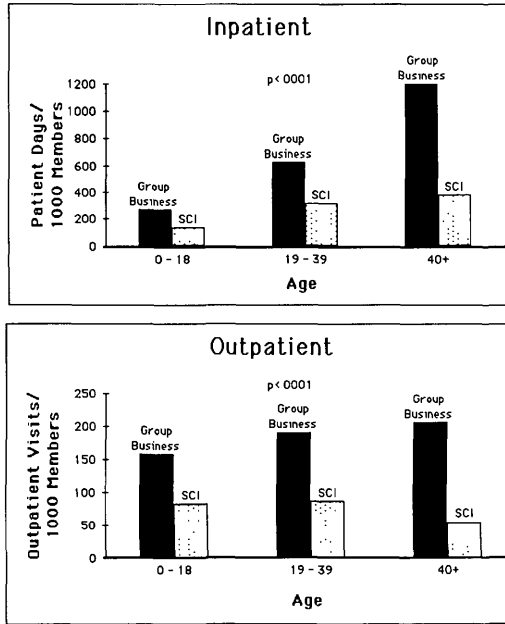


Fig. 2. Levels of inpatient and outpatient medical care utilization by age categories for SCI and Group Business.

tests the hypothesis that the observed proportion of the statistic in question (admissions per 1000, patient days per 1000, average length of stay, or outpatient days per 1000 for SCI members (P_{SCI}) was significantly lower than the expected proportion (P) of admissions for Other Accounts. The standard deviation in proportion units is $\sqrt{PQ/N}$, where $Q = (1 - P)$ and $N =$ sample size of the SCI group. Thus, $z = (P_{SCI} - P)/\sqrt{PQ/N}$ (33, p. 50). As a test for normality, NP and NQ must exceed 5, and the data must be corrected for continuity if either product is between 5 and 10 (30, p. 51). This would be the test of choice for the 18 treatment categories as well, but due to very small proportions the data were too skewed and nonnormal to justify the use of the test. Instead, the sign test was used as an overall test of the difference between SCI and Group Business on the 17 pathologic treatment categories taken together (omitting pregnancy and childbirth).

RESULTS

Figure 1 shows that for every year from 1981 to 1985, SCI's utilization rates were consistently lower than Group Business for medical and surgical inpatient and outpatient medical care. It is interesting to note in Figure 1 that over the 5 years, Group Business decreased on inpatient medical and surgical utilization while its outpatient utilization increased.

The 5-year means showed that SCI's admissions per 1000 compared to Group Business's were 63% fewer for inpatient medical, 71.5% fewer for inpatient surgical, 58.8% fewer for outpatient medical,

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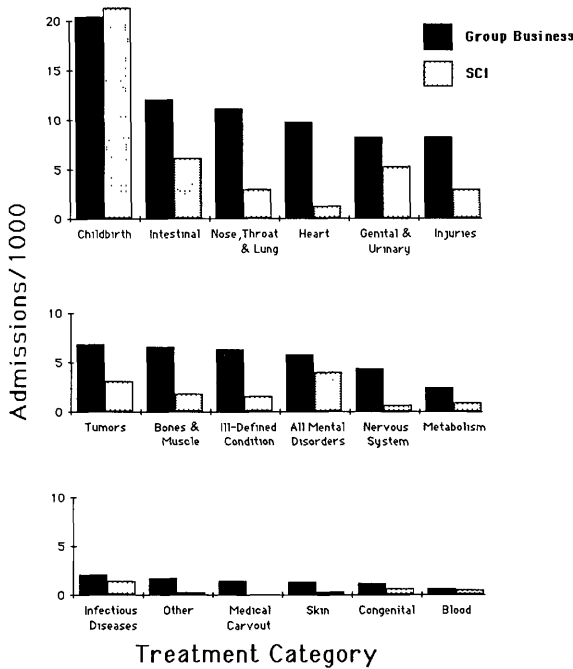


Fig. 3. Levels of medical care utilization in 18 treatment categories for SCI and Group Business.

and 56.0% fewer for outpatient surgical ($ps < 0.0001$). SCI's obstetric admission were 5.6% higher than Group Business over the 5-year period, a nonsignificant difference.

All other utilization indicators—patient days per 1000, inpatient and outpatient procedures—showed results that were similar to admissions per 1000 ($ps < 0.0001$).

Figure 2 shows that SCI had lower medical utilization rates than Group Business in all age categories. Inpatient days per 1000 were 50.2% fewer for SCI children

(0–18), 50.1% fewer for SCI young adults (19–39), and 68.4% fewer for SCI older adults (40+), $p < 0.0001$. Outpatient visits per 1000 were 46.8% fewer for SCI children, 54.7% fewer for SCI young adults, and 73.7% fewer for SCI older adults, $p < 0.0001$.

Figure 3 shows that SCI had lower admissions per 1000 than Group Business in all 18 treatment categories except obstetrics. For the other 17 categories, SCI had lower admissions rates: intestinal, –49%; nose, throat, and lung, –73.0%; heart, –87.3%; genital and urinary, –37.0%; in-

injuries, -63.2%; tumors, -55.4%; bone and muscle, -67.6%; ill-defined conditions, -76.0%; all mental disorders, -30.6%; nervous system, -87.2%; metabolism, -65.4%; infectious diseases, -30.4%; other, -91.2%; medical carveout (services covered by Medicare), -100%; congenital, -50.6%; and blood, -32.8%. The probability of SCI being lower than Group Business in the 17 medical treatment categories is $0.5^{17} = 7.63 \times 10^{-6}$, a highly significant result. The *N* of the SCI group was not large enough for a finer breakdown into subcategories.

Table 1 shows that SCI had significantly fewer hospital admissions than the mean of Other Accounts of similar professional membership for medical and surgical admissions per 1000 and patient days per 1000 ($p < 0.0001$), but a comparable average length of stay. However, the average length of stay in the hospital for child delivery for the meditating mothers was 3 days, compared with an average of 4.1 days for Other Accounts and the obstetrics patient days per 1000 were 62 for SCI compared to 88 for Other Accounts ($p = 0.0021$). It is noteworthy that SCI was lower than the lowest of the five Other Accounts for medical, surgical, total admissions per 1000, and patient days per 1000.

Cost Benefit

SCI's combined cost of inpatient and outpatient treatment per 1000 members paid out by the insurance carrier was 26.5% to 67.4% less than Group Business for different years, which amounted to \$623,571 per 1000 less over the 5-year period. The average one-time cost to learn the TM technique per person is approximately \$300, or \$300,000 per 1000. Therefore, after teaching a group of people the TM tech-

nique, one would still save an estimated third of a million dollars per 1000 over a five-year period, a considerable reduction of health care costs if extended nationwide.

DISCUSSION

Regular practice of the TM technique 15-20 min twice a day was the only explicit defining characteristic of the SCI group. It is reasonable to believe that SCI members actually did meditate regularly because members sign a legal agreement to continue to regularly practice the program as a condition of eligibility for the insurance benefits, and because they are periodically required to participate in standard checking of the practice offered by TM centers. The specific criteria of correct meditation used by the TM teacher are that the practice is effortless and relaxing and produces cumulative benefits in activity.

However, the SCI group (as well as all the comparison groups) were self-selected, which raises the question of causality. Does the requirement for 6 months of participation in the TM program bias this group in relation to the nonmeditator enrollees in the other insurance groups? One possible explanation for the data is that people who learn and continue to participate in the TM program tend to have more health-promoting life-styles anyway. This appears to be unlikely, however, because many people come to learn the technique because they are having problems, and research using random assignment and other experimental designs have shown that the technique has beneficial effects on people who begin even with serious problems (e.g., 19, 20). In addition, it seems unlikely that the meditators could significantly change

their life-styles merely on the basis of an intellectual or emotional commitment to some ideal of behavior; indeed, no change in belief system or life-style is suggested or required for participation in the program.

In addition, there does not appear to be anything in the terms of the SCI insurance policy that would tend to reduce its utilization relative to the comparison groups. The SCI insurance policy had a low deductible and a coinsurance plan typical of the normative data (Group Business) and Other Accounts of similar professional membership. SCI does exclude prospective members who have a current major illness, but so do most group insurance plans represented in the comparison groups, either through not enrolling high health-risk individuals in their health insurance plan or by having a waiting period (SCI had no waiting period). The distribution of gender was the same for the SCI and Group Business so this was not a factor.

With regard to age, the SCI group had lower medical utilization rates in all age categories. The categories were broad in order to maintain a substantial N in each, but there was little in the distributions within the categories to explain the results. For example, in the high-risk 60-69 decade the SCI group actually had a slightly higher percentage of members than Group Business, although they did have 12% fewer members in the 50-59 decade and proportionally more in the 40-49 decade. Within the 19-39 bracket, SCI members were actually more distributed towards the older 30-39 decade, so younger age could not account for their lower medical utilization rates. For the 0-18 group, SCI had 19.3% more preschoolers, which might have resulted in less disease because of not being exposed at school. However, it is

unlikely that this 19.3% discrepancy could have accounted for all of the approximately 50% reduction in hospitalization and doctor visits observed for the SCI children.

An interesting note on age is that the contrast between the SCI group and Group Business increased with age. Whereas health care utilization was approximately 50% less for SCI in the 0-18 and 19-39 age brackets, for the 40+ group it was 68.4% less for inpatient and 73.7% less for outpatient utilization. This result supports previous research (25, 26) demonstrating the cumulative preventative benefits of the TM program for aging.

Inpatient vs. Outpatient Treatment

SCI's reduced medical care utilization cannot be attributed to a shift from inpatient to outpatient care, because SCI had lower inpatient and outpatient rates relative to both Group Business and Other Accounts. The normal obstetric admission rates for SCI further indicate normal medical utilization for nonpathologic use, i.e., child delivery. This pattern of results suggests that the reduction in SCI's utilization rates was not due to a life-style preference, such as a tendency to deliver babies at home rather than in the hospital or a preference for outpatient rather than inpatient treatment. In addition, the finding that the SCI group had lower incidences of major conditions such as heart disease and cancer shows that their utilization levels were not restricted to the less serious medical categories.

The SCI mothers did spend somewhat fewer days (3.0) in the hospital than did Other Accounts mothers (4.1). This may have been because of a preference to leave the hospital earlier or because of better health. The latter interpretation is con-

sistent with previous medical research on over 100 mothers showing better health for mother and child during pregnancy and childbirth, shorter duration of labor, and lower frequency of operative intervention during labor (34) and research showing more time in the quiet alert state in neonates of meditating mothers (35).

The explanation for the data that is most consistent with the previous research taken as a whole (7–20, 22–32, 34–37) is that the regular experience of the physiologic state of restful alertness produced by the TM technique influences health both directly and indirectly. Direct effects would occur through preventing the accumulation of physiologic stress. Indirect effects would occur through improved life-style due to becoming a “better chooser” on the basis of stabler, more balanced physiologic functioning, which increases one’s sense of coherence. Decreasing the physiologic manifestations of stress could be expected to decrease internal “noise,” thus increasing the signal-to-noise ratio, which would allow one to attend to the subtle cues coming from within the body and environment so that one would spontaneously make more health-supporting choices with regard to diet, smoking, seat belts, etc.

The research showing that TM meditators reduce their intake of alcohol, drugs, and tobacco (13–19, 36) can be interpreted as indicating their growing ability to make better choices. One study (37) found that the principal reason given by TM participants for reducing their intake of these substances is increased sensitivity to the negative consequences of the substances on their physiology. Increased sensitivity to the physiologic effects of food might also result in dietary changes. Diet influences health (38), but unfortunately information on the dietary and exercise habits of the SCI group was not available. Al-

though there is no published research on the TM program and diet, personal observation suggests that a tendency towards vegetarianism develops gradually over a matter of years in some but not all meditators. However, in their study of biologic aging, Wallace et al. (25) controlled for both diet and exercise and found that the TM program had an independent effect on reducing biologic age relative to chronologic age.

More random assignment studies are needed to further clarify the relationship between the TM program, health-promoting behavior, and health. However, large-scale studies of this type are difficult to do for a number of practical reasons; random assignment experiments were nonexistent in one review of ADM impact (2) and those that did exist on the effects of mental health treatment on medical utilization were small, with a median $N = 22$ (3). The present study had a larger N than all but 1 of 25 studies cited in the first review (2) and a larger N than all 58 studies cited in the second review (3). The present study also had a longer treatment duration than all but 3 of the 25 studies in the first review (2).

A New Theoretical Perspective on Health

A recent overview of health-enhancing strategies stated that “we need to be open at this point to a broad spectrum of conceptual models of health and ways to enhance it” (39). Most health-enhancement strategies follow a two-step process of 1) identifying specific behavioral factors that influence health and 2) finding techniques that modify behavior to promote health. The list of health-related behaviors includes cigarette smoking, physical exercise, the use of seat belts, and chronic stress

(40). Techniques for changing health-related behaviors have been termed participant modeling (41) and include various procedures that have been classified as corrective action, direct feedback, and social modeling (39).

The TM program differs fundamentally from these health-enhancement strategies in that it does not involve attempting to identify or directly modify specific target behaviors. Recently, however, Maharishi has made available a comprehensive prevention program called Maharishi's Ayurveda, which, in addition to the TM technique, includes programs on diet, herbal supplements, exercise, behavioral patterns, and prevention techniques for different physiologic types, seasons, and climates (42, 43). However, the majority of the present study occurred before these other programs were available and it only involves the TM program itself, which does not require or even recommend changes in life-style. Yet without specifically attempting to change behavior, the TM program has been shown to have a wide-ranging impact on ADM (13–20, 36, 37), sense of coherence (22–24), and health (25–32). The generality of the TM program's effects is also illustrated in the present study by the low utilization rates of the SCI group in virtually all medical treatments categories.

The holistic effects indicated by the present and previous research have prompted a new theoretical approach to health that draws upon unified field theory of modern physics (42–44). Hagelin (44) and other theoretical physicists have noted the emergence at nature's fundamental scales of measurement of characteristically subjective qualities, such as dynamism, intelligence, and attributes of self-awareness, suggesting that consciousness may require a more fundamental position in our

conception of nature. Hagelin (44) has demonstrated that there are close structural parallels between the technical properties of the unified field of quantum field theory and the descriptions by both ancient and modern meditators of the field of pure consciousness experienced when conscious awareness settles into its "least excited state" (6). Chopra (42) points out that the Vedic tradition that Maharishi represents, as well as the roots of most cultures of the world, identify the unified field of natural law with a field of pure consciousness, which can be directly experienced by the human nervous system to achieve higher levels of health and well being. Wallace (43) has reviewed experimental evidence on the TM program supporting the theory that the direct experience of the unified field as pure consciousness produces an optimally balanced state in the neurochemical environment of the body that maximizes the efficient use of the information in DNA to induce self-repair, holistic growth, and, hence, a higher level of health.

Based on previous research, some physicians prescribe the TM program for stress management, and there are two organizations that serve the over 6000 physicians who have learned the TM technique and many more who recommend it.² Future large-scale research in business, industry, military, governmental, or educational settings would further clarify the ability of this promising technology of health enhancement to prevent disease and to reduce medical care costs.

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