"Assessment of Network Spinal Analysis in retrospective and prospective research design formats using a survey of Self-Reported Health and Wellness"

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Well-designed patient questionnaires have become important outcome measures in predicting global health, psychological well-being, resilience/thriving and spirituality. In as much as Network Spinal Analysis (NSA), a health modality evolved from subluxation-based chiropractic, does not purport to diagnose nor treat disease, our research group at the University of California Irvine developed and continue to validate a survey instrument of Self-Rated Health and Wellness (SRHW) to assess the health/wellness changes in patients undergoing NSA. The instrument was developed to evaluate health according to the World Health Organization definition as being a "… state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity". This survey was used in two research formats: 1) a large practice-based retrospective (cross-sectional) assessment of 2,818 clients (67-71% response rate) undergoing NSA from a total of 156 Network offices (49% practitioner response rate) in the United States, Canada, Australia, and Puerto Rico, and 2) a systematic longitudinal tracking of 388 patients (51% response rate) from 30 Beta Sites randomly selected from a total of 91/161 of the Network offices Worldwide meeting the following inclusion criteria 1) Doctor of Chiropractor in the United States, 2) member of the Association for Network Chiropractic and certified Part1- NSA, and 3) willingness to participate in the study. The SRHW was administered before initiating NSA care and at regular intervals (2,4,6,9,12 mo.) for one year.

The first results from the retrospective study were published previously (J. Vertebral Subluxation Res. 1,4, 1997 15-31), and indicated that patients reported significant, positive perceived change ($p < 0.05$) in all four domains of health assessed (physical state, mental/emotional state, stress indicators, life enjoyment) as well as overall quality of life. Clinical effect sizes in each domain were large (> 0.9). These results suggest that NSA is associated with significant benefits evident from as early as 1-3 months under care, and appear to shown continuing clinical improvement in the duration of care intervals studied, with no indications of a maximum clinical benefit.

These results are important because they indicate that there is a high level of patient satisfaction and significant improvement across all domains of health as defined by the WHO. The far-reaching implications of these findings are seen in the questions making up each scale. Physical state scale: (10 items) presence of physical pain; feeling of tension or stiffness or lack of flexibility in spine; incidence of colds and flu; headaches; nausea or constipation; menstrual discomfort; allergies/eczema/skin rashes; dizziness/light-headedness; and, accidents/tripping/falls. Mental/Emotional state scale: (10 items) If pain is present, how distressed are you about it; presence of negative/critical feelings about self; experience of moodiness or temper or angry outbursts; experience of depression or lack of interest; being overly worried about small things; difficulty thinking or concentrating or indecisiveness; experience of vague fears or anxiety; being fidgety or restless; difficulty sitting still; difficulty falling or staying asleep; and, experience of recurring thoughts or dreams. Stress indicators scale: (10 items) Patients were asked to evaluate levels of stress relative to family, significant relationship, health, finances, sex life, work, school, general well-being, emotional well-being, and coping with daily problems. Finally, the Life Enjoyment scale (11 items) which also included components of spirituality asked about: openness to guidance by your "inner voice/feelings"; experience of relaxation or ease or well-being; presence of positive feelings about yourself; interest in maintaining a health lifestyle; feeling of being open and aware/connected when relating to others; level of confidence in ability to deal

with adversity; level of compassion for and acceptance of others; satisfaction with the level of recreation in your life; incidence of feelings of joy and/or happiness; level of satisfaction with your sex life; and, time devoted to things you enjoy. The patient was asked to evaluate each of these questions on a five-part Likert scale, and at two points in time, "presently" and "before Network Care". This gave the investigators the ability to derive a difference score, based upon this retrospective recall format, relating time in care with perceived change. The items in each scale were averaged to give three composite (presently, before Network Care, and difference) scores for each scale. The average of all four give a "Combined Wellness Score.

Results from the second major longitudinal study confirm the retrospective findings. Of particular interest is the finding that each of the four domains show different time courses for improvement while under NSA care. The battery of physical symptoms resolve early (by 2 months) and show little change thereafter up through one year of care. Similarly, the mental state domain also shows rapid improvement by 2-4 months, and then a more gradual positive change thereafter. In contrast, stress indicators and life enjoyment show steady improvement throughout the one year of study of patients undergoing regular NSA and as sampled at 2,4,6,9, and 12 mo. Not only do the longitudinal studies confirm the earlier retrospective study, but the longitudinal format allows us to propose a cause-effect relationship between NSA care and significant self-reported changes in all four health domains of health. Moreover, the random sampling of 30 Beta sites allows the data from this subset of practitioners to be generalized across the larger population meeting the inclusion criteria. Thus, patients undergoing NSA self-report significant changes in the physical and mental well-being, report improved ability to deal with stress in their lives, and greater life enjoyment. It is important to recognize that whereas physical and emotional challenges improve quickly while under care (within 2-4 months), the benefits in stress relief and life enjoyment continue to accrue over time.

In a third major study, the retrospective data were utilized to compute a mathematical model of wellness for this particular subpopulation by evaluating the statistical interactions between patient sociodemographics, health/wellness difference scores and changes in patient health lifestyles while under care (15 items) including changes in: incidence of smoking, coffee/caffeine consumption, health food/vitamin consumption, vegetarian/partial diet, food choices (chicken/fish vs. beef), regular exercise, relaxation/self-hypnosis, meditation/prayer, Tai Chi/Yoga, use of prescription medications, self-improvement/self-healing programs, alternative medicine practices (e.g., acupuncture, homeopathy, etc.) and whether they get eight or more hours sleep per night.

Structural equation modeling is a statistical approach that uses factor analysis to group together the concrete questions that represent the abstract constructs that constitute wellness; these are linked by paths whose strength and direction are determined by multiple regression.

The structural equation model below summarizes these results. Note that there are three derived domains- "Network care", "Wellness", and "Health lifestyles". Each of these derived domains is impacted along a path by antecedent constructs composed of related independent variables; the antecedent constructs and derived domains are linked along a paths by numbers (normalized regression coefficients) indicating their relative contribution to the construct. The arrows on the path indicate the cause-effect relationship between elements in the wellness model. This model indicates that "Wellness", defined as patient self-reported health, is promoted by their positive "Health Lifestyles" along a path weighted .222. The modality under study, "Network Care", prom otes wellness along a path weighted almost twice as much (.429), and positively

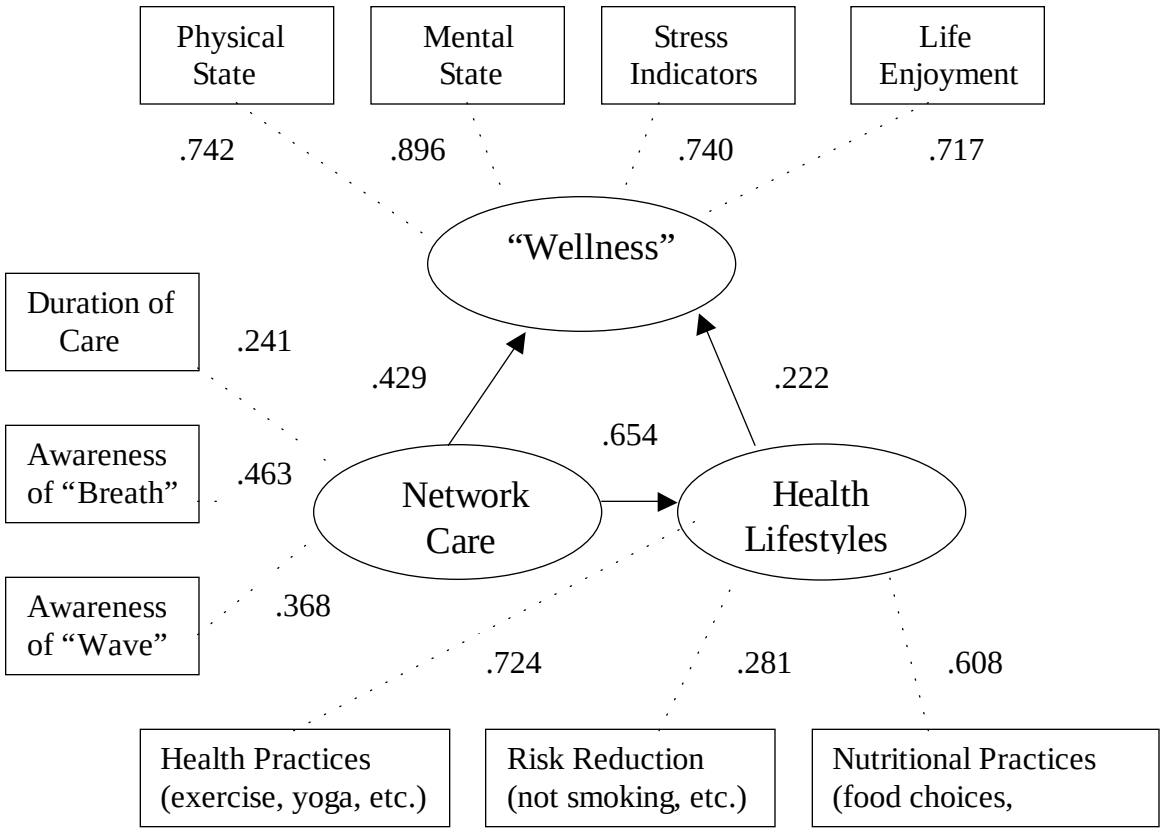

Figure 1: Structural equation model of "Wellness" derived from analysis of data from 2,596 patients undergoing NSA (see text for details).

influences wellness indirectly (.654) by improving "health lifestyles". Note that the four domains of health- physical health (.742), mental health (.896), stress indicators (.740), and life enjoyment
(.717) have a major impact on wellness with mental state being ranked somewhat higher than the other three. Also, the three antecedents of "health lifestyles" are heavily weighted for "Health Practices" (.724), "Risk Reduction" (.281) and Nutritional Practices (.628). Moreover, the construct Network Care is composed of 1) duration of time under care (.241), 2) awareness of their breath (.463) and 3) the somatopsychic wave (.368). The latter indicates that greater levels of self-reported wellness are reported by patients with early awareness of breath and onset of the somatopsychic wave, and for those staying under care longer. Finally, several sociodemographic variables were found to be significant (gender, age and education), i.e., woman under care reported greater wellness difference scores (.06), and stayed under care longer (.17); individuals with college and post-college education report higher difference in wellness scores (.05); and, increasing age was associated with shorter time under care (-.12), and smaller positive health lifestyle changes (.14).

In summary, within the constraints and assumptions of structural equation modeling and cross-sectional data, there is evidence that the use of NSA, and presumably other Complementary and Alternative modalities (CAM) operating in the illness/wellness model, contribute not only directly to self-rated health and perceived wellness improvements, but also indirectly by way of health lifestyle practices perhaps by promoting positive lifestyle choices. This knowledge could also advance understanding of the disease outcomes of these lifestyles, and the success of national health policies in helping people achieve healthier more productive lives.