

A Longitudinal Assessment of Chiropractic Care Using a Survey of Self-Rated Health Wellness & Quality of Life: A Preliminary Study

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Abstract — This longitudinal study evaluated changes in self-rated health status of patients receiving chiropractic care at the training clinic of the New Zealand School of Chiropractic. The study was designed to assess subluxation-based chiropractic care in association with changes in patients' perceived health status. The Self-Rated Health/Wellness Survey (SRHW) was used to evaluate the health status on two occasions, "initial" and "follow-up." The instrument assessed health across four domains, Physical State, Emotional/Mental State, Stress and Life Enjoyment. Collectively, these four domains, assessed initially and after a follow-up period, constituted Combined Wellness, or a fifth domain. Quality of Life was evaluated as a sixth domain of the questionnaire instrument. The study population included 89 subjects, evaluated over a five-month study period. The average interval between initial and follow-up surveys was 8.0 ± 3.2 weeks, with an average number of visits of 9.1 ± 4.2 . A bivariate analysis was conducted using a two tailed, paired sample t-test to assess the subjects' survey responses. Subjects reported significant positive perceived changes in Physical State ($p = 0.000$), Mental/Emotional State ($p = 0.008$), and Combined Wellness ($p = 0.001$), with corresponding effect sizes of 0.61, 0.24 and 0.31 respectively. The improvement in the Physical and Mental/Emotional State, and Combined Wellness suggests that chiropractic care provided through the NZ School of Chiropractic is associated with significant benefits in these domains. Study data suggested that health/wellness may accrue with time under care. Thus, further study with a larger sample size and longer duration of care is proposed to more thoroughly investigate possible health benefits in the areas studied, as well as to confirm present findings.

Key words: chiropractic, vertebral subluxation, outcomes assessment, wellness, quality of life, subluxation-based chiropractic, Self-Rated Health/Wellness Survey (SRHW).

Introduction

Over the past century, different schools of thought have emerged within chiropractic.¹ One view is that spinal manipulative therapy is a means of treating pain, mechanical dysfunction and/or certain disease processes. Another perspective, to which the NZ School ascribes, is to promote overall health/wellness in the patient.² This is believed to occur through specific spinal adjustments to correct vertebral subluxation, a condition

believed to interfere with the flow of neurological information. Thus, reduction of vertebral subluxation is thought to promote overall health by contributing to the proper function of the body's inherent adaptive abilities, many of which appear linked to neurological function.³ Thus, chiropractic, as taught and practiced at the NZCA School of Chiropractic, is a health care discipline within the subluxation-based chiropractic model. It is founded on the premise that people free from vertebral subluxation experience a greater sense of relative health and wellness. Implicit in the subluxation-based model of chiropractic is an appreciation of a broad-based concept of health, encompassing multiple domains including physical, mental, and social well being.

A review of the basic science and clinical models of subluxation by Kent⁴ concluded that there is a wide diversity of techniques in chiropractic that may use different methods but share the common objective of correcting spinal nerve interference associated with vertebral subluxation. Kent has suggested a need

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to achieve commonality and accountability across all techniques by developing models of care that emphasize clinical outcomes, allowing the practitioner the flexibility to determine how those objectives will be achieved. Such outcomes would include general health and quality of life indicators.

In recent reports⁵⁻⁷ it has been emphasized that both the chiropractic colleges and the developers of the various approaches have a responsibility to fully describe their rationale, objectives and protocols, and to report outcomes. This applies equally to the clinical protocols followed at the NZ School. Thus, this study has considered one form of validation of clinical practice methods through reporting clinical outcomes that include evidence of improvements in general health and quality of life indicators.⁸

The trend towards the approach of assessing patient health outcomes is also occurring within Western medicine. Wilson and Cleary⁹ have proposed that general health perceptions are a reflection of biological and physiological variables, symptoms status and social interactions, all of which are influenced by the individual's genetic make-up and the environment. However, this view implies that a healthy individual would not express disease or infirmity. Within the chiropractic model of health care a healthy individual may or may not present with disease or infirmity. One factor that differentiates the healthy from the unhealthy individual is the body's adaptive ability to maintain a state of functional fitness; i.e., the ability to physically carry out personal expectations.⁵

Traditional measures of biological and physiological function show a low correlation with patient-reported symptoms.⁹ Hence, treatments directed at these measures are unlikely to be fully effective in the relief of symptoms. Wilson & Cleary further emphasize the need for caution in the way measures of biological and physiological function are interpreted and applied. These authors suggest the strongest predictors of mortality and health services usage are general health perceptions which are increasingly being used as an outcome in clinical trials, effectiveness research, and research on quality of care.⁶

Questionnaire instruments that assess functional health status already exist. Two of the most notable include the RAND 36-item Health Survey and the Dartmouth COOP charts.⁸ However these instruments, together with 21 other psychometric survey instruments reviewed and evaluated by McDowell and Newell,⁸ may be inappropriate for measuring changes in a population of patients likely to be presenting for care already in relatively good health.^{8,10} That is, "ceiling" effects exist in these instruments that limit their utility for measuring improvement in an already healthy population. Also, most of the recently developed surveys⁸ have a disease specific orientation, which is not consistent with the model of health/wellness associated with subluxation correction.

This study used a self-rated health (SRHW) survey instrument developed by Blanks, Schuster & Dobson,¹⁰ which more directly reflects the broad World Health Organization's definition of health,¹¹ i.e., "a state of complete physical, mental and social well being, and not merely the absence of disease or infirmity." The Blanks, et al. questionnaire assesses health across four domains, namely Physical State, Emotional/Mental State, Stress and Life Enjoyment. The summation of these four health domains, when re-scaled between 0-1 provides a Combined

Wellness scale. Quality of life is assessed by a fifth domain within the health survey. The instrument has been shown to have a high level of sensitivity for measuring the central theme of "wellness." It was also shown to be reliable, and exhibited internal and external construct validity.¹⁰

Methods

Patient population

All patients commencing chiropractic care at the NZ School's clinic facility in Auckland, between March 1st and September 24th 1998, were invited to participate in this research project. Patients who were unable to understand or complete the survey and those patients under the age of 18 were excluded from taking part. Only patients completing a minimum of 4 weeks of care were evaluated for health/wellness outcomes.

Ethical Considerations

The study was approved through the NZ School's Ethics Procedure, which involved approval by the Auckland Institute of Technology Ethics Committee. The predominant ethical issues were participants' informed consent and confidentiality. Patients signed a consent form constructed to detail the objectives of the study and the responsibilities of the subject, researcher and the attending intern. Consent was obtained from the patient at the time of initial consultation prior to delivery of the health survey. All subjects were given a code number for the purpose of data collection and analysis in order to ensure confidentiality.

Delivery of care

Registered practicing chiropractors serving as clinic tutors supervised all aspects of care including patient evaluation, management plans and the delivery of adjustments. The total population of participating patients were seen by 31 different Junior and Senior Interns. Full spine analysis and adjusting is taught and practiced at the NZ School of Chiropractic. When clinically indicated, chiropractic care consisted of manual adjustments to the spine for the purpose of correcting vertebral subluxation. The adjusting techniques used in the care of patients by the interns included Gonstead,¹² Diversified,¹³ and Toggle Recoil.¹⁴

Research design

The study required patients to complete the same SRHW survey on two different occasions. The initial completion of the questionnaire was considered a baseline of the patient's perceptions. The questionnaire was completed a second time (follow up), consistent with the attending interns patient re-assessment schedule. Since some patients were adjusted more frequently than others, depending on the unique circumstances of each case, the duration between the initial questionnaire and the second, or follow-up questionnaire varied accordingly.

Subjects completed the survey alone, and were provided with an envelope to ensure confidentiality. The attending student

Table 1. Characteristics of the Study Population

	Males	Females	Age
Total Study Population (N = 89)	42	47	30.0 ± 9.0
Subgroup (N=51) (4-7 weeks duration of care)	23	28	30.6 ± 8.2
Subgroup (N=38) (8-21 weeks duration of care)	18	20	29.0 ± 10.2

intern collected the completed health questionnaires for analysis. The questionnaire assessed health, wellness, and quality of life by having subjects self-rate 55 items within the following five domains:

1. Physical State: 10 items rated on a frequency scale of 1 - 5.
2. Mental / Emotional State: 10 items rated on a frequency scale of 1 - 5.
3. Stress Evaluation: 10 items rated on an analogue stress scale of 1 - 5.
4. Life Enjoyment: 11 items rated on a degree scale of 1 - 5
5. Overall Quality of Life: 14 items rated according to feelings relative to perceived quality of life on a scale of 1 - 7.

Each of these scales was considered a dependent variable measured for change in association with chiropractic care. Responses were re-scaled so that the lowest possible scores were coded 0 and the highest possible score coded 1. By summing the four scales, and re-scaling in the 0-1 range, a "Combined Wellness" score was obtained. The fifth scale, Overall Quality of Life, was not part of the Combined Wellness score as it was derived from a separate instrument. The difference between the Combined Wellness score for the initial questionnaire response versus the follow-up score, is referred to as the *wellness coefficient* with a range of -1 to +1. A positive value represents a collective improvement over the four scales, while a zero indicates no change in "wellness." A zero score could reflect identical scores on the two questionnaires, or improvement in one or more scales, balanced by a decreased score in another scale(s). A negative *wellness coefficient* is reflective of an overall decrease in scores among the four scales comparing the initial versus follow-up responses.

Study Period

The time period of this study was initially designed to coincide with the final academic term of the authors (a three month period), who were senior students. The duration of care for each patient was initially expected to be between 4-7 weeks, as this length of time was considered adequate to evaluate possible wellness benefits derived from chiropractic care. However, at the completion of the data collection period, 89 participants had

been evaluated over a period of 4 to 21 weeks (Figure 1). Thus, within the total population of participants, a subgroup of N=51 completed the study in 4-7 weeks, while the remainder (N=38) completed the study in 8-21 weeks. Because of the variation of duration intervals between the initial and follow up survey of the group of N=89, the population was evaluated as a total group, and separately (N=51, and N=38) to ascertain if duration effects were evident within the study population. As well, for the entire population (N=89) correlation of time intervals between the initial and follow up survey assessments and survey scores was also evaluated.

Statistical Analysis

The statistical significance of changes in SRHW scores for the entire population, N=89, as well as the two subgroups, was evaluated by a two-tailed paired t-test. The alpha of 0.05 was corrected for multiple testing (5 questionnaire scales - Appendix 1) to yield a value of 0.01. An alpha value of 0.05 was considered acceptable for evaluating the significance of Combined Wellness, as it represented the sum of the four SRHW domains.

In addition, effect size¹⁵ was used as a measure of the clinical significance of change. Collectively, the statistical significance and the effect size identified the strength of the bivariate relationship. The effect size was calculated using the following formula: $(M2-M1)/S1$, where M1 and M2 are the respective group means of the initial and follow-up surveys, and S1 is the standard deviation of the initial survey. Effect sizes below 0.50 are considered small, 0.50 - 0.80 moderate, and greater than 0.80 large. Pearson correlation was used to ascertain the influence of duration of care on survey outcomes.

Cronbach's coefficient alpha¹⁶ was calculated as an assessment of internal consistency reliability of the survey instrument. This statistic uses the logic that confidence can be increased by using multiple measures and gauging the extent to which the item scores are interrelated beyond random fluctuations.

Results

Subject Population Characteristics

Table 1 shows the characteristics of the study population. During the data collection period 136 new patients (64 males, 71 females) agreed to participate in the study. Of those 136 subjects, 89 completed the follow-up survey with a minimum of four

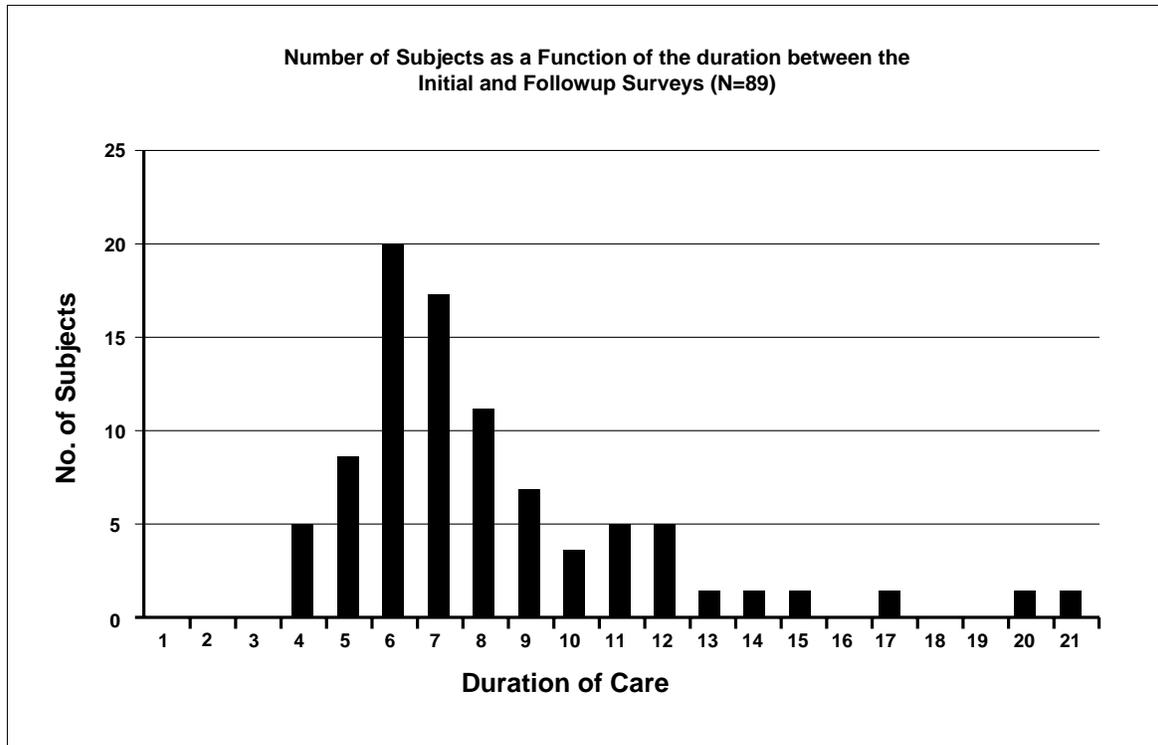


Figure 1.

weeks under care, for a completion rate of 65%. The 89 subjects consisted of 42 males ranging in age from 18 to 53 years, and 47 females ranging in age from 18 to 61 years. For the group of N=89, the mean age and standard deviation was 30.0 ± 9.0 . Within the population of 89 participants, the duration between the initial and follow-up survey ranged from 4 to 21 weeks with a mean and standard deviation of 8.0 ± 3.2 (Figure 1).

The subgroup of N=51 patients completing the study in 4-7 weeks was composed of 23 males and 28 females, ranging in age from 18 to 53 with a mean age and standard deviation of 30.6 ± 8.2 . The remaining participants representing a study duration of 8-21 weeks (N=38) was composed of 18 males and 20 females ranging in age from 18 to 61, with a mean age of 29 ± 10.2 . There were no statistical differences between the two subgroups with respect to age or gender ratio.

Internal Reliability of the questionnaire

Previous assessment of the reliability of the questionnaire by Blanks, et al.¹⁰ revealed high levels of internal consistency for the physical state, mental/emotional state, stress evaluation, and life enjoyment scale items. Table 2 shows the reliability coefficients, determined in the present study, for each of the five scales. Cronbach's coefficient alpha (0-1) was determined for each series of items. A coefficient of 0.7 or higher has been considered a good measure of internal reliability.¹⁶ All five scales demonstrated coefficients greater than 0.7, ranging from 0.772 - 0.894. This indicates that each scale represented a dependable and interpretable measure of its respective theme, and further

supports the reliability of the instrument on repeated trails.

Change in Health Scales, Overall Quality of Life Combined Wellness and Wellness Coefficient.

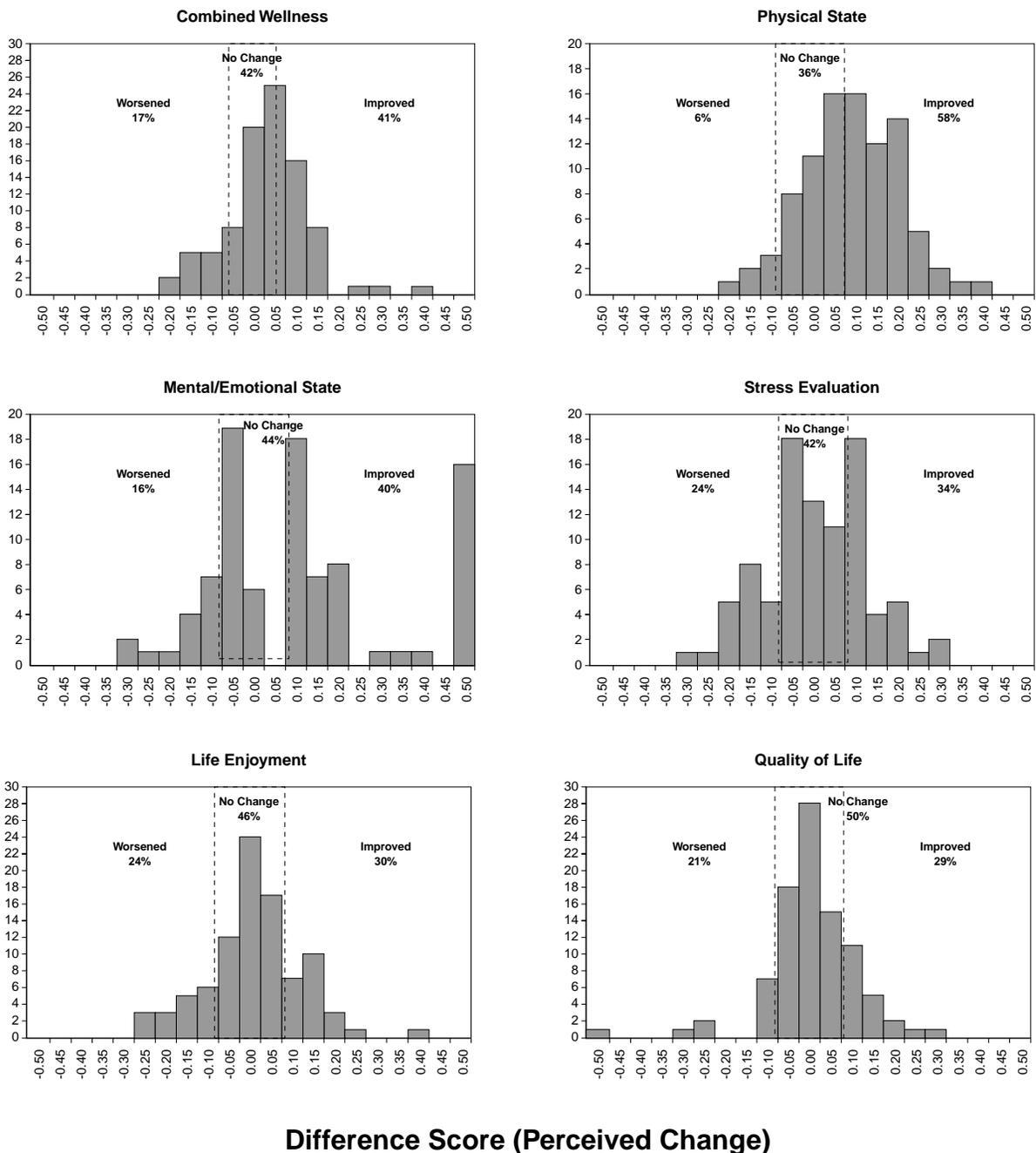
The scores for the "initial" and "follow-up" surveys for each of the scales were compared, giving a change or difference score for each individual. The means and standard deviations of these difference scores for the four health scales, and overall quality of life scale, are presented in Table 3, for both subgroups as well as the entire population.

When evaluating the entire population (N=89), analysis of the difference scores revealed significant change for Physical State ($p = 0.000$), and Mental/Emotional State (0.008). Effect size for the Physical state change was moderate (0.61), while the change for the Mental/Emotional scale was small (0.24). There were no significant changes in Stress Evaluation, Life Enjoyment and Overall Quality of Life.

Combined Wellness (sum difference of the four scales) did change significantly between initial and follow-up responses ($p = 0.000$), exhibiting a small effect size (0.31). A wellness coefficient (difference between initial and follow up Combined Wellness) averaging 0.033 was determined between the two questionnaire responses for the total population.

Histograms, after the method of Blanks, et al.¹⁰ for the each of the domains (Figure 2) show the proportion of subjects categorized as "improved," "no change" or "worsened" when comparing the difference scores between the two survey responses. The cut-off for each domain was ± 0.50 standard deviation

Number of Subjects



Difference Score (Perceived Change)

Figure 2 depicts the perceived changes in the wellness co-efficient, quality of life and each of the four health domains. The percentages of subjects who “improved”, showed “no change” and “worsened” are superimposed on the individual domains. The cut-off values were calculated as (0.5 standard deviation. The vertical axes represent the number of subjects for each difference score.

around zero (no change). Those subjects whose individual difference scores were greater than 0.50 standard deviation away from zero were said to have improved. Those whose scores lay within one standard deviation (- 0.50 to + 0.50) standard deviation were categorized as no change, while subjects whose scores decreased more than 0.50 standard deviation were said to have worsened.

Within the population of subjects (N=89), a range of 36% to 50% exhibited no change in the various health, wellness, or quality of life domains when comparing scores between the two questionnaire responses (Figure 2). However, in those domains

which also demonstrated significant change, i.e., Physical State, Mental/Emotional State, and Combined Wellness, a range of two to eight times the percentage of subjects improved as opposed to worsened. Moreover, no more than 24% of the subjects worsened in any one of the six domains studied.

Duration Intervals Between Initial and Follow up Surveys

The interval between the initial and follow up SRHW survey responses ranged from 4 to 21 weeks (Figure 1), with a mean of 8.0 ± 3.2 . The largest percentage of subjects (81.0 %) com-

Table 2. Reliability Coefficients for Self-Rated Health, Wellness, and Quality of Life Scales¹

Scale	Internal Consistency (Cronbach's coefficient alpha) ²
Physical State	0.7722
Mental/Emotional State	0.8470
Stress Evaluation	0.8477
Life Enjoyment	0.8324
Overall Quality of Life	0.8942

1. Taken from Blanks et al.¹⁰

2. A value of 0.7 or greater, is considered an acceptable indicator of internal consistency.²¹

pleted the study in 4 to 11 weeks and 12.0 % were greater than 11 weeks. There was no significant linear correlation between time intervals and measured survey responses. Among the domains studied, correlation coefficients were all low ranging from - 0.016 in regard to Life Enjoyment to 0.146 for Stress Evaluation.

The N=51 subgroup that completed the study between 4-7 weeks, was similar to the longer duration subgroup as both exhibited significant change in the domain of Physical State ($p = 0.000$), with respective effect sizes of 0.62 and 0.59 (Table 3). Both groups also demonstrated significant improvement in Combined Wellness ($p = 0.008$, and 0.041 respectively). However, the effect size for Combined Wellness was lower in the shorter duration subgroup compared to the longer duration group (0.27 and 0.35 respectively). Interestingly, neither of the two subgroups demonstrated a statistically significant change in Mental/Emotional State, as was evident in the study population as a whole ($p = 0.008$). However, the effect size for this domain was 0.32 in the longer duration subgroup ($N=38$), than the 4-7 week subgroup (0.18). In this same domain (Mental/Emotional State), which did show a significant change in the total population, the clinical effect size was 0.24. Thus, the largest clinical effect was found in the longer duration subgroup (Table 3), when compared to either the shorter duration subgroup, or the total study population. Comparing the SRHW survey responses between the two groups using an independent 2-tailed t-test did not reveal any significant differences in the magnitude of response in the domains studied.

Discussion

Study Design

The present study evaluated changes in domains of health, wellness, and quality of life in a population of 89 new patients receiving chiropractic care, during the period of March 1st - September 24th, 1998. This period represented the Winter - Fall term for Interns practicing in the New Zealand School of Chiropractic Training Clinic, which coincided with the academic schedule of the authors, who were senior interns. The 89

patients were dispersed among 31 Interns (13 junior interns, 18 senior interns), each of whom was supervised by a registered (licensed) NZ chiropractor. Although a variety of indicators were used in the overall assessment of patient progress, the present study has focused on the patients' self perception of health/wellness as expressed through their responses on the initial and follow up SRHW surveys. It is important to note that the variety of approaches to chiropractic care afforded each patient is a characteristic of the clinic training experience in NZ. The intent of the study was not to prescribe a definitive approach to care, but to evaluate in its actual clinical setting, what changes occur relative to the chiropractic plan of care, rather than study patients all receiving the same specific care regimen. Thus, diversity was encouraged, with the patient's self-perceptions being the outcome. Because of the different regimens of care administered for the unique needs of each patient, the current design may have reflected the fact that not all patients were progressing at the same rate of improvement. Consequently, this may have accounted, to some extent, for the apparent lack of improvement in certain health domains measured by the SRHW survey.

The SRHW

The Self-Rated Health/Wellness Survey (SRHW), used to evaluate the patients, assessed four domains of health, Wellness (the sum total of the four domains), and Quality of Life (a separate scale). The Cronbach's Alpha coefficients reported in this study closely paralleled those previously reported by Blanks et al.,¹⁰ with each being above the accepted value of 0.70. This indicates that each of the items significantly contributed to the theme of their respective health domains. Thus, the present internal validity findings further support the SRHW as an instrument, which measures health/wellness.

Changes in Self-Rated Health/Wellness, and Quality of Life

Possible Ramifications of Duration of Care

The variation in time intervals between the initial survey

Table 3. Outcomes Derived from Changes (Difference Scores) in Self-Rated Health/Wellness, Quality of Life Scales Between Initial and Follow up Surveys.¹

	Difference Scores (mean ± S.D.)	Paired t-test (p value)	Effect Size
Total Study Population (N=89)			
Scale			
1. Physical State	0.084 ± 0.110	0.000	0.61
2. Mental/Emotional State	0.037 ± 0.131	0.008	0.24
3. Stress Evaluation	0.000 ± 0.116	0.969	0.00
4. Life Enjoyment	0.009 ± 0.113	0.430	0.09
5. Combined Wellness	0.033 ± 0.090	0.000	0.31
<i>(wellness coefficient²)</i>			
6. Quality of Life	0.005 ± 0.107	0.641	0.05
Subgroup (N=51)^a			
1. Physical State	0.084 ± 0.102	0.000	0.62
2. Mental/Emotional State	0.030 ± 0.114	0.064	0.18
3. Stress Evaluation	-0.002 ± 0.117	0.910	-0.01
4. Life Enjoyment	0.010 ± 0.111	0.512	0.09
5. Combined Wellness	0.031 ± 0.079	0.008	0.27
<i>(wellness coefficient)</i>			
6. Quality of Life	-0.001 ± 0.120	0.974	0.00
Subgroup (N=38)^b			
1. Physical State	0.085 ± 0.121	0.000	0.59
2. Mental/Emotional State	0.048 ± 0.153	0.060	0.32
3. Stress Evaluation	0.004 ± 0.117	0.850	0.03
4. Life Enjoyment	0.008 ± 0.118	0.659	0.08
5. Combined Wellness	0.036 ± 0.106	0.041	0.35
<i>(wellness coefficient)</i>			
6. Quality of Life	0.013 ± 0.089	0.364	0.12

1. Self-Rated Health/Wellness Survey, Blank et al.¹⁰
2. The *wellness coefficient* is the difference in Combined Wellness, initially versus follow up. Over a range of -1 to + 1, a positive *wellness coefficient* connotes improvement, zero connotes no change, and a negative value connotes worsening.¹⁰
3. Values in bold are statistically significant.
 - a. Duration of care = 4-7 weeks
 - b. Duration of care = 8-21 weeks

response and the follow up survey response, ranging from 4-21 weeks, was the result of several factors. These included: 1) patients having to terminate care prematurely due to relocation, 2) Lack of patient compliance with regard to the established plan of care. This increased the duration of care required to derive sufficient information to evaluate patient progress from a clinical perspective; and 3) Logistics of arranging re-assessment schedules between patients and their respective attending interns.

The study did not reveal any significant linear correlation between duration of care (time in which the study was completed) and score differences between the initial and follow up SRHW survey. It is not readily apparent, however, if this implies

that there was no time interval effect, or if one was not detected. This consideration is based on the fact that 88% of the 89 subjects completed the study in a time span of 4 - 11 weeks. While the authors believed that a time interval of up to four weeks of care was sufficient for patients to perceive changes, it could be that the time interval of up to 11 weeks did not allow a thorough assessment of duration of care effects on patient perceptions of health/wellness. Moreover, since only 12% of the participants completed the study in 12-21 weeks, the smaller numbers could possibly have masked any longer term correlation to SRHW responses, if present.

Since the number of visits (with adjustments given when clinically indicated) over the entire time span of the study was

9.1 ± 4.2, it appears that patient/intern contact was not dramatically different for the spectrum of patients, independent of the time interval between the initial and follow up survey. However, since a response to care may be linked to the quality and appropriate quantity of adjustments rendered, it is readily apparent that future investigation will have to consider a longer study period, with closer attention being given to the number of adjustments per patient, as well as the frequency of their administration. This would allow a more thorough evaluation of the association between subluxation correction and patient self-perceptions of health/wellness changes.

The importance of a longer study period is further supported by considering the difference in the subgroup of 51 patients that completed the study in 4-7 weeks (57% of the total study group) compared to the 38 subjects (43%) which included duration of care as long as 21 weeks. Both of these subgroups showed significant improvement in Physical State, with very close moderate effect sizes of 0.62 and 0.59. However, while both subgroups also showed significant improvement in Combined Wellness, the effect size was 0.35 for the longer duration subgroup, and 0.27 for the shorter duration subgroup. This indicates a greater clinical effect in the subgroup under care for the longer period. Thus, any additional chiropractic care administered to the group of 89 could have been sufficient to elicit a greater magnitude of self-perceived change in Combined Wellness.

Another possible consequence of the limited duration of the present study was revealed when comparing the SRHW survey changes in the entire study group of 89 and the subgroup of N=51 and N=38. Both subgroups reported significant improvement in the domain of Physical State, as well as Combined Wellness. However, although the total population showed statistically significant improvement in the domain of Mental/Emotional State, this did not occur in either of the subgroups. While the lack of detection of statistical significance in the longer duration subgroup may be the consequence of too few numbers (N=38), it may also suggest that the length of the shorter duration subgroup (4-7 weeks) was not sufficient for those patients to perceive significant change in the domain of Mental/Emotional State. This finding, viewed in consideration of the greater clinical effect in the longer duration of care subgroup (0.32 versus 0.18 in the 4-7 week subgroup), suggests that benefits may accrue with time. Thus, based on the assumption of accruing benefits, it will be important to conduct longer studies of a larger population relative to self-rated health/wellness assessment. This will be required to adequately determine if and when significant changes occur, and if longer duration of care will also reflect changes in the other domains studied, i.e., Stress Evaluation, Life Enjoyment, and Overall Quality of Life.

Possible Significance of SRHW Responses

Considerable speculation could be advanced as to why the subject group did not express significant change in three of the domains of health. However, it is believed by these authors that sufficient evidence has been presented to suggest that a longer duration study of more respondents in various duration of care intervals should be conducted before discussion on the full spectrum of possible health/wellness outcomes can be assessed. In

the present study the total population and subgroups were not significantly different with regard to age or sex. While it appears that age and sex may not account for the outcome differences in the present study groups, the effects of other sociodemographic variables on the outcomes were not examined. Further investigation in another study population is being conducted to examine the effects of sociodemographic factors on these outcome variables (personal communication; Schuster and Dobson, University of California, Irvine).

In regard to the three areas of health and wellness in which significant improvements did occur, one explanation could be that a majority of patients may have presented with physical dysfunction. This would reasonably promote a response with the most rapid and greatest self-perceived gains being reported in the Physical State domain. In regard to the total population of 89 participants in the present study, these gains could have promoted significant self-perception of improvement in the Mental/Emotional domain reflecting of reduction of physical discomfort. This seems plausible, as the patient profile at the School clinic is estimated (unpublished data) to represent close to 60% of new patients presenting with physical problems such as chronic pain, headaches, musculoskeletal dysfunctions, and neurological problems. Moreover, positive benefits in these areas could then have accounted for the significant self-perceived improvement in Combined Wellness. This was further substantiated by the presence of a positive *wellness coefficient* for both the total population, as well as the subgroups that completed the study in 4-7 and 8-21 weeks. This possible interaction of domains seems consistent with health/wellness being a holistic phenomenon.

Although further study with a larger patient population will be required to verify the full range of possible patient health/wellness benefits suggested in this study, it is noteworthy, that positive benefits could have been occurring as early as 4 weeks under care, and remaining as long as 21 weeks under care. This is supported by the increased effect sizes with in Combined Wellness associated with increased duration of care, positive *wellness coefficients*, and the significant change in the Mental/Emotional domain in the total population. In regard to future study, it will be of interest to know if statistically significant improvements accompanied by increasing effect sizes regarding all SRHW survey domains of health, wellness, and quality of life, as has been suggested by other authors,¹⁰ also occur with time under care at the NZ School of Chiropractic clinic.

Summary

The present study evaluated health/wellness and quality of life changes in a population of 89 new patients receiving chiropractic care in the New Zealand School of Chiropractic clinic training facility. Patients were evaluated longitudinally using the SRHW survey, which demonstrated strong internal validity as a measure of health/wellness, with Cronbach's Alpha coefficients greater than 0.70 for each domain studied. Results showed that patients completing the study over a period of 4 - 21 weeks of care, reported significant improvement in the health domains of Physical State and Mental/Emotional State, as well as Combined Wellness and positive *wellness coefficient*. Although there was no linear correlation between duration of care and survey response over the spectrum of domains composing the SRHW survey,

patients completing the study in a shorter duration of 4–7 weeks demonstrated less of a clinical effect in the areas of Mental/Emotional State and Combined Wellness when compared to those under care up to 21 weeks. This suggests that health/wellness benefits associated with chiropractic, as practiced at the NZ clinic facility, may be related to time under care.

Measuring functional health status in the chiropractic office has been considered by others.^{17,18} Consistent with this approach, the results of the present preliminary study, conducted to evaluate the plausibility of implementation of patient SRHW survey assessment as a routine component of patient care in the NZ School of Chiropractic clinic, indicate the value of this instrument in the overall evaluation of patient progress.

Conclusions

1. Within the parameters of the study it can be concluded that patients under care at the NZ School of Chiropractic clinic, are likely to experience health benefits in the domains of Physical State and Mental Emotional State, as well as a greater state of wellness. This is borne out in the significant changes occurring in the subject population with regard to Physical State, Mental/Emotional State, Combined Wellness, and the presence of a positive *wellness coefficient*.
2. Interns in training, as well as patients, could benefit from the use of the SRHW survey as an outcome measure of patient progress.
3. Patient benefits in the domains of health, wellness, and quality of life may accrue with time under chiropractic care.
4. Based on the evidence presented in this study, it appears that a greater insight regarding the full potential of possible health and wellness benefits will require similar studies with a larger number of subjects to guarantee statistical power sufficient to detect larger effect sizes and statistical significance. As well, these studies should be conducted over a longer time period, with greater emphasis on tracking the number of adjustments and frequency of adjustments administered to each patient over the duration of the study.
5. The strong Cronbach's alpha coefficients add credence to the internal validity of the SRHW survey regarding its use as a measure of domains of Health, Combined Wellness, and Quality of life outcomes.

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