Biological correlates of Reiki Touch' healing

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WARDELL D.W. & ENGEBRETSON J. (2001) *Journal of Advanced Nursing* 33(4), 439-445

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Background. Despite the popularity of touch therapies, theoretical understanding of the mechanisms of effect is not well developed and there is limited research measuring biological outcomes.

Aims. The aim of this study was to test a framework of relaxation or stress reduction as a mechanism of touch therapy.

Methods. The study was conducted in 1996 and involved the examination of select physiological and biochemical effects and the experience of 30 minutes of Reiki, a form of touch therapy. A single group repeated measure design was used to study Reiki Touch's' effects with a convenience sample of 23 essentially healthy subjects. Biological markers related to stress-reduction response included state anxiety, salivary IgA and cortisol, blood pressure, galvanic skin response (GSR), muscle tension and skin temperature. Data were collected before, during and immediately after the session.

Results. Comparing before and after measures, anxiety was significantly reduced, $t(22) = 145$, $P = 0.02$. Salivary IgA levels rose significantly, $t(19) = 2.33$, $P = 0.03$, however, salivary cortisol was not statistically significant. There was a significant drop in systolic blood pressure (SBP), $F(2, 44) = 6.60$, $P < 0.01$. Skin temperature increased and electromyograph (EMG) decreased during the treatment, but before and after differences were not significant.

Conclusions. These findings suggest both biochemical and physiological changes in the direction of relaxation. The salivary IgA findings warrant further study to explore the effects of human TT and humeral immune function.

Keywords: Reiki, touch, biological markers, stress response, relaxation

Introduction

Continued interest in complementary therapies or nonbiomedical-treatments, by the United States public and media have created a need for health care professionals to better understand and research these therapies (Astin 1998). One category of these therapies, touch, has increased in popularity and has particular significance for nursing. Touch is funda

mental to the practice of nursing and is recognized in the Nursing Interventions Classification Code (McCloskey & Bulecheck 1996).

Touch therapy has been used to promote relaxation, reduce pain and accelerate the healing process. Nurses have also provided much of the early research leadership in this area beginning with the seminal work of Krieger (1975) in the area of Therapeutic Touch (TT) and its effect on raising

haemoglobin levels. In two recent meta-analyses of TT positive effects were found, but the results were often mixed (Peters 1999, Winstead-Fry & Kijek 1999).

Touch therapies include the specific techniques of Ti', healing touch, Reiki, massage and others. Although these therapies have different grigins, their efficacy is often understood as deriving from su,btle energy or spiritual changes (Alternative Medicine 1992, Dossey *et al.* 1995, Engebretson 1997). Reiki Touch", a touch therapy that involves the balancing of energy within the body through the healer's hands, was investigated in this pilot study. Relaxation is one of the most commonly reported effects of touch therapies. Physiological and biochemical correlates of relaxation, conceptualized as the reverse of stress, were investigated in this study. The aim of our investigation was to identify markers that could be used in further development of theories and efficacy research.

Reiki uses touch to bring balance and harmony to the body, mind and soul. It originated in the Tibetan Sutras almost 3000 years ago and was re-introduced in Japan in the 19th century (Stewart 1995). The word Reiki is composed of two Japanese characters Rei which means spirit, air, essence of creation and source of life; and Ki, which means power or energy that brings it into form (Stewart 1995). One Reiki Master, Takata, practicing in Hawaii in the late 1930s, was largely responsible for the spread of Reiki to the United States of America (USA) in the 1970s. Little was written about early Reiki as information was passed on through oral tradition. In keeping with oral tradition, current training is conducted by a Reiki Master (Brown 1992). There are three levels of Reiki practice. In the first, the healer becomes sensitized to imbalances of energy in the body, and in the second the Reiki energy is accentuated for faster and deeper results. At the third or Master level, a commitment is made to Reiki as life's work, using energy for healing (Stewart 1995). The technique involves light touch over clothing with an ordered placement of the palms of the hands over different parts of the body starting with the head and working down the body front and back.

The questions addressed in this study were what is the effect of Reiki on anxiety and physiological measures over time. The physiological measures included blood pressure, skin conductance, muscle tension, skin temperature and the biological measures of cortisol and IgA as measures of the relaxation response.

Framework

A conceptual framework of relaxation or stress reduction was used to identify the measures for observing the effects of a

Reiki treatment on clients. The framework was selected because it incorporates the complex mind—body communication system of the autonomic, endocrine and immune systems as modulated by the neuropeptides. Activity in any of these systems can be triggered by emotional factors, therefore, the human response is a psychosocial, as well as a biochemical event. This is a bi-directional information circuitry in which anyone of these systems can modulate the activity of the others (Rossi 1993, Lovallo 1997). Stress is cognitively experienced as anxiety and somatically experienced in the motor system as muscle tension. The stress response is complex and includes physiological effects of stimulation of the sympathetic nervous system (SNS) such as elevated blood pressure, lowering of peripheral skin temperature and increased galvanic skin response (GSR). Neuro-endocrine responses include elevation of cortisol. The immune system is also involved with a lowering of IgA. The relaxation response, for the most part, involves a reversal of the above markers. It was hypothesized that the physiological-behavioural measures would show a change in the direction of relaxation, less anxiety and muscle tension, lowered sympathetic response, decreased cortisol and elevated IgA as the stress response was modulated. Although a triangulation of both quantitative and qualitative outcomes was employed in the study design, the quantitative measures are the focus of this report.

Stress response affects the central nervous system through intricate neuro-endocrine pathways. A generalized sympathetic response elicits elevated blood pressure and increased heart rate. Blood volume is shifted from digestive organs to large skeletal muscles — the flight or fight response. This results in a shift of blood volume away from peripheral structures, resulting in lowered skin temperature and increased resistance to electrical current, thus increasing the GSR. Anxiety can be experienced in both the cognitive level of awareness, thus detectable in a questionnaire and through muscle tension, measured by electromyographic (EMG) readings.

Many of the anxiety-induced somatic changes are related to the increased levels of cortisol in the blood (Benjamins *et al.* 1992). Normal endogenous cortisol levels exhibit diurnal rhythms with highest levels in the early morning and lowest levels in late evening (Kirschbaum *et al.* 1990). However, these natural fluctuations can be easily overridden by a variety of exogenous factors, including situational events. Cortisol levels provide a reasonable measure of hormonal response to stressful stimuli and have the advantage of reflecting the present state of the neuro-hormonal response.

The psycho-neuro-immunological system operates by way of the same mind-modulating mechanism as the autonomic and endocrine systems (Rossi 1993). The mind is described as

having direct neural access via the central nervous system for modulating the organs of the immune system (lymph nodes, bone marrow, etc.). Inhibition or stimulation of the hypothalamus results in changes of immunological activity and vice versa. Hence, intercommunication between the immune system and the hypothalamus may be open to mind modulation. Lymphocytes synthesize, the immunoglobulin with the specific ability to destroy antigens. This is the body's main defense against infections. Lymphocytes bear receptors for hormones of the endocrine system and neurotransmitters of the autonomic nervous system. Therefore, alterations of hormone and neurotransmitter function modify immunological reactivity. Decrease in immunocompetence is associated with stress. Immunocompetence has been shown to be enhanced with various health promoting activities such as biofeedback, imagery and relaxation (Rossi 1993). One of the measures of immunocompetence is secretory IgA, which is produced in bodily secretions such as saliva, blood and breast milk.

There is a presumed relationship between the measured values of IgA and humoral immunity. Humoral immunity is one of two interrelated major types of immunity, the other being cell-mediated immunity. In humoral immunity the B lymphocytes, which mature in the bone marrow, are responsible for the primary and secondary response to an invading antigen (Houldin *et al.* 1991). They confer immunity by antibody secretion. In periods of stress the IgA levels in saliva were found to be lower (Jemmott *et al.* 1983). Therefore, IgA has been used as a measure of the stress response and conversely of relaxation.

Background

The efficacy of touch therapies has been studied in a variety of populations, using different health related outcomes, however, most studies agree that relaxation is one of the outcomes. The following research is related to the variables in this study. The efficacy of touch in reducing anxiety (Heidt 1981, Quinn 1989, Ferrell-Torry & Glick 1993, Simington & Laing 1993, Adamat & Killingworth 1994, Gagne & Toye 1994) and muscle relaxation, promotion of general wellbeing, or stress reduction have been reported (Randolph 1984, Quinn 1989, Olson *et al.* 1992, Peck 1997). Olson *et al.* (1997) demonstrated enhanced humoral immunity with the use of a TT. Mixed results for IT on healing rates have been reported in several double blind cross-over studies (Wirth 1992, 1995, Wirth *et al.* 1993, 1994, 1996).

Less research has been conducted on Reiki. Wetzel (1989) investigated Reiki and found that haemoglobin levels were raised, whereas Wirth and Barrett (1994) found nonsignificance. Brewitt *et al.* (1997) found changes in energy flow through the energy channels (meridians) after 11 Reiki sessions.

In summary, the stress-response framework provides a way of looking at the efficacy of touch therapies in promoting relaxation. Using the physiological correlates of salivary IgA, cortisol, blood pressure, GSR, EMG and temperature, a psycho-social measure of anxiety strives to provide a thorough mechanism for studying this type of alternative therapy. This information is important for nurses who continue to explore touch therapies in practice and for understanding their nature.

The study

Methodology

This study used a single group repeated measures design. Two major advantages of this design are: (1) variability as a result of individual differences are removed from the error term, thus resulting in increased precision and (2) economy of subjects (Stevens 1999). Lack of a control group is a disadvantage. Based on the following specifications: cc= 0.05, power = 0.80, number of repeated measurements = 3, average correlation among repeated measures = 0.80, effect size = medium, 14 subjects were needed (Stevens 1996). Allowing for attrition, 23 subjects were recruited to participate.

Sample

A nonprobability sample was recruited by flyers placed in buildings in a large medical centre in the south-western USA. Twenty-nine individuals were called for appointments. They were included if they read and spoke English, and had no immune alterations (e.g. acquired immunodeficiency syndrome (AIDS) or pregnancy), adrenal disorders, or cardiovascular disorders requiring pharmacological management. One individual was excluded for pre-existing disease and five did not keep their appointments for a total of 23 subjects. The University's Institutional Review Board approved the study. Subjects completed consent forms and received a small remuneration for their participation.

Subjects included 18 (78.2%) females and five males (21.7%) between the ages of 29 and 55 years with a mean age of 41 years (SD.-- TO. The ethnicity of the sample included 19 Caucasian (82.6%), three (13%) Asian and one (4.3%) Hispanic, with education levels from 12 to 22 years (M = 15/6, SD = 2.35). Fifteen (652%) had previously experienced some type of complementary therapy such as massage and meditation, and eight (34.8%) had no previous experience with alternative therapies. No one had had a Reiki treatment in the past. Thus, the sample was predominantly

white, highly educated females with some complementary therapy experience.

Instruments

Anxiety was measured using the State-Trait Anxiety Inventory (STAI) developed by Spielberger in collaboration with Gorsuch *et al.* in 1968 and 1977. This instrument has been widely used in stress-related research. The STAI consists of two parts: one for (T) trait anxiety or how one generally feels and one for (S) state anxiety or how one feels at the present moment. The S-anxiety scale, Form Y has 20 statements evaluating how a particular person feels at the moment. Form Y has been tested in the construction and standardization with more than 5000 subjects. All but one of the a coefficients for S-anxiety were above 0.90 with a median of 0.93.

Blood pressures were monitored with a Dinamap 845, an automated blood pressure device with a conventional cuff measuring diastolic (DBP), systolic (SBP) and mean arterial pressure (MAP). Recordings use an oscillometric technique. The reliability of the Dinamap 845 was validated in a series of 28 studies, during which the Dinamap readings were compared with simultaneous, direct intra-arterial readings. The average difference between the direct intra-arterial and the indirect Dinamap readings was 23 mmHg (SD = +4.21) with a correlation of 0.984 (Ramsey 1979, Venus *et al.* 1985).

The J&J 1-330 system, with two M-501 EMG Modules, and Module T-601 was used for temperature and skin conductance. The specifications for the M-501 Module include narrow band: 100 Hz; wide band: 25-1000 Hz and the M-601 Module calibration ±0.3 with a range of 60-100°F and the skin conductance range from 0 to 50 µSr[i] calibrated to ±0.3 (Litchfield 1989).

Cortisol was measured through radioimmunoassay of saliva. Activation of the adrenal cortical axis leads to measurably elevated levels of cortisol in blood, urine and saliva (Hillman & Giroud 1965, Mason 1968, Gutal *et al.* 1972, Kirschbaum *&* Hellhammer 1989). Studies support the use of salivary cortisol as a measure of glucocorticoid response (Kirschbaum *et al.* 1990, Benjamins *et al.* 1992, Stupnicki & Obminski 1992). Salivary cortisol has been shown to correlate directly with the biologically active, nonprotein-bound serum cortisol by mirroring the free concentration, rather than bound cortisol. Salivary levels provide the most direct information about the availability of corticosteroid to tissue (Wade & Haegele 1991). As saliva samples can be collected simply and noninvasively, assessment of cortisol in saliva provides a biochemical measure of subject's experiential stress.

Salivary cortisol can be measured reproducibly by slight modification of a commercially available radioimmunoassay kit (Kahn *et al.* 1988). As salivary cortisol is not protein-bound, no extraction procedures are needed. To account for lower concentration of cortisol in saliva (5-10% serum levels), the dilution factors of the commercial standards were used. The noninvasive procedure had additional benefits in that no blood products were used to reduced the variable of fear regarding needle sticks, which can cause a rise in cortisol levels within a 1-3 hour time frame (Wood & Randolph 1983).

Secretory IgA also was collected from saliva. As a result of the high cost of the radioimmune serum assay, a less expensive measure was provided by salivary immunoglobulin (sIgA) which is measured by radial immunodiffusion. Salivary IgA concentration measurement is a noninvasive method that provides a relatively easy assay. It is an immunodiffusion assay for secretory IgA quantification. A meta-analysis of relaxation studies by Rood *et al.* (1993) indicated that the observed changes in sIgA concentration were both consistent for direction of change and significant.

Procedure

Potential subjects were screened for eligibility and introduced to the study. After completing consent forms, a brief demographic form, and the STAI, the subject was taken into a special soundproof room and introduced to Reiki Master, Julia Carroll, who has been teaching and practicing Reiki Touch for over 20 years. She conducted all treatments to provide consistency in experience level of the healer. Treat-nients were given in the afternoon and early evening to avoid normal circadian rhythm changes in cortisol, which are most dramatic before noon.

Next subjects were given two cotton dental swabs and instructed to chew on these until they were saturated with saliva. These were placed in collection tubes. The subjects removed their shoes and lay supine on a massage table, fully clothed. The room was softly lit and one or two members of the research team were present throughout the treatment. A blood pressure cuff was attached to the left arm and equipment was attached as follows: GSR to the middle and fourth digit of the right hand and the temperature probe to the second digit. EMG electrodes were attached to the forehead and to sternocleidomastoid muscle. Equipment then was turned on and the Reiki Master placed a facial tissue over the subject's eyes. Preliminary base line data (at 1-minute intervals) were gathered for a 10-minute warm-up period (Time 1). At a signal from one of the researchers, the Reiki master then placed her hands gently over the subject's eyes for 15 minutes, at which time, in a response to a signal from the researcher, she moved her hands to the abdomen for an additional 15 minutes for a total of 30 minutes (Time 2). She

then removed her hands from the subject, who was monitored for an additional 10 minutes (Time 3). The subject was then gently touched on the left arm, the tissue removed from her/his eyes, and the equipment detached. After the anxiety state form was completed and two additional salivary specimens collected, subjects were escorted to an adjacent office for an interview regaining the experience.

Data analysis

A series of univariate repeated measures analysis of variance (ANOVA) was used to compare GSR, EMG, temperature and blood pressure indices measured before (Time 1), during (Time 2), and after (Time 3) the Reiki session. Huynh-Feldt Epsilon values ranged from 0.68 to 1.00, indicating that the sphericity assumption had been met in all analyses. As the Tukey procedure is appropriate in repeated measures analysis if the sphericity assumption is met, it was employed for the purpose of *post hoc* analysis (Stevens 1999). The t-test for correlated samples was used to compare Time 1 and Time 3 measurements. All analyses were conducted at the 0.05 level of significance.

Results

First, the pre and posttest measures of anxiety, IgA and cortisol were analysed. Table 1 describes the results of these treatment measures, which were done before the monitoring equipment was attached and after it was removed. The effect of Reiki on anxiety was that state anxiety was lower after Reiki Touch' (M = 2617, SD = 6.26) than before treatment (M = 31-96, SD = 9-73), t(22) = 2-46, *P =0-02.*

The effects of Reiki on the physiological measures of cortisol and IgA were analysed. Salivary samples of cortisol for two of the subjects were eliminated from analysis because the laboratory did not report a useable value (reported as <1). Fifteen of the subjects demonstrated a decrease in salivary cortisol and seven showed an increase. However, the difference between the before and after levels of cortisol was not statistically significant, t(21) 144, P = 0-17. The comparison of the before and after session measures of slgA was statistically significant, t(19) = 2.33, *P* = 0-03. The slgA levels

Table 1 Mean values and standard deviations for anxiety, cortisol, and IgA before and after the Reiki session

Measurement	Before		After	
	M	SD	M	SD
State Anxiety	31.96	9-73	27-17	6.26
Cortisol	0.684	0-364	0.586	0.371
IgA	22-19	17.57	35.51	27-30

Table 2 Mean values and standard deviations for GSR, EMG, temperature and blood pressure measurements during Reiki session

Measurement	Time I (before-)		Tirur 2 (during)		Time 3 %After)	
	\I	so	M	st)	M	Sp
MAP	84 72	9-23	82.94	*73	83.52	8.30
SBP	115-33	13-35	111-50	13-OH	111'65	13-95
DBP	6928	7.95	67-67	7-54	68.15	6-55
GSR	9-97	5.43	8-72	579	9-10	6-67
Temperature	92.64	470	92.78	4 65	9(1·6-4	6.10
EMG (trapezoid)	2 52	1-16	2.10	1.27	240	1.58
EMG (forehead)	11·5	1 ' 13	246	1.13	2.61	1.27

rose after the treatment, indicating a possible increase in immune function.

Secondly, the effect of Reiki on the repeated physiological measures of blood pressure, skin conductance, muscle tension, skin temperature and over what time period these changes occurred were analysed. Mean values and standard deviations for GSR, EMG, skin temperature and blood pressure measurements (MAP = mean arterial pulse, SBP = systolic blood pressure, DBP = diastolic blood pressure) are summarized in Table 2. Three subjects were not included in the GSR, EMG, and temperature analysis because of missing data from computer recording disc failure.

Systolic blood pressure measurements decreased significantly from Time 1 (pretest) to Time 2 (during treatment) and remained about the same from Time 2 to Time 3 (posttest), $F(2, 44) = 6.60$, $P = 0.003$, mean squares error (MSE) = 1646. Changes in DBP measurements, $F(2, 44) = 2.58$, $P = 0.09$, MSE = 6.04, arterial pressure (AP) measurements, $F(2, 44) = 2.30$, $P = 0.11$, MSE = 8.26, GSR measurement, $F(2, 36) = 2.62$, $P = 0.09$, MSE = 2.97, and EMG (forehead) measurements, $F(2, 38) = 1-25$, $P = 0.30$, MSE = 047, were not statistically significant.

EMG (STM) changes from Time 1 to Time 2 were statistically significant but not significant from Time 2 to Time 3, $F(2, 38) = 3-26$, $P = 0.049$, MSE = 0-30. Temperature measurements did not statistically change from Time 1 to Time 2 but significantly decreased from Time 2 to Time 3, $F(2, 38) = 4.63$, $P = 0.02$, MSE = 6-15.

Discussion

The hypothesized relaxation or lowering of the stress response was demonstrated in the reduction of state anxiety scores, the lower SBP, and the reduced EMG readings of the neck muscles. The current study also suggests increased activity in humoral immunity, in relation to touch therapies. Skin temperature rose during the treatment although not

significantly, which is consistent with the relaxation hypothesis. Further support for this hypothesis of warming with relaxation was found when the temperature dropped during the final post-treatment data collection period (during which no Reiki Touch was given) as the subjects acclimated to the cool room in which treatments were conducted. There was no significant change in cortisol levels before and after treatment although more of the su"bjects (n = 15) demonstrated a lowering of cortisol levels and less *(n = 7)* had a rise in cortisol.

It is difficult to evaluate a single Reiki treatment in the context of a research environment in which subjects were attached to equipment and asked to produce specimens. The Reiki Master followed a standardized process using only two hand placements that were time and were not individualized, as it would be in a natural setting in which Reiki therapies are used. There were changes in the individual's biochemical and psychological responses. It cannot be determined that a causal relationship exists between the changes in these individuals because of the Reiki Touch or because of other reasons such as lying on a table in a quiet room and in the presence of a caring person. However, it is interesting that such significant (findings resulted in only a 30 minute time period.

Conclusions

The findings suggest that a single Reiki session has an effect on decreasing perceived anxiety, increasing signs of relaxation and increasing humoral immunological functioning through an increase in IgA. In a recent study, Olson *et al.* (1997) found a significant difference in IgA and IgM between subjects receiving TT and controls. Immune function can be affected by numerous variables. Although IgA is a measure of a generalized immune response it is only one part of the response. The mechanisms for the immune findings are not yet fully understood or theoretically developed. Clearly there needs to be more research investigating the relationship between touch and immune response. The addition of a control group and randomization would strengthen future study findings.

Touch therapies remain a very low risk, low cost intervention, and within the scope of nursing practice. The increased popularity for complementary therapies among the public and the interest within nursing warrant additional research.

Acknowledgements

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