

MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

I declare that this thesis is my own work and that, to the best of my knowledge and belief, it does not contain material from published sources without proper acknowledgement, nor does it contain material which has been accepted for the award of any other higher degree or graduate diploma in any university

(Rebecca Urie)

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Acknowledgments

The participants in this study for giving their time over an extended period, answering my many questions and in many cases doing something they had never done before.

My supervisors for this project Greg Hannan, Raimondo Bruno and Walter Slaughuis.

Staff at the Richmond Fellowship, Colony 47, the Tolosa St respite rehabilitation programs, Royal Hobart Hospital Department of Psychological Medicine and the Eureka Clubhouse who helped me to recruit participants and provided me spaces to run the study from.

Dean Smith, Terry Melbourne, Serge Rivest, Vanessa Bennett, Kenny Ng, Michelle Swallow and the Australian Association of Massage Therapists for keeping me inspired about this project.

Jacqueline Saunders for donating her time and energy to translate a research article for me.

And last but not least to Andrew McNaughton for his contributions, support and patience over what has turned out to be quite a long haul.

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Literature Review

A review of research relating to the likely efficacy of massage therapy for people with schizophrenia placed in the context of current healthcare policy and practice.

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Abstract

This literature review examines evidence regarding the likely efficacy of massage therapy for people with schizophrenia and is placed in context by reviewing the past and current uses of touch based therapies in health care. To date, only one study has examined the efficacy of massage therapy for schizophrenia. Andres, Bellwald and Brenner (1993) found that an intervention combining massage therapy with movement and breathing exercises significantly reduced physiological arousal and significantly improved subjective ratings of well being for people with schizophrenia. Evidence reviewed from diverse bodies of research suggests that by improving body awareness, reducing anxiety and depression, providing temporary relief from movement disorders caused by antipsychotic medication, and providing touch massage therapy may improve quality of life and possibly reduce the symptoms of schizophrenia. While there is some evidence that, as people with schizophrenia may be less familiar with touch and less sensitive to tactile stimulation, massage therapy may be less effective than in other populations which have been studied, in general the evidence reviewed supports its use.

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The aim of this literature review is to examine research pertaining to the efficacy of massage therapy for people with schizophrenia. It will examine four facets of schizophrenia (the symptoms of the disorder itself and the secondary consequence of it) which massage therapy may be effective in treating. These four facets are sensation and body awareness problems, anxiety and depression, extrapyramidal side effects (movement-disorders induced by dopamine antagonists such as anti-psychotics), and touch deprivation.

Before this evidence is examined, the question posed by the literature review will first be placed in context. This will be done by reviewing research on the mechanisms by which massage appears to derive its benefits so that the applicability of these mechanisms to schizophrenia can be understood. The current uses of touch as part of physical and mental healthcare will also be briefly reviewed to place the review in the context of current healthcare policy and practice.

Massage therapy: A Definition and Mechanisms of Effect

Moyer, Rounds and Hannum (2004) define massage therapy as ‘the manual manipulation of soft tissue intended to promote health and well-being’ (p.3) and, massage techniques involve pressing, rubbing or otherwise manipulating the soft tissues of the body using the massage therapist’s hands, fingers, elbows, forearms and feet. Target tissues include muscles, tendons, ligaments, skin, connective tissue, lymphatic vessels and gastro-intestinal organs (Australian Association of Massage Therapists). As Ezzo (2007) has commented, the term “massage therapy” is most accurately conceptualised as an umbrella term under which many treatment approaches fit

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(connective tissue massage, bowen therapy and myofascial release therapy to name but a few).

There are a number of mechanisms by which massage therapy is theorised to work. Those which have received most research support include stimulating the parasympathetic nervous system (Hernandez-Reif et al., 2000; Kaye et al., 2008; Diego, Field, Sanders and Hernandez-Reif, 2004); benefits derived through the provision of touch (Juhan, 1987; Kutner et al., 2008); psychological effects such as provision of interpersonal attention (Moyer, Rounds & Hannum, 2004) and benefits derived due to a client's belief in the efficacy in the treatment and trust in the therapist (Esch, Guarna, Bianchi, Zhu & Stefano, 2004). Evidence for localised, mechanical effects such as promoting blood and lymph circulation (Andersen et al., 2000) or relieving neuromuscular 'trigger-points' (hyper-irritable spots in soft tissues which cause predictable patterns of referred pain: Travell & Simons, 1999) have also been found.

It seems likely that there are multiple mechanisms of massage efficacy which have differing degrees of relevance for different populations and conditions. As Moyer, Rounds and Hannum (2004) write, "one of the most interesting aspects of [massage therapy] is that it may deliver benefit in multiple ways; specific ingredients and common factors may each play a role, with each being differentially important depending on the desired effect." (p.15)

The use of touch based techniques in mental healthcare. Touch based therapeutic techniques have a long recorded history in a number of diverse cultures. In his book on the history of massage therapy, Calvert (2002) reviews archaeological evidence which suggests massage therapy techniques were part of ancient Chinese,

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Greek, Egyptian, Roman, Hindu, and Japanese cultures. The oldest documentation may be in the ancient Chinese text from 2600 B.C.E titled *The Yellow Emperor's Classic on Internal Medicine* (Wen, H.T.N.C.S) which recommended massage of skin and flesh. Other examples include hieroglyphics depicting massage which have been found in a number of Egyptian tombs (as cited in Ghalioungui & Dawkhly, 1965).

In regards to western culture, evidence suggests massage was a common healthcare technique in Greco-Roman culture and Greek physician Hippocrates (460-377 B.C.E) gave detailed descriptions of massage techniques and their effects (as cited in Nomikos, Nomikos & Kores, 2010). However, events such as the move away from Greco-Roman traditions (Moyer, Rounds & Hannum, 2004), the pharmaceutical revolution of the 1940's (Field, 1998), and the ethical concerns raised in psychotherapy about combining touch and talk therapies (Kertay & Reviere, 1993) have resulted in these techniques being pushed to the periphery of mental and physical healthcare in western culture.

The use of touch in psychotherapy. Psychotherapy initially embraced the use of massage techniques. In the late 1800's and throughout the 1900's touch based techniques were used by psycho-analysts such as Wilhelm Reich, Alexander Lowen and Sandor Ferenczi (Kertay & Reviere, 1993). Wilhelm Reich's use of touch was based on the theoretical premise of "body armour": the defence system which is established in neurosis as protection against perceived threat. In his clinical practice he would use his thumb or palm to press hard on his patient's jaws, necks, chests, backs or thighs, aiming to dissolve their muscular, and thereby psychological, rigidity (Conger, 2005). Similarly, in his well known book 'The betrayal of the body', Lowen wrote extensively

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on the characteristic patterns of co-ordination, muscular tension and breathing in neurotic and schizoid personalities (1967).

Sigmund Freud also supported (and used) massage therapy techniques early in his career. However, his increasing emphasis on analysing processes of transference and maintaining a 'blank slate' as a therapist, led him to believe that touch was counter-productive to the therapeutic process (Fossage, 2000). Kertay and Reviere (1993) argue that the preference of the majority of currently practising psychotherapists to use minimal, or no touch, when working with clients can be traced to this turning point in Freud's career.

Controversy regarding the use of touch in psychotherapy still exists. Some authors argue that far from being a 'blank slate', the choice not to touch clients in the psychotherapy context is an intervention in its own right: communicating distance, that the client is untouchable, or that their desire for touch is bad. However, other authors have raised concerns that using touch may further exaggerate the power differential within the client/therapist relationship or may cause the client to feel disrespected or threatened (Strozier, Krizek and Sale, 2003).

Massage therapy as CAM and difficulties with this model of service delivery. In public health care events such as the pharmaceutical revolution of the 1940's (Field, 1998) caused touch-based therapies to be largely pushed out of mainstream health care and into complementary/alternative medicine (defined as "diagnosis, treatment and/or prevention which complements mainstream medicine by contributing to a common whole, by satisfying a demand not met by orthodoxy or by diversifying the conceptual frameworks of medicine" Ernst et al., 1995, p.506). While

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public health care in Australia still incorporates some touch based therapies such as physiotherapy, its use is limited and focused primarily on physical health care. The experience of the author is that although massage therapists are fairly commonly employed in aged care facilities, they are rarely employed in mental health care (no massage therapists are currently employed in public mental health care in Tasmania for example (K. Toon, Department of Health and Human Services, personal communication, May 28th, 2008)).

Touch based therapies can still be accessed privately but the cost, training of massage therapists, and the limited research base of massage therapy for treating mental health symptoms, result in significant problems with this method of service delivery. Accessing massage therapists in private practice can be prohibitively expensive, and this may be particularly true for people with schizophrenia. The fee for massage therapy recommended by Australian Association of Massage Therapists is \$80 per hour. Although many private health insurance companies offer rebates for massage therapy, a study conducted by SANE (2002) found that only 13.5% of people with schizophrenia have private health insurance.

Massage therapists currently receive minimal training in treating people with psychiatric disorders. Current accreditation guidelines for massage therapy courses contain no requirement for inclusion of psychopathology (Community Services and Health Industry Skills Council, 2007). In contrast, at a Diploma and Advanced Diploma training level there is comparatively extensive coverage of pathophysiology: the physical conditions which can be safely treated using massage and those which need to be referred on to other professionals. In training and practice the clinical application of

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massage therapy seems to be focused primarily on physical pathologies while massage therapy aimed at improving mental health (increasing relaxation for example) is largely conceptualized as a way for essentially healthy people to pamper themselves. As a result of these accreditation guidelines and the current focus of clinical massage more generally, people with psychiatric disorders who seek out massage therapy are likely being treated by someone who hasn't received training to address their specific needs.

Finally, there is limited research into the safety and efficacy of massage therapy for treating mental health complaints (Wezel, Leathard, Grange, Tiplady & Stevens, 2006). As found by Knaudt et al. (1999) consumers of psychiatric services need, and are demanding, more information to make informed decisions about the suitability, safety and likely efficacy of different complementary and alternative medicine (CAM) approaches for them. Returning to the training of massage therapists, arguably one of the reasons massage therapists aren't trained to treat clients who have psychiatric disorders is the lack of research into the safety and efficacy of massage therapy for this population. A larger research base is needed to inform consumers and practitioners of CAM therapies.

The use of CAM therapies by people with psychiatric disorders. The need for research into the efficacy of massage therapy for treating mental health complaints is further heightened by evidence that it is fairly common for people with psychiatric disorders to use CAM therapies. While estimates vary considerably (possible due to what is covered under the loose term 'complementary and alternative medicine'), studies based on consumers of psychiatric inpatient and outpatient services in Australia (Australian Bureau of Statistics, 2008), North America (Elkins, Rajab & Marcus, 2005;

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Knaudt et al., 1999) and Germany (Assion et al., 2007) have found that between 21% and 54% of consumers use CAM therapies each year. Research into the efficacy of CAM therapies, including massage therapy, needs to catch up to the increase in its use.

This review will focus on evidence relating to the indications and contraindications of massage therapy for people with schizophrenia and is set in a context where there is a need more generally for research into the efficacy of massage therapy for mental health symptoms. As has been outlined, this research is needed to inform all the stake-holders involved: consumers of psychiatric services, massage therapists and the policy makers charged with determining whether massage therapy should be included as part of public health care.

Schizophrenia: Definition and Diagnosis

Schizophrenia is “a clinical syndrome of variable but profoundly disruptive psychopathology that involves cognition, emotion, perception and other aspects of behaviour” (Sadock & Sadock, 2007, p. 467). Emotions in schizophrenia can seem flattened, overly active, or mismatched with the person’s behaviour and speech. Perception can be altered and the person may experience hallucinations (hearing, smelling, seeing, tasting or feeling things that aren’t real). Finally, cognition can be altered by the experience of delusions (believing things which aren’t real), impaired attention, difficulty with abstract reasoning, disorganised thinking and a loss of ego boundaries (the lack of a clear sense of where the person’s own body, mind and influence end where those of other animate and inanimate objects begin: Saddock & Saddock).

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One of the most enduring classification systems of schizophrenia is the division into positive symptoms (phenomena not present in the normal population but which are present in schizophrenia such as hallucinations and delusions) and negative symptoms (symptoms which represent a deficit from normal functioning such as affective flattening). The positive and negative symptom distinction is used in the commonly utilized rating scale for schizophrenia, the Positive and Negative Symptom Scale (PANSS: Kay, Fiszbein & Opler, 1987).

Diagnosis of schizophrenia using the *Diagnosis and Statistical Manual of Mental Disorders* (4th ed., text revised) requires two of: delusions, hallucinations, disorganised speech, grossly disorganised or catatonic behaviour or negative symptoms such as affective flattening. Although there are some exceptions, symptoms must generally be present much of the time for at least one month and some sign of disturbance must be present for a minimum of six months (American Psychiatric Association, 2000).

Variability in symptoms between individuals meeting the diagnostic criteria for schizophrenia and within the same individual over time can be so large some authors have questioned the validity of schizophrenia as a diagnostic entity (Harrison et al., 2001; Zubin & Ludwig, 1983). However, as a group, people with schizophrenia experience one of the most severe and disabling of any mental or physical illness. This disorder presents a huge burden for the individuals suffering from it and for the friends, family members and health systems responsible for their care (Knapp, Mangalore & Simon, 2004).

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There are a number of aspects of schizophrenia which suggest massage therapy is an intervention worth exploring for this population, however, only one known experimental study has explored this possibility. Andres, Bellwald and Brenner (1993), gave 10 minute massages to ten participants with a diagnosis of schizophrenia, 2- 3 times a week for 3 months. It was part of a more general physically orientated intervention involving passive and active movements, breathing exercises, and psycho-education about breathing patterns that can occur during times of elevated stress. The overall intervention was found to significantly decrease physiological arousal and to significantly improve subjective well being ratings on a measure developed by the authors. Physiological arousal was also shown to decrease during massage therapy. While this study gives tentative support for massage therapy as a beneficial intervention for people with schizophrenia it isn't clear how much the massage therapy component of the intervention contributed to the significant results and the sample was small. This literature review will further investigate the likely efficacy of massage therapy for this population.

An Overview of Sensation and Body Awareness Problems in Schizophrenia and Interventions Found to Improve Them

Schizophrenia is associated with problems in the accurate perception of sound, sight, taste, smell and, of particular interest to the current review, touch. Returning to the positive and negative symptom classification, these problems can be both negative (such as decreased sensitivity to pressure and pain) and positive (such as tactile based hallucinations and delusions).

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Research shows people with schizophrenia may be less sensitive to tactile stimulation. Lenzenweger, (2000) found a correlation between greater schizotypic features and higher two-point discrimination thresholds (defined as the smallest distance between two points of fine tactile stimulation that can be discerned as two points and not one). Similarly, in a study of sensation and pain thresholds, Blumensohn, Ringler and Eli (2002) applied an electric stimulus of increasing intensity to a tooth of their participants. They found that people with schizophrenia took significantly longer to identify the presence of the stimulus and to identify the moment the stimulus became painful when compared with age and gender matched controls. The meta-analysis by Potvin and Marchand (2008) also concluded that people with schizophrenia have significantly higher pain thresholds.

People with schizophrenia commonly experience somatic delusions. A large scale study by McGilchrist and Culting (1995) in which the researchers interviewed people with schizophrenia found 64% had abnormal beliefs about their body such as believing their body is melting. Although much less common than hallucinations in other senses, people with schizophrenia can also experience tactile hallucinations (Sadock & Sadock, 2007). As McGilchrist and Culting note, the boundary between somatic hallucinations and delusions is blurred and some delusional beliefs may be based on abnormal body sensations. It therefore makes sense that other authors have not attempted to distinguish between tactile hallucinations and delusions but instead refer simply to the 'body distortions' common in schizophrenia. The term body distortions includes difficulties in perception (such as in estimating body size), body concept

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(thoughts and beliefs regarding your body), boundaries (knowing where the body starts and ends), and determining the location of the body in space (Roxendal, 1985).

It is unclear what the implications of these sensation and body awareness problems might be for the likely efficacy of massage therapy in treating people with schizophrenia. Increasing tactile sensitivity and body awareness may be avenues through which massage therapy proves efficacious. However, decreased tactile sensitivity may mean people with schizophrenia are less sensitive to the benefits of massage therapy.

Several researchers have reported that movement and body awareness interventions are effective for people with schizophrenia. Interventions which have been investigated are body awareness therapy (a series of exercises developed in the field of physiotherapy which aim to stimulate sensory awareness, coordination and possible emotional reactions), body orientated psychotherapy (movement, breathing and body awareness exercises which aim to focus attention on body posture, movement, body-ego boundaries and reality contact) and yoga. Both body orientated psychotherapy (Hricht & Priebe, 2006) and yoga (Duraismamy, Thirthalli, Nagendra & Gangadhar, 2007) have been found to significantly improve negative psychopathology as measured by the Positive and Negative Symptom Scale (PANSS). Body awareness therapy was also shown to be effective for people with schizophrenia on a body awareness measure developed by the author (Roxendal, 1985).

Massage therapy has been found to enhance body awareness in other populations. Leivadi et al. (1999) found it increased balance, posture and range of motion in dancers, and two studies by Price (2005; 2007) found massage therapy

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significantly improved ratings of disassociation and body connection in female survivors of childhood sexual abuse. If massage therapy can also enhance body awareness for people with schizophrenia it may benefit them in similar ways to yoga, body orientated psychotherapy, and body awareness therapy. However, if people with schizophrenia are less sensitive to touch, using massage therapy to improve body awareness may be less effective than the movement approaches described above. More research to answer these questions is needed.

The Relationship between Quality of Life, Anxiety, Depression and Psychosis for People with Schizophrenia

The second aspect of schizophrenia for which massage may be beneficial, arises from research on the inter-relationships between quality of life, anxiety, depression and psychosis. Comorbidity between schizophrenia, anxiety and mood disorders is high. While estimates vary, data collected as part of the large scale Schizophrenia Patient Outcomes Research Team study (n=685) found 34% had a comorbid diagnosis of depression and 21% had a comorbid anxiety disorder (Dixon et al., 2001).

The presence of anxiety and depression predict poorer outcomes for people with schizophrenia in a number of ways. According to Walker and Diforio's neural-diathesis-stress model, people with schizophrenia are generally less able to cope effectively with psychosocial stressors, stressors which can cause a relapse of psychotic symptoms and possibly even trigger the onset of illness for people who are biologically vulnerable to developing schizophrenia (1997, see also Neuchterlein & Dawson, 1986; Lucres et al., 1998). For people with schizophrenia who also have an anxiety or mood disorder, this risk of relapse may be even higher. Both comorbid anxiety and comorbid depression are

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associated with higher rates of relapse and hospitalisation (Hertz & Melville, 1980; Becker, 1988) and risk of relapse following the experience of a psychosocial stressor has been found to be higher in those with higher levels of trait anxiety (Docherty, St-Hilaire, Asskre & Seghers, 2008).

Comorbid depression also increases the risk of suicide for people with schizophrenia (Addington & Addington, 1992), a risk which is already much higher than the general population (worldwide, 26% of people with schizophrenia have attempted suicide in their lifetime (Karaqianis et al., 2009)). Finally, and perhaps counter-intuitively, a study by Huppert et al. (2001) found that levels of trait anxiety and depression have a greater impact on how highly people with schizophrenia rate their quality of life than the severity of their schizophrenia related symptoms do. That is, high levels of anxiety and depression decrease quality of life ratings more than high levels of schizophrenia symptoms do.

The meta-analysis by Moyer, Rounds and Hannum (2004) found a series of massages has a moderate effect size on trait anxiety and depression (trait anxiety, Hedges's $g = 0.75$, depression $g = 0.62$ where Hedges's g is an estimation of the number of standard deviations by which the average member of a treatment group differs from the average member of a comparison group). By improving anxiety and depression, massage therapy may also improve quality of life and perhaps even reduce the risk of relapse for people with schizophrenia.

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Extrapyramidal Side-Effects: Prevalence, Effect on Quality of Life and Soft-Tissue Therapy Approaches to Treating Them

Massage therapy may also benefit people with schizophrenia by alleviating extrapyramidal side effects. Extrapyramidal side-effects are movement-disorders induced by taking substances which are dopamine antagonists, mostly commonly typical antipsychotics. They include dyskinesia (involuntary movement which are rapid, brief, jerky, discrete, and stereotyped); and parkinsonian symptoms (muscle rigidity, tremor, and slowness initiating movements).

Given the nature of extrapyramidal and other antipsychotic side effects, it is unsurprising that they were shown to negatively impact on quality of life ratings (Awad, Voruganti & Heslegrave, 1997) and are a common cause of medication non-compliance (Hoge et al., 1990; Rogers et al., 1999). Non-compliance is clinically important as it has been shown to significantly increase the risk that the person will have a relapse of psychotic symptoms (Faloon, 1984; Hogarty & Ulrich, 1998).

On a worldwide scale, many people with schizophrenia are still taking typical antipsychotics. Data from the Schizophrenia Outpatient Health Outcomes survey (involving over 17,000 patients with schizophrenia from 27 countries) found that 37.9% were taking a typical antipsychotic orally and 22.4% as an intra-muscular (depot) injection. Of those taking some kind of antipsychotic medication (typical or atypical) 49.6% had experienced extrapyramidal side effects in the previous six months (Karagianis et al., 2009). This evidence shows that finding interventions which alleviate these side effects has the potential to improve quality of life for a large number of

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people with schizophrenia. This may lead to increased medication compliance and a reduced risk of relapse.

Due to the involvement of skeletal muscle tissue, massage therapy may be helpful in alleviating extrapyramidal side effects. There is only one known study which has investigated this. Schoonderwoerd (2005) reported on a case study using a mix of massage therapy, stretching and spinal manipulative therapy for a woman experiencing 'uncontrollable muscle spasms' and 'a continuously distorted posture' (p.92) secondary to neuroleptic treatment for schizophrenia. Schoonderwoerd reported the woman experienced temporary symptom relief following treatments and continued to seek them out.

Due to the limited research investigating massage therapy for extrapyramidal side effects, this review will examine the evidence base for massage therapy and related soft tissue therapy approaches for movement disorders which have other aetiologies.

Evidence for soft tissue approaches to relieve symptoms of Parkinson's disease is particularly informative. This is because both schizophrenia and Parkinson's disease are associated with an imbalance in dopamine and it is because some of medications used in the treatment of schizophrenia are dopamine antagonists that they cause Parkinson's disease like symptoms (Sadock & Sadock, 2007). If massage therapy is an effective treatment for the symptoms of Parkinson's disease, it is also likely to be useful for parkinsonian side effects.

There is emerging evidence that soft tissue therapy is effective for people with Parkinson's disease. Neuromuscular therapy (the utilization of static pressure on specific myofascial trigger points to relieve pain) was found to significantly improve ratings on

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the motor subscale of the Unified Parkinson's Disease Rating Scale (Craig, Svircev, Haber, & Juncos, 2006) and both Hernandez-Reif et al. (2002) and Paterson et al. (2005) found that a series of deep tissue massages (a variety of massage techniques, including neuromuscular therapy, which target deeper soft tissues) significantly improved patient and clinician's activities of daily living (ADL) ratings. Tremor seems to be particularly responsive to soft tissue therapies (see for example Rasco, 2009), and this may be because it is known to be exacerbated by stress and ameliorated by relaxation (Schlesinger, Benyakov, Erikh, Suraiya & Schiller, 2009). Indeed, a study comparing listening to relaxing music to neuromuscular therapy found these interventions were equally effective in reducing tremor (Craig, Svircev, Haber & Juncos, 2006). While no studies have investigated soft tissue therapy approaches for dyskinesia, massage therapy has been found to alleviate other neuromuscular conditions such as multiple sclerosis (Hernandez-Reif, Field, Field, & Theakston, 1998b) and fibromyalgia (Field et al., 2002; Sunshine et al., 1997).

Research to support or reject the use of massage therapy for alleviation of extrapyramidal symptoms is clearly limited. There is some evidence that through the induction of a parasympathetic nervous system response, or influencing neuromuscular processes, massage therapy may be able to alleviate symptoms. Based on the case study by Schoonderwoerd (2005) such an approach may provide a temporary, but still worthwhile, relief from symptoms.

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The Importance of Touch and Touch Deprivation in Schizophrenia

“Touch is a basic behavioural need, much as breathing is a basic physical need.... the dependent infant is designed to grow and develop socially through contact, tactile behavior, and throughout life to maintain contact with others.”- p.46 Montague (1986).

Research shows touch is vitally important for our psychological, social and physiological functioning. Although a detailed review of the importance of touch is beyond the scope of this literature review, some of the most common findings will be outlined (for more in depth reviews see Montague, 1971 or Schanberg and Field, 1987). Touch seems to be particularly important for infants and the majority of research has been focused here. In infant rats, touch deprivation appears to cause reduced growth hormone production with consequential impaired body and brain growth and lower levels of immunity (Wang, Bartolome & Schanberg, 1996). It has also been linked to psychosocial problems including an impaired ability to handle stressful situations (Levine & Otis, 1958) reduced curiosity and problem solving ability (Bernstein, 1952) and lower social and sexual dominance (Hammett, 1922). Similar results have been found in infant monkeys (Harlow, 1958, 1959) and in infant humans (Hertenstein & Campos, 2001; Hart et al., 1998; Field et al., 1996). For human infants, receiving adequate touch also seems to be important in the formation of healthy attachments to caregivers (Moore, Anderson & Bergman, 2007).

Touch is also important for human adults and has been hypothesised to have an integral role in communicating attachment, care giving and sexuality (Brennan, Wu & Loev, 1998). Prior studies have found affectionate touch between adults influences

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physiological measures such as increasing oxytocin, lowering heart rate and lowering blood pressure (Light, Grewen & Amico, 2005). It has also been found to improve a range of relationship-quality related measures including relationship satisfaction, empathy, levels of conflict and conflict resolution skills (Gulledge et al., 2007). It appears that for infants and adults, receiving adequate affectionate touch is important for a range of physical and psychological health outcomes.

There is indirect evidence that people with schizophrenia receive less affectionate touch than the general population. For example, while no known study has directly investigated how much touch people with schizophrenia receive, a survey of people with mental illness more generally found that, alarmingly, 13% had not touched or been touched by another person in the previous 12 months (SANE Australia, 2009).

There are a number of factors that need to be taken into account when considering the likely reaction people with schizophrenia may have to a therapeutic touch intervention. While evidence that they may be at risk of touch deprivation suggests they may benefit from an intervention to alleviate this, symptoms of paranoia may make it more likely the person will be touch averse, or find the experience of being touched threatening. In a small scale study Salzmänn-Erikson and Erikson (2005) conducted in-depth interviews with consumers of a psychiatric outpatient service who had previously been hospitalized for psychosis. Participants reported that their need for physical contact actually increases when their mental health declines. However, other authors have urged caution. In a study interviewing psychiatric nurses about their use of touch, nurses said they felt they need to be particularly cautious touching people experiencing psychosis as the touch may be misinterpreted or experienced as

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uncomfortable. For example, a brief and benign kind of touch such as brushing past the patient may be misinterpreted as threatening (Gleeson and Higgins, 2009).

The effect touch has appears to be determined by a range of factors including, the quality of the relationship, the quality of touch given and individual differences in how is it perceived. For example, some participants in the Salzmänn-Erikson and Erikson (2005) study stated that when they had a good relationship with a particular psychiatric inpatient nurse their touch was experienced as warm, real and compassionate but when the touch was unwelcome or given by a nurse they didn't know well, they felt inferiority and fear. In regards to the quality of touch given, only moderate pressure touch seems to reduce physiological arousal for both adults and infants (Diego et al, 2004; Field et al., 2004). Finally, there are also likely to be large individual differences in how touch is perceived. Thus, the same kind of touch may affect a touch-averse person very differently to someone who enjoys and feels comfortable being touched (Gulledge et al., 2007).

While affectionate touch has been shown to be very important for physiological, psychological and social health, research to date suggests that people with schizophrenia receive much less touch than the general population and so may benefit from a tactile based intervention. While particular care may need to taken when touching people with schizophrenia, for example by gauging verbal and non-verbal cues as to how the touch is being received (Gleeson & Higgins, 2009), in general research seems to support its use.

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Summary and Conclusion

Evidence reviewed here shows that there is large and possibly increasing use of CAM therapies such as massage by people with mental illness. However, research into the safety and efficacy of massage, particularly as it relates to mental health symptoms, is still in its infancy. More evidence based research is needed to help guide the training and practice of massage therapists working in this field, inform people with psychiatric conditions make decisions about the suitability of massage therapy for them, and inform policy makers trying to determine if massage therapy should be part of the public health care system.

The need for research investigating massage therapy for mental health symptoms is particularly apparent in schizophrenia where only one known experimental study has been conducted (Andres, Bellwald and Brenner, 1993). While this study does indicate that people with schizophrenia respond to massage therapy in a similar manner to other populations which have been studied (with a drop in physiological arousal for example), more research with larger sample sizes and which study the effect of massage therapy in isolation from other therapy components is clearly needed. This is especially apparent in the context of evidence that people with schizophrenia may be less comfortable with massage therapy or less sensitive to its effects when compared to other populations. As reviewed here, there are a number of ways massage therapy may be beneficial for people with schizophrenia specifically including improving body awareness, reducing anxiety, depression and extrapyramidal side effects and by providing therapeutic touch. Experimental studies which test the effect of massage therapy on these dependent measures would also provide a valuable development to research in this area.

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MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Empirical Study

An Investigation into the Efficacy of Massage Therapy for people with Schizophrenia

MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Abstract

This study investigated the effect of a four week massage therapy intervention on quality of life, extrapyramidal side effects, blood pressure and pulse for people with schizophrenia. Justification for the study was based on prior research which suggested that by improving body awareness, decreasing anxiety, depression, extrapyramidal side effects and physiological arousal and by providing therapeutic touch massage therapy may increase quality of life ratings. Ten participants were recruited through a number of outpatient mental health services. As measured by the Positive and Negative Symptom Scale (Kay, Fiszbein & Opler, 1987) the sample had positive symptoms in the 15th percentile ($M=12.7$, $SD=4$) and negative symptoms in the 20th percentile ($M=15.3$, $SD=3.9$). Results were analysed using clinical significance statistics. Just one of the ten participants showed a clear positive response to massage as indicated by reliable and clinically significant improvement in health related quality of life (as measured by the Mental and Physical Component Scales of the SF-36v2) and a decrease in physiological arousal. A further three participants had a reliable decrease in parkinsonian symptoms as measured by the Simpson-Angus Scale (Simpson & Angus, 1970). In contrast to the quantitative data, qualitative feedback from participants indicated they did experience positive changes in physical and mental wellbeing following the intervention. Most notably, two participants reported that the frequency and intensity of their voices decreased following massage therapy. Results are discussed with regard to Moyer's theory (2008), that massage therapy effects are greater when people learn how to receive it.

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Massage therapy is 'the manual manipulation of soft tissue intended to promote health and well-being' (p.3, Moyer, Rounds & Hannum, 2004). Massage techniques can include pressing, rubbing, and otherwise manipulating the soft tissues of the body and can be applied using the massage therapist's hands, fingers, elbows, forearms and feet (Australian Association of Massage Therapists).

Massage therapy research is in its infancy. As pointed out by a number of authors, the symptoms massage therapy may benefit, mechanisms of massage therapy efficacy, and what session length and number of sessions is required to produce a significant effect, are all questions which are yet to be adequately answered (Ezzo, 2007; Moyer, Round & Hannum, 2004). However, existing studies do indicate massage therapy is beneficial for a range of conditions, including psychiatric disorders. For example, massage therapy has been found to reduce symptoms of Attention Deficit/Hyperactivity Disorder (Field, Quintino, Hernandez-Reif & Koslovsky, 1998c), Anorexia Nervosa (Hart et al., 2001) and autism (Field et al., 1997b).

Only one quantitative study has investigated the efficacy of massage therapy for people with schizophrenia. Andres, Bellwald and Brenner (1993) found that an intervention combining massage therapy with movement and breathing exercises significantly decreased physiological arousal and improved well-being ratings. While providing tentative support for the use of massage therapy with this population, it isn't clear how much the massage therapy component contributed to the significant results and the sample was small (n= 10). Research using larger sample sizes to investigate the effect of massage therapy in isolation of other interventions is clearly needed.

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The hypothesis that massage therapy may benefit people with schizophrenia is supported by research investigating other physical therapies for schizophrenia and those investigating massage therapy for other populations. For example, a preliminary study found that body orientated psychotherapy (exercises aimed at focusing attention on body posture, movement and reality contact) decreased negative symptoms of schizophrenia such as blunted affect and motor retardation (Hricht & Priebe, 2006). In a study by Duraiswamy et al. yoga was also found to be effective for alleviating these symptoms (2007). Like the Andres, Bellwald and Brenner (1993) study, this research suggests physical interventions which enhance body awareness are beneficial for this population, but the mechanism for their effect is unknown. In particular, it is not clear how much the active movement versus the body awareness component of these interventions contributed to the significant results. The current study's focus on massage therapy, a physical intervention which has also been found to enhance body awareness (Leivadi, 1999; Price, 2005, 2007) but obviously does not involve active movement, may contribute to an understanding of the mechanisms involved.

The capacity of massage therapy to reduce anxiety and depression is another potential avenue of benefit. The meta-analysis by Moyer, Rounds and Hannum (2004) found massage therapy was effective in reducing measures of trait anxiety (Hedges's $g = 0.75$) and depression ($g = 0.62$, where Hedges's g is an estimation of the number of standard deviations by which the average member of a treatment group differs from the average member of a comparison group). The presence of comorbid anxiety or depression is a strong predictor of poor health and wellbeing outcomes for people with schizophrenia including decreasing quality of life ratings (Huppert et al., 2001) and

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increasing the risk of relapse, hospitalization and suicide (Addington & Addington, 1992; Hertz & Melville, 1980). If massage therapy can reduce anxiety and depression for people with schizophrenia it may also improve their quality of life and perhaps even reduce their risk of relapse and suicide.

There is some indication massage therapy may alleviate extrapyramidal side effects (movement-disorders induced by substances which are dopamine antagonists such as anti-psychotics). Extrapyramidal side effects (EPS) include dyskinesia (involuntary movements which are rapid, brief, jerky, discrete and stereotyped) and parkinsonian symptoms (muscle rigidity, tremor, and slowness initiating movements). A qualitative case study by Schoonderwoerd (2005) found a mix of massage therapy, stretching and spinal manipulation temporarily improved extrapyramidal symptoms. Massage therapy has also been found to alleviate symptoms of Parkinson's disease (Craig, Svircev, Haber, & Juncos, 2006; Hernandez-Reif et al., 2002; Paterson et al., 2005). This is relevant to the current study because both schizophrenia and Parkinson's disease are thought to involve an imbalance in dopamine and it is because antipsychotic medications are dopamine antagonists that they cause Parkinson's disease like symptoms (Sadock & Sadock, 2007). If massage is effective for Parkinson's disease it is likely to be effective for extrapyramidal parkinsonian symptoms.

Finally, massage therapy provides an experience of touch, something people with mental illness generally are at risk of being deprived of. For example, a survey of people with mental illness found that 13% had not touched or been touched by another person in the previous 12 months (SANE Australia, 2009). Similar findings have been found for people in psychiatric inpatient care (Tommasini, 1990; Salzmann-Erikson &

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Erikson, 2005). While concerns have been raised that touch can be misinterpreted by people experiencing psychosis (Gleeson & Higgins, 2009) there is a large body of evidence which shows receiving adequate touch is important for psychological and physical health. Adequate touch has been linked with improved growth and immune system functioning, decreases in aggression and anxiety, and improved attachment and adult relationship satisfaction (Gulledge et al., 2007; Brennan, Wu & Lev, 1998; Hertenstein & Campos, 2001; Hart, Field, Hernandez-Reif, & Lundy 1998; Field et al., 1996). The importance of receiving adequate touch suggests that a sensitively conducted touch based intervention is worth investigating for people with schizophrenia.

The current study. The current study investigated the effect of massage therapy on subjective ratings of quality of life, extrapyramidal side effects, blood pressure and pulse. Quality of life was included as this is increasingly being recognised as an important outcome measure in schizophrenia research (Bobes et al., 2005; Awad, Voruganti & Heslegrave, 1997). Based on previous findings regarding the capacity of massage therapy to reduce anxiety and depression, and the strong correlation between anxiety, depression and quality of life for people with schizophrenia, it was hypothesised that massage therapy would improve quality of life ratings. Extrapyramidal side effects were included because they are commonly experienced and often reduce quality of life (Karagianis et al., 2009; Awad, Voruganti & Heslegrave; Hoge et al., 1990; Rogers et al., 1999). Based on findings from previous massage therapy research (Craig, Svircev, Harber, & Juncos, 2006 for example) it was hypothesised that massage therapy would reduce severity ratings of dyskinesia and parkinsonian symptoms. Finally, blood pressure and pulse were included to provide

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more objective measures of massage efficacy. It was hypothesized blood pressure and pulse rate would drop significantly following massage therapy, as has been found in other populations (Hernandez-Reif et al., 2000; Cambron, Dexheimer & Coe, 2006).

Method

Design

The study employed a within-subjects repeated measures design. As the sample size was limited, the methods of Jacobson and Truax (1991) for determining reliable and clinical change were applied at the level of the individual participant. Further information about this method of analysis is given below.

Participants

Eligible participants were adults with a current diagnosis of schizophrenia who were on a stable psychiatric medication regime (measured as having no change to medication type or dosage for at least four weeks prior to participation). Participants also needed to have the capacity to give informed consent and be comfortable receiving massage. Exclusion criteria were a risk of aggression or sexually inappropriate behaviour as identified by a mental health care worker familiar with the potential participant (for example their psychologist or psychiatric nurse).

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Based on a conservative expected effect size of $g = 0.25$, it was calculated that 33 participants would be required in order to have sufficient power to conduct a repeated measures ANOVA on the data.¹ However, only 15 participants were able to be recruited. The implications of this for the statistical analysis chosen for the study are discussed in the results section. Of the 15 participants recruited, two withdrew between the collection of baseline data and commencing massages due to worsening mental health, and another two participants withdrew during the massage therapy intervention period: the first due to worsening mental health, and the second after he moved house and became un-contactable. A fifth participant was dropped from the data analysis due to changes in his psychiatric medications. Of the remaining ten participants, there were three females and seven males with mean age of 41 ($SD = 10.6$). Five were living in the community and five in supported living accommodation.

Participant recruitment occurred through mental health services in Hobart, Tasmania. Specifically, participants were recruited from the Richmond Fellowship residential and day programs, the Eureka Clubhouse day program, out-patient services in the Royal Hobart Hospital (Department of Psychological Medicine), the Colony 47 drop in centre, and the Tolosa Street respite and rehabilitation programs. Recruitment

¹ In the meta-analysis by Moyer, Round and Hannum (2004), massage therapy was found to reduce blood pressure by an effect size of this magnitude. This was the lowest effect size observed in previous massage therapy research for any of the variables in the current study.

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involved talking to groups of potential participants, posting flyers, and referrals from staff of those services.

Participants were assessed on the Positive and Negative Symptom Scale (PANSS: Kay, Fiszbein & Opler, 1987). A detailed description of this instrument is provided in the Materials section. The sample had positive symptoms in the 15th percentile ($M=12.7$, $SD=4$), negative symptoms in the 20th percentile ($M=15.3$, $SD=3.9$) and general psychopathy symptoms in the 15th-20th percentile ($M=28.3$, $SD=5.2$). This indicates that on average participants had less severe mental health symptoms than the standard reference sample for PANSS and had slightly worse negative symptoms compared with positive symptoms. Symptom type and severity varies widely between different people with schizophrenia, and within the same individual over time (Harrison et al., 2001; Zubin & Ludwig, 1983) therefore the results of the current study will be more relevant to people whose mental health symptoms are similar to those described here rather than to the broader diagnostic entity of schizophrenia.

Participants with comorbid psychiatric diagnoses and substance use were included in the study. One participant had comorbid Bipolar Disorder, one Generalised Anxiety Disorder and a third Obsessive Compulsive Disorder and depression. A number of participants also had comorbid substance use. Comorbid psychiatric and substance related disorders are very common in schizophrenia (Jablensky et al., 2000; Dixon et al., 2001). These participants were included to increase the external validity of the study.

Six participants had significant physical health complaints. The specific physical health complaints of these participants and, where relevant, changes to the methodology which were made to accommodate these conditions were:

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- Multiple Sclerosis (MS). Data relating to the extrapyramidal symptoms of this participant were excluded due to the difficulty in differentiating extrapyramidal symptoms from MS related symptoms.
- Emphysema
- Hepatitis C, epilepsy (last seizure 3 years prior), and high blood pressure. This participant reported that they did not always take their blood pressure medication. Blood pressure data for this participant was excluded from analyses as variable doses of blood pressure medication was considered to be a confounding variable.
- As a precaution against Hepatitis C infection, massage strokes were altered to avoid contact with any broken skin. In the view of the researcher this alteration is unlikely to have significantly changed the overall effect of the massage therapy.
- Type 2 Diabetes (insulin controlled).
- Type 2 Diabetes (diet and exercise controlled).
- Visual impairment and mobility difficulties. It was too difficult for this participant to climb on and off the massage table so massages were conducted on their bed.

All participants were taking anti-psychotic medication. As measured by the Neuroleptic Conversion Calculator software (Addat, 2002), the mean daily chlorpromazine equivalent for the sample was 692.61 mg/day ($SD = 496.8$, range 95 to 1612 mg/day).

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Materials

Positive and Negative Symptom Scale (PANSS: Kay, Fiszbein & Opler, 1987). The PANSS (Kay, Fiszbein & Opler, 1987) was used to assess the nature and severity of mental health symptoms in the sample. The PANSS has 30 items which are rated on a seven point scale based on the person's current symptoms. The 30 items contribute to three scales: the Positive Scale (covering symptoms such as hallucinations and delusions) the Negative Scale (covering symptoms such as blunted emotional affect) and a General Psychopathology Scale (covering symptoms such as anxiety and depression). Higher scores on PANSS scales indicate greater psychopathology.

The PANSS has been used extensively in schizophrenia research, including studies examining interventions which aim to improve body awareness (for example Duraiswamy et al., 2007; Hricht & Priebe, 2006). It has good psychometric properties. For example a large study by Van den Oord et al. (2006) found the scale has acceptable reliability (Cronbach's alphas for the subscales: 0.70 to 0.85) and that PANSS subscales correlated well with DSM-IV diagnoses. Although it was not feasible to have more than one person making PANSS ratings and therefore collect interrater reliabilities, the researcher did complete the PANSS training program developed by the Department of Psychiatry at the University of Melbourne prior to making PANSS ratings. Such training has been found to improve the reliability of PANSS ratings (Müller & Wetzel, 1998).

PANSS ratings were derived from information obtained during the Structured Clinical Interview for the PANSS (SCI-PANSS: Kay, 1991). The SCI-PANSS gives a general interview structure as well as possible question probes. Information elicited during SCI-PANSS interviews forms the basis for ratings on the PANSS scale. For

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example, responses to questions about the current year and current prime minister are used to rate the disorientation scale.

Simpson-Angus Scale (SAS: Simpson & Angus, 1970). The SAS was used to measure parkinsonian symptoms. It has ten items that relate to rigidity, tremor and excess salivation which are rated on a five-point scale, where higher scores indicate more severe symptoms. Knol, Keijsers, Jansen and Belitser (2009) found this scale has acceptable reliability ($\alpha = 0.83$) and correlates acceptably with the parkinsonian symptoms subscale of the Schedule for Assessment of Drug-Induced Movement Disorders. Other authors have also concluded this scale has good psychometric properties (Janno, Holi, Tuisku & Wahlbeck, 2005; Calvo-Gomez, Sanchez-Pedraza, Jaramillo-Conzalez & Tarcisio-Mantilla, 2006).

As with all the extrapyramidal rating scales used in this study, rating on the SAS were based on information gathered from the General Akathisia, Tardive phenomenon and Extrapyramidal rating Schedule, version 6.5 (GATES 6.5: Lambert, 1998). The GATES is a structured clinical examination where the examinee is asked to perform a range of activities likely to elicit any extrapyramidal symptoms which may be present. For example the examinee is instructed to walk for a distance then turn around as quickly as they can while the examiner checks for the presence of parkinsonian symptoms. Parkinsonian symptoms elicited during the GATES interview were rated for severity on the SAS. Again, although it was not feasible to have more than one rater for this measure, the researcher did make use of the multi-media training material available to assist in conducting GATES interviews and in accurately recognizing and rating symptoms.

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Abnormal Involuntary Movement Scale (AIMS: Guy, 1976). The AIMS was used to assess the presence and severity of dyskinesia. It has 12 items which are scored on a four-point scale. Higher scores indicate more severe dyskinesia. Gerlach et al. (1993) concluded this scale has a good intra rater reliability coefficient (0.80–0.84 over a four week period) and, inter-rater reliability (0.76–0.85). It also appears to be a valid measure of dyskinesia as measured by its convergent validity with the subscale of a similar measure, the St. Hans Rating Scale. Data used for AIMS ratings was derived from the General Akathisia, Tardive phenomenon and Extrapyrimal rating Schedule (see above).

Medical Outcomes Study Short Form, version 2, Australia (SF-36v2: Ware, Kosinski & Dewey, 2000). The SF-36v2 is a widely used self-report measure of health related quality of life. It has 36 items that contribute to eight scales which in turn are used to score two summary measures, the Physical Component Summary Score and the Mental Component Summary Score. Higher scores on this scale indicate better quality of life. This study used the component summary scores only as it has been found these are almost as sensitive in detecting change as the scale scores, but have the advantage of reducing the number of statistical analyses which need to be computed (Ware et al., 1995).

The SF-36 has been found to have very good psychometric properties and is considered to be a reliable and valid measure of health related quality of life both in the general population (Butterworth & Crosier, 2004) and for people with schizophrenia (Russo et al., 1998; Tunis, Croghan, Heilman, Johnstone & Obenchain, 1999). For

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example, Huang, Wu and Frangakis (2006) found Cronbach's alpha values for the subscales all in the acceptable range ($\alpha = 0.76-0.91$).

World Health Organization Quality of Life measure (WHOQOL Group, 1998a). This commonly used quality of life measure is based on self-report. Two questions from the scale were used as a global quality of life measure ("How would you rate your quality of life?" and "How satisfied are you with your health?").

Questions from this scale were restricted to two items to reduce the time burden on participants. This was thought to be particularly important for the current study where psychiatric symptoms such as cognitive disorganisation and anxiety would make it more difficult for participants to spend long periods of time responding to questions. While it was acknowledged these global items may be less sensitive to change, the main focus of the study was health related quality of life and this was measured by the full version of the SF-36v2. The author wished to include a measure of global quality of life and concluded an appropriate solution would be to include the global measures from this scale.

In regards to the psychometric properties of the overall scale, the WHOQOL BREF (a 26 item version of the scale) was found to have good to excellent psychometric properties as shown through item-total correlations, discriminant and construct validity in a large international study of the general population (Skevington, Lotfy, & O'Connell, 2004). These author's found Cronbach's alpha values for domain scores were all acceptable ($\alpha = 0.7 - 0.82$) with the exception of the Social Relationships domain which was marginal ($\alpha = 0.68$). The WHOQOL-100 (the 100 item version of the measure) was also found to be a reliable quality of measure for people with

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schizophrenia and subscales of the measure correlated well with measures of psychopathology severity (Örsel, Akdemir & Da, 2004).

Automatic blood pressure gauge. An automated blood pressure gauge was used to measure resting systolic blood pressure, diastolic blood pressure and pulse.

Massage safety screening questionnaire. Participants were given a list of medical conditions which have the potential to negatively impact on the safety and comfort of the massage and asked tick any which applied to them. The list was based on recommendations provided by the researcher's training provider, Massage Schools of Queensland, which in turn reflects current research evidence pertaining to the safety of massage therapy such as the research summary by Ng and Cohen (2011). Massage was altered to accommodate any existing medical conditions. For example, participants indicating they had high blood pressure were informed they may feel a little light headed or dizzy when rolling over or sitting up from the massage table and were encouraged to do so slowly and carefully. The questionnaire is shown in Appendix A.

Massage therapy materials. The following materials were during massage: portable massage table with face crest and arm rest, unscented vegetable-based massage oil, towels, a double sheet, pillows and blankets (as required).

Procedure

Ethics approval for this study was received from both the University of Tasmania Social Sciences Human Research Ethics Committee and the Heath and Medical Human Research Ethics Committee.

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The study involved collecting data at four time points: at an initial meeting, four weeks later just prior to the first massage, four weeks later again just after the final massage, and a follow-up which occurred four weeks after the completion of the massage intervention. This procedure will now be described in more detail.

At baseline, the aims and methods of the study were described to each participant, and written consent was obtained. A copy of the information sheet and consent form given to each participant is included in Appendix B. Participants were then asked to complete the SF-36v2, questions from the WHOQOL, and the massage safety screening questionnaire. The SCI-PANSS and GATES were also administered and participants had their blood pressure and pulse taken. The order measures were administered was randomized by drawing names of measures from a hat. However, due to the sensitive nature of the SCI-PANSS questions, if drawn first this measure was left until later in the meeting when it was hoped greater rapport would have been established. Blood pressure and pulse was measured when the participant had been seated and relaxed for a period of time.

Four weeks after this initial meeting the researcher met participants for a second time and administered the SF-36v2, the GATES and WHOQOL questions and took their blood pressure and pulse. The massage therapy intervention commenced immediately after measures were taken. Massages were conducted using the standardised procedure described in Appendix C.

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Massages were 30 minutes duration and were given twice a week for four weeks. Research comparing the efficacy of different lengths of massage and number of massages given which could have informed decisions about dosage levels for the current study does not, to the researcher's knowledge, currently exist. Therefore, the intervention both in dose and in procedure was based on the study by Hernandez-Reif et al. (2002) who found this intervention significantly decreased symptoms of Parkinson's disease. The format of 30 minute massages twice a week for eight weeks is also commonly employed in research conducted through the Touch Research Institute, a major source of massage therapy research. Employing this format was chosen to make it easier to compare results of the current study and those conducted through the Touch Research Institute. Massages were given by the researcher who is a trained remedial massage therapist with six years experience.

Following the eighth and final massage, participants were again administered the SF-36v2, the GATES, questions from the WHOQOL and had their blood pressure and pulse taken (time 3) (note that while these measures could have been included after each massage to collect data regarding the efficacy of a single 'dose' of the intervention, it was thought that this would add too greatly to the time burden on participants). Four weeks after this (at time 4), participants were administered the measures for a fourth and final time to gather data on any long term effects of the intervention. They were also asked for qualitative feedback about their experience. Note that Scores from the initial meeting (time 1) and after 4 weeks of no intervention (time 2) were combined to form a baseline measure. This average was used to control for fluctuations in the symptoms and quality of life of participants for reasons aside from the massage therapy intervention.

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Results

Results for the study are organised by first outlining the clinical significance analyses conducted on the measures of quality of life and extrapyramidal side effects. This is followed by the findings from the physiological measures (blood pressure and pulse), then the qualitative data collected from participants regarding their experience of the massage therapy. Finally, a more detailed examination of the results from two participants (chosen for their differing response to the intervention) is presented.

Results of Clinical Significance Analyses

As noted in the methodology section, difficulties were encountered recruiting sufficient participants to run a repeated measures analysis of variance, therefore, data for individual participants was analysed using clinical significance statistics. This method of statistical analysis will first be described. Results from clinical significance analyses across each of the time points will then be outlined.

Description of the clinical significance method employed. Clinical significance refers to the capacity of an intervention to produce practical and meaningful change. It has been operationalised in a number of ways (for a thorough overview see Ogles, Lunnen & Bonesteel, 2001). This study will use the two-step methodology outlined by Jacobson and Truax (1991) where an individual's post treatment score is considered clinically significant if there is a return to normal functioning and if the magnitude of the change is statistically reliable.

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Step one. Jacobson and Truax (1991) provide three methods for calculating a return to normal functioning and suggest that the least arbitrary is the method they describe as *option c*: “to determine if the level of functioning subsequent to the intervention places that participant closer to the mean of the functional population than it does to the mean of the dysfunctional population” (p.13). This option requires mean and standard deviation data from a normative sample and that the clinical and normal samples have overlapping distributions. Two dependent measures in the current study, the SF-36v2 and the WHOQOL, met these requirements. Norms for the SF-36v2 were taken from Hawthorne, Osborne, Taylor and Sansoni (2007) and norms for the WHOQOL were taken from Murphy et al. (2000).

As they are measures of clinical symptoms, no normative data exists for the AIMS or the SAS. Clinical significance for these measures was therefore operationalized using Jacobson and Truax’s *option a*: “the level of functioning subsequent to therapy should fall outside the range of the dysfunctional population” (p.13).

Step two. The second step in Jacobson and Truax’s methodology involves calculating the Reliable Change Index (RCI: Jacobson, Follette, & Revenstorf, 1984, with later amendments by Christensen & Mendoza, 1986). Here the probability that change in an individual’s score is due to the intervention (true score variance) rather than measurement error is calculated using the test-retest reliability of the measure.

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Test-retest reliability data for the SF-36v2 was taken from Ware et al. (2008).

For the WHOQOL it was taken from Murphy et al. (2000), for the AIMS from Gerlach et al., (1993) and for the SAS from Calvo-Gómez, Sánchez-Pedraza, Jaramillo-González & Tarcisio-Mantilla (2006).

Clinically significant change and Reliable Change Indices were calculated for each individual using the Reliable and Clinical Change Generator – Version 3.5, part of the ClinTools software package (Deville, 2005). Examples of output from these calculations are included in Appendix D.

Analysis of quality of life and extrapyramidal side effects ratings across time.

Checking for external variability: quality of life and extrapyramidal ratings across the baseline period. Most ratings did not significantly change from Time 1 to Time 2 indicating the quality of life and extrapyramidal symptoms of participants was generally stable prior to commencing massage therapy. However, as shown in Tables 1-6, some change did occur over the four week baseline period. To control for external variability in ratings across time an average of Time 1 and Time 2 ratings was used as a baseline measure.

Massage therapy effects: quality of life and extrapyramidal side effects following massage therapy intervention. Participants' scores after massage therapy (Time 3) were compared to baseline (average Time 1 and 2) for each of the quality of life and extrapyramidal measures. These results are summarized in Tables 1-6.

Participant 5 reliably improved on both the Physical and Mental Component Summary scores of the SF-36v2 and this change was also clinically significant. This participant was classified as a responder to massage therapy, and their data is explored

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further below. One participant reliably improved on the SF-36v2 Mental Component Summary but this change wasn't clinically significant. On the WHOQOL question "How would you rate your quality of life?" the rating of one participant was significantly worse following massage therapy. One participant reliably improved on the AIMS and three participants reliably improved on the SAS. All other ratings following massage therapy were not reliably different from baseline.

Long term effects: quality of life and extrapyramidal ratings at follow up. Two participants dropped out between time 3 and 4 due to changes in their psychiatric medications. A third participant refused to have data on extrapyramidal symptoms, blood pressure or pulse collected at time 4. As shown in Table 5, the reliable improvement on the AIMS made by participant 4 were maintained through to the follow-up. Participant 8 had a reliable deterioration in symptoms when compared to baseline. All other ratings were not significantly different from baseline.

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Table 1

SF36 Physical Component Summary: Comparison of Participant Scores across Time Points.

Participant	Time 1→Time 2	BL→ Post MT	BL →FU
1	31.52→31.61	31.56→27.64	-
4	55.15→48.67	51.91→46.73	51.91→54.11
5	41.71→42.57	42.14→54.95*†	42.14→48.62
6	56.91→51.57	54.24→50.06	54.24→56.91
8	55.35→ 64.43	59.89→54.78	59.89→52.46
9	52.22→ 56.21	54.21→53.0	54.21→58.9
10	39.10→48.03	43.57→45.31	43.57→48.7
12	33.01→ 50.33	41.67→34.44	41.67→39.41
13	52.49→ 59.39	55.94→54.97	-
14	40.17→ 45	42.58→42.21	42.58→39.31

*Reliable Change Index is significant at $p < 0.05$

†Result is also clinically significant

Note higher scores indicate greater quality of life.

Note: BL= Baseline (average score for Time 1 &2), Post MT= post massage therapy and FU = Follow up.

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Table 2

SF36 Mental Component Summary: Comparison of Participant Scores across Time Points.

Participant	Time 1→Time 2	BL→ Post MT	BL →FU
1	21.72→22.66	22.69→22.14	-
4	36.90 → 45.20	41.05→33.80	41.05→53.43
5	36.77→ 34.35	35.56→51.83*†	35.56→42.83
6	35.90 → 49.83	42.86→44.53	42.86→48.44
8	37.08 → 32.55	34.82→38.84	34.82→46.97
9	41.39 → 35.72	38.55→43.77	38.55→30.15
10	21.77 → 29.21	25.49→33.90	25.49→27.11
12	50.09 →30.56*	40.33→41.68	40.33→50.40
13	20.91→ 41.40*	31.16→46.42	-
14	53.63→49.97	51.80→56.35	51.80→55.11

*Reliable Change Index is significant at $p < 0.05$

†Change is also clinically significant

Note that higher scores indicate greater quality of life.

Note: BL= Baseline (average score for Time 1 &2), Post MT= post massage therapy and FU = Follow up

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Table 3

WHOQOL Question 1 ('how would you rate your quality of life?'): Comparison of Participant Scores across Time Points.

Participant	Time 1→Time 2	BL→ Post MT	BL →FU
1	4→4	4→2*	-
4	4→4	4→4	4→5
5	3→4	3.5→4	3.5→4
6	5→5	5→4	5→5
8	4→4	4→4	4→5
9	4→4	4→4	4→3
10	3→3	3→4	3→3
12	5→4	4.5→5	4.5→4
13	4→3	3.5→4	-
14	3→4	3.5→4	3.5→4

*Reliable Change Index is significant at $p < 0.05$
†change is also clinically significant
Note that higher scores indicate greater quality of life.
Note: BL= Baseline (average score for Time 1 &2), Post MT= post massage therapy and FU = Follow up

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Table 4

WHOQOL Question 2 ('how satisfied are you with your health?'): Comparison of Participant Scores across Time Points.

Participant	Time 1→Time 2	BL→ Post MT	BL →FU
1	3→2	2.5→2	-
4	4→4	4→4	4→4
5	3→3	3→3	3→3
6	4→4	4→4	4→4
8	4→5	4.5→4	4.5→4
9	4→4	4→4	4→3
10	2→3	2.5→3	2.5→3
12	5→4	4.5→5	4.5→4
13	3→3	3→3	-
14	2→4	3→4	3→4

*Reliable Change Index is significant improved at $p < 0.05$

†change is also clinically significant

Note that higher scores indicate greater quality of life.

Note: BL= Baseline (average score for Time 1 &2), Post MT= post massage therapy and FU = Follow up

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Table 5

Abnormal Involuntary Movement Scale: Comparison of Participant Scores across Time Points.

Participant	Time 1→Time 2	BL→ Post MT	BL →FU
1	1→2	-	-
4	5→5	5→2*	5→1*
5			-
6	3→6*	4.5→2	4.5→2
8	3→3	3→3	3→3
9	0→0	0→0	0→0
10	0→3#	1.5→1	1.5→2
12	0→2	1→0	-
13	3→4	3.5→2	-
14	2→0	1→2	-

*Reliable Change Index is significant improved at $p < 0.05$

Reliable Change Index significant deteriorated at $p < 0.05$

Note that higher scores on this measure indicate more severe abnormal movements.

Note: BL= Baseline (average score for Time 1 &2), Post MT= post massage therapy and FU = Follow up

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Table 6

Simpson-Angus Scale: Comparison of Participant Scores across Time Points.

Participant	Time 1→Time 2	BL→ Post MT	BL →FU
1	0.4→0.4		-
4	0.2→0.2	0.2→0.6	0.2→0.3
5			
6	0.5→0.5	0.5→0.4	0.5→0.3
8	0.6→0.5	0.55→0.5	0.55→1#
9	0.3→0.1	0.2→0.1	0.2→0.1
10	0.7→0.6	0.65→0.2*	0.65→0.5
12	1.8→0.9*	1.35→0.8*	-
13	0.9→0.6	0.75→0.3*	-
14	0.9→0.6	0.75→0.7	-

*Reliable Change Index is significant improved at $p < 0.05$

Reliable Change Index significant deteriorated at $p < 0.05$

Note that higher scores indicate more severe parkinsonian symptoms

Note: BL= Baseline (average score for Time 1 &2), Post MT= post massage therapy and FU = Follow up

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Physiological Data

Reliable change indices could not be carried out on blood pressure and pulse measures as these variables change many times over the course of the day. Instead the classification (normal, high-normal or grade one, two or three hypertension) of each participant's systolic and diastolic blood pressure across time points was examined for clinical improvement and changes in the average pulse rate for the sample over time was examined graphically. Clinical improvement in blood pressure was defined as a drop by one or more blood pressure classification level following massage therapy and clinical deterioration by an increase by one or more classification.

Blood pressure classifications are taken from the Heart Foundation (2008). As shown in Table 7 systolic blood pressure following massage therapy was found to improve for two participants, deteriorated for three participants and remained the same for four participants. As shown in Table 8, diastolic blood pressure improved for five participants, deteriorated for two participants and remained the same for four participants. Improvements in blood pressure observed at time 3 were not sustained at time 4. Data for participant 10 was excluded due to changes in their blood pressure medications.

Pulse rate data is presented graphically in Figure 1. As can be seen, mean pulse rate decreased over time and was lowest at time 4.

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Table 7.

Systolic Blood Pressure Classification for each Participant across Time Points.

Participant	Baseline	Time 3	Time 4
1	Normal	High Normal#	Grade 1 Hypertension#
4	High Normal	High Normal	-
5	Grade 1 Hypertension	Normal†	High Normal†
6	Grade 1 Hypertension	Grade 1 Hypertension	High Normal†
8	High Normal	High Normal	Normal†
9	Normal	High Normal#	Normal
10	-	-	-
12	Grade 1 Hypertension	High Normal†	High Normal†
13	Normal	Grade 1 Hypertension#	-
14	Normal	Normal	-

†Participant dropped by one or more blood pressure classification compared to baseline

#Participant increased by one or more blood pressure classification compared to baseline

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Table 8.

Diastolic Blood Pressure Classification for each Participant across Time Points.

Participant	Baseline	Time 3	Time 4
1	Normal	High Normal#	High Normal#
4	Grade 2 Hypertension	Grade 1 Hypertension†	-
5	Grade 2 Hypertension	High Normal†	Grade 2 Hypertension
6	Grade 2 Hypertension	Grade 1 Hypertension†	Grade 1 Hypertension†
8	High Normal	Normal†	Normal†
9	Normal	Normal	Normal
10	-	-	-
12	Grade 1 Hypertension	High Normal†	High Normal†
13	Normal	Normal	-
14	Normal	High Normal#	-

†Participant dropped by one or more blood pressure classification compared to baseline

#Participant increased by one or more blood pressure classification compared to baseline

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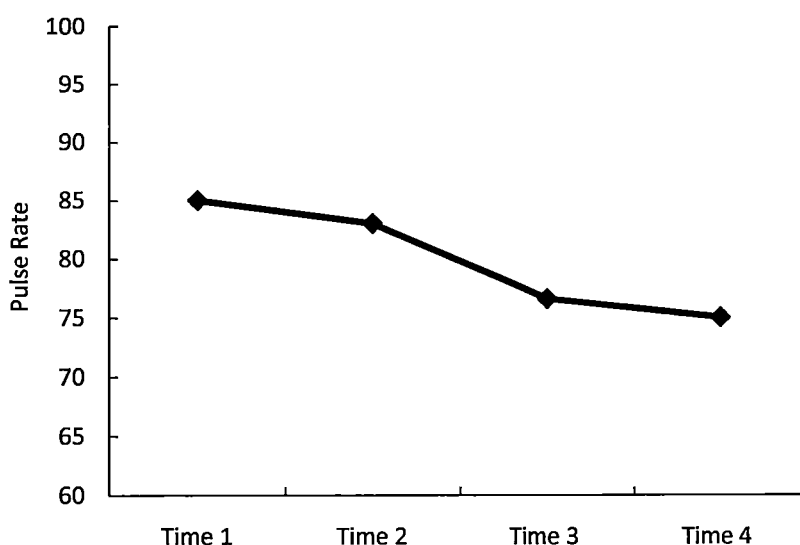


Figure 1. Mean Pulse rate at each time point

Qualitative Feedback

Following collection of data at time 4, participants were asked for qualitative feedback regarding their experiences of the massage therapy. Feedback sessions followed the general structure of asking participants if they had noticed any physical or mental changes following each massage. Minimal prompting was used and participants were encouraged to be as honest as possible in their feedback.

The main qualitative statement from the study which relates specifically to people with schizophrenia is that of two participants who reported that their voices were less intense and less frequent following massage therapy. The amount of time the effects of massage lasted varied but was generally shorter than the four week follow up point chosen for this study.

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The only negative comment from a participant related to discomfort one participant experienced lying on their back to be massaged. This participant noted that while they had noted as number of positive changes following massage, they experienced a lower back ache following the final massage.

The qualitative feedback from participants is summarized in Table 9. Qualitative feedback was unable to be obtained from participant 4 as an ethical issue regarding that participant's safety arose at that time.

Table 9

Qualitative Feedback

	Participant number								
	1	5	6	8	9	10	12	13	14
Found massages relaxing	✓			✓			✓	✓	✓
Had more energy/ able to do more physical activity		✓		✓		✓	✓	✓	
Felt positive/ euphoria						✓	✓	✓	
Voices less intense/ less frequent	✓				✓				
Requested referral for ongoing massages			✓	✓					

Note: ticks indicate a participant spontaneously indicated they noticed that particular change following massage therapy.

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Further exploration of the results using two case studies

The current sample, much like people with schizophrenia more generally, was diverse in the schizophrenia related symptoms they experienced and in the psychological, medical and substance related comorbidity they presented with. Therefore, to more fully understand the results, data from two participants will now be described in more detail.

Participant 5. This participant was chosen as a case study because results indicate a significant positive response to massage therapy, the only participant to do so consistently across most of the variables measured.

The PANSS measure indicated participant 5 had symptoms of cognitive disorganisation but no hallucinations or delusions. The overall positive symptoms were of comparable severity to the sample average (15th percentile). Negative symptoms were lower than the overall sample (5th percentile compared to sample mean of 20th percentile). The participant was also on the lowest dose of anti-psychotic medication of any participant (daily chlorpromazine equivalent 95mg daily compared with sample average of 692.61mg) and also not on any other psychiatric medications.

The participant had comorbid multiple sclerosis (MS). According to the report of the participant's General Practitioner, MS symptoms were quite stable over the course of participation, indicating this was not a major confounding variable. However, due to difficulties distinguishing MS symptoms from extrapyramidal side effects, data relating to extrapyramidal side effects was not collected for the participant.

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Participant 5 had a clinically significant and reliable improvement on both the Physical and Mental Component Summary scales of the SF-36v2. While physiological data could not be collected at time 1, systolic blood pressure dropped from grade 1 hypertension at time 2 to being within the normal range following massage and diastolic blood pressure dropped from grade 2 hypertension at time 2 to being high-normal after massage. Pulse rate also dropped following massage therapy. These effects did not last through to the 4 week follow up. There was no reliable change on either of the WHOQOL questions. Results for participant 5 are illustrated graphically in Figures 2-8.

The participant seemed able to relax fairly easily and fell asleep during some of the massages. In qualitative feedback they reported feeling comfortable receiving massages. They also reported feeling revitalized and had an increase in energy levels for 2-3 days following massage therapy.

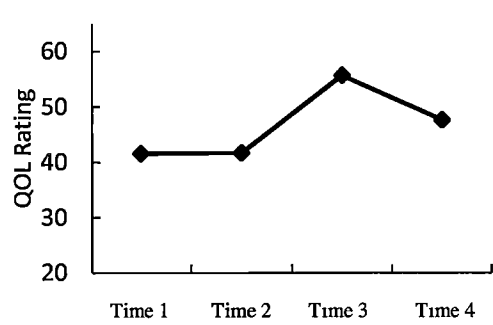


Figure 2. Participant 5 score across time on the SF-36 Physical Component Summary

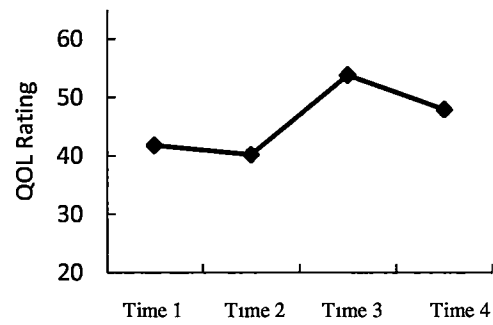


Figure 3. Participant 5 score across time on the SF-36 Mental Component Summary

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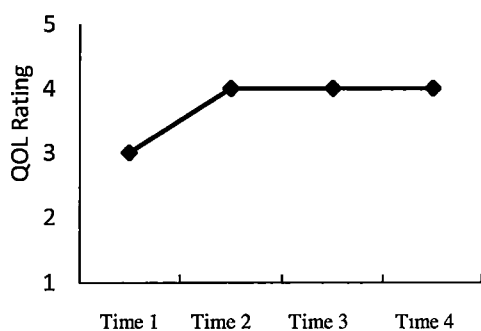


Figure 4. Participant 5 score across time on WHOQOL Question 1: “how would you rate your quality of life?”

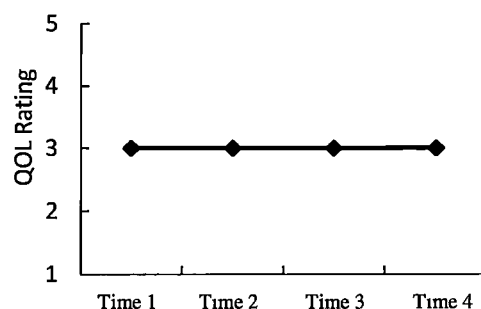


Figure 5. Participant 5 score across time on WHOQOL Question 2: “How satisfied are you with your health?”

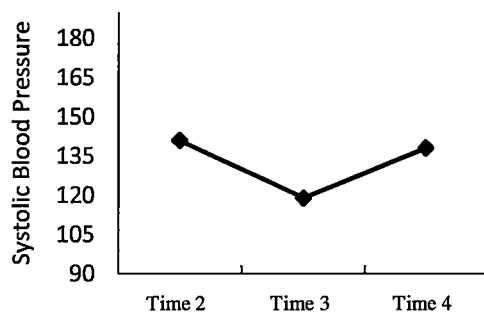


Figure 6. Participant 5 systolic blood pressure across time

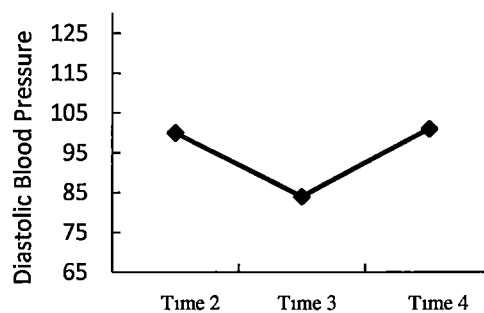


Figure 7. Participant 5 diastolic blood pressure across time

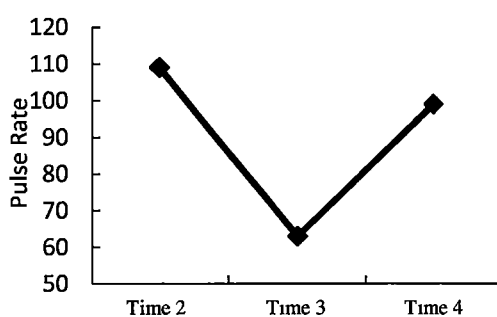


Figure 8. Participant 5 pulse rate across time

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Participant 10. The aim of examining data from this participant was to find clinical variables to explain why, in contrast to participant 5, they generally did not respond to massage therapy. As measured by the PANSS, this participant had the highest level of positive symptoms in the sample (45th percentile) and negative symptoms slightly below the sample average (10th percentile). They had co-morbid diagnoses of Obsessive Compulsive Disorder and depression. Participant 10 was on the highest dose of anti-psychotic medication of any participant in sample (daily chlorpromazine equivalent = 1612mg) and was also taking mood stabilising and anti-depressant medication. This participant was also in the methadone program, had Hepatitis C and high blood pressure. Although prescribed a medication to control blood pressure, this participant reported not taking it consistently. Blood pressure data for this participant was therefore excluded from analysis.

The observation of the researcher was that this participant had higher overall levels of physiological arousal when compared to participant 5 as indicated by greater tension in body posture, lower levels of eye contact and more pressured speech. They also seemed less comfortable receiving massage. For example they appeared to have difficulty relaxing muscular tension in response to massage strokes, particularly in the initial portion of each session. However, in qualitative feedback participant 10 did rate the experience of massage positively. They reported experiencing lower levels of anxiety and depression for the day following massage and improved sleep for the following night. On SF-36v2 scales (and as shown in Figures 9-15 below), this participant's ratings did improve on some scales but these increases were non-

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significant. This participant had a reliable improvement in parkinsonian symptoms as measured by the Simpson-Angus Scale.

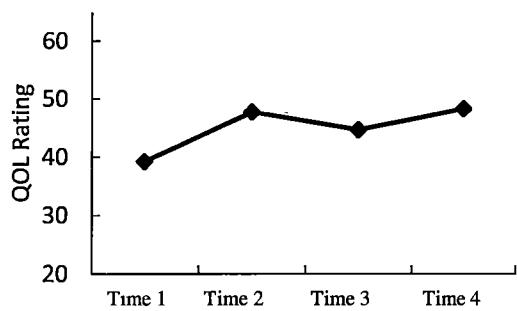


Figure 9. Participant 10 score across time on the SF-36 Physical Component Summary

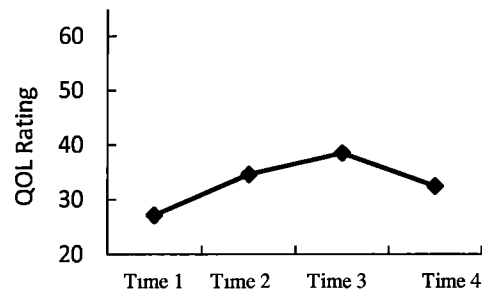


Figure 10. Participant 10 score across time on the SF-36 Mental Component Summary

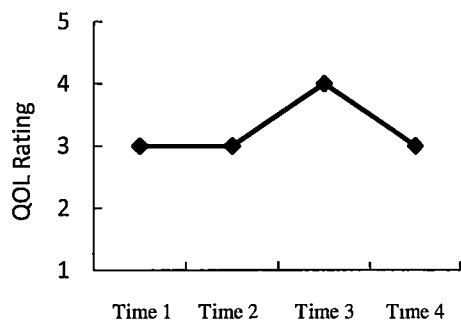


Figure 11. Participant 10 score across time on WHOQOL Question 1: “how would you rate your quality of life?”

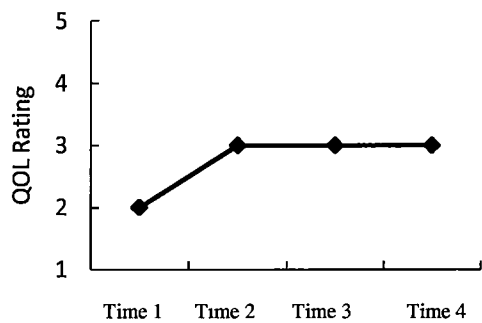


Figure 12. Participant 10 score across time on WHOQOL Question 2: “How satisfied are you with your health?”

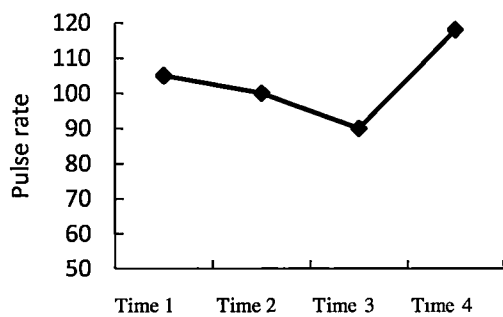


Figure 13. Participant 10 pulse rate across time

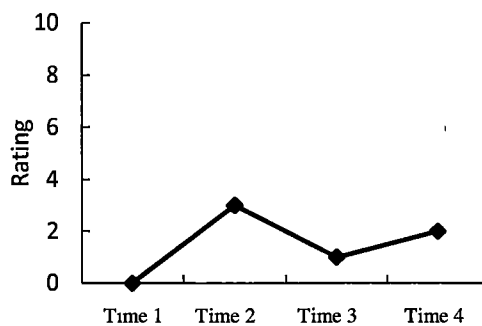


Figure 14. Participant 10 score across time on the Abnormal Involuntary Movement Scale

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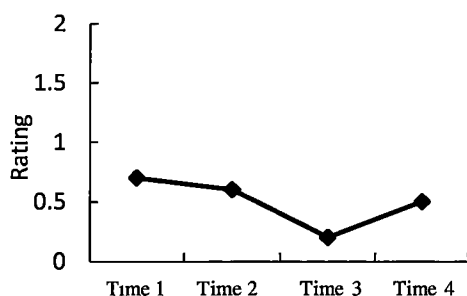


Figure 15. Participant 10 score across time on the Simpson-Angus Scale

Discussion

Summary and Discussion of Study Findings

The prediction that massage therapy would significantly improve quality of life ratings and significantly decrease physiological arousal and extrapyramidal side effects was not supported for the majority of participants in the current study. This finding runs counter to that of Andres, Bellwald and Brenner who found massage therapy significantly decreased physiological arousal for this population (1993).

Significant and noteworthy results. There were two exceptions to the predominantly non significant findings worth noting: the results from participant 5 and the qualitative feedback which was collected from participants.

One of the ten participants, participant 5, had reliable and clinically significant increases in ratings on the Physical and Mental Component Summary scales of the SF-36v2 and a decrease in measures of physiological arousal following massage therapy. These effects are similar to those which have been found in other populations massage therapy has been applied to (for example see Hernandez-Reif et al., 2002; Paterson et

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al., 2005; Price, 2005). The reason for this participant's differing response to massage therapy is unclear, however one possibility is that the absence of particular schizophrenia related symptoms may have made it easier to derive benefits from the intervention. As noted in the results section, although this participant had relatively severe symptoms of cognitive disorganisation, other symptoms (such as hallucinations or delusions) were relatively mild or absent. The hypothesis that some symptoms of schizophrenia make it more difficult to derive benefits from massage therapy is discussed in more detail below.

Qualitative data collected from participants regarding their experience of the massage therapy was almost entirely positive. The most noteworthy feedback was from two participants who reported that the frequency and intensity of their voices was reduced following each massage. This was an unexpected finding and appeared to relate to an increased sense of relaxation following massage therapy for these participants whose voices are exacerbated by stress. While unexpected, this finding does fit with previous psychotherapy studies. As outlined in the introduction, comorbid anxiety disorders increase the risk the person with schizophrenia will have a relapse of psychotic symptoms (Hertz & Melville, 1980). A more specific link between anxiety and auditory hallucinations has also been reported (Delepaul, deVires & van Os, 2002). Furthermore, Slade (1976) found that for patients where there appeared to be a relationship between social anxiety and auditory hallucinations, a psychotherapy intervention to address the anxiety also reduced the hallucinations. Massage therapy may have had a similar effect to psychotherapy for these two participants in the current study.

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Other results. There were a number of other significant results in the study.

However these results could not solely be attributed to the intervention, and appear to be caused, at least in part, by external variability. One participant showed reliable (but not clinical) improvement on the Mental Component Summary scale of the SF-36v2 however this participant's ratings also changed significantly over the baseline period suggesting this result may reflect fluctuations in mental health related quality of life for reasons unrelated to the intervention. A further participant had a reliable decrease in their global quality of life rating following massage therapy. However their experience of a major bereavement during the intervention period is likely to have influenced this rating. Physiological arousal data for the group showed a mixed physiological reaction to massage and overall it suggests participants may not have had a strong parasympathetic nervous system response to massage therapy.

Partial support was found for the hypothesis that massage therapy would decrease parkinsonian symptoms. Three participants reliably improved on the Simpson-Angus Scale following massage therapy. However, ratings for one of these three participants also reliably improved over the baseline period. Previous research has found tremor in people with parkinson's disease is particularly responsive to soft tissue therapy interventions, including to massage therapy (for example Craig, Svircev, Haber & Juncos, 2006; Rasco, 2009). Results of the current study provide mixed support for the hypothesis massage therapy is also beneficial for extrapyramidal parkinsonian symptoms.

Long term effects. Just one rating was sustained to the follow up- the reliable improvement on the AIMS for participant 4. Similarly, in qualitative feedback benefits

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following massage were generally reported to last from a few hours to a few days— well short of the four weeks used as a follow up point. The duration massage therapy effects last for is yet to be conclusively answered in the research literature. Future studies investigating massage therapy for people with schizophrenia could make use of data such as the qualitative feedback collected in this study, and employ research designs with a shorter gap between the conclusion of the intervention and follow up measures being taken.

It is argued that while massage therapy did have a positive effect on participants (as reported in qualitative feedback), this effect generally wasn't large enough to show up in quantitative measures. There are a number of factors that may have contributed to this. Among the most likely is the statistical power of the study to detect change, the sensitivity to change of self rated quality of life for people with schizophrenia and problems with learning to receive massage therapy. These will now be explored further.

Discussion of Possible Reasons for the Predominantly Non-Significant Results

The statistical power of the study to detect change. As a group, participants in this study were clinically complex. A number had comorbid psychiatric and medical conditions. Furthermore some participants were known to be using drugs and alcohol and many had psycho-social stressors occurring over the course of their participation. While this complexity and variability is representative of people with schizophrenia (Jablensky et al., 2000; Dixon et al., 2001), it makes it more difficult to detect change which may have occurred due to the massage therapy intervention when compared to other populations with more stable and less complex presentations.

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The choice to use clinical significance rather than statistical significance as a method of analysis was made to try and overcome these difficulties with statistical power. Future studies could continue to use this single case design approach but increase the intensity of the intervention (for example increasing the massage time from 30 minutes to 1 hour).

The sensitivity of measures chosen: Self rated quality of life for people with schizophrenia. Changes reported by participants in qualitative feedback did not always correlate with improved quality of life ratings. For example, the two participants who requested a referral in order to receive ongoing massage therapy did not rate their quality of life significantly higher following the intervention.

There is some debate in the literature about the ability of people with schizophrenia to accurately rate their own quality of life. While some authors have found that self ratings on the SF-36 by people with schizophrenia correlate well with clinician ratings of symptom severity and have good test-retest reliability (Russo et al., 1998; Tunis, Croghan, Heilman, Johnstone & Obenchain, 1999), Cramer et al. (2000) found quality of life ratings of schizophrenic patients are less sensitive to changes in psychiatric medication when compared to interviewer ratings. Subjective quality of life remains an important outcome measure for schizophrenia research (Bobes et al., 2005). However, results from this study suggest subjective quality of life measures may be best used when effect sizes are expected to be large or in conjunction with more sensitive measures. Further research investigating massage therapy for people with schizophrenia could use clinician ratings, symptom specific ratings (such as anxiety and depression) as well as self rated quality of life measures.

MESSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Deriving benefits from massage therapy may be more difficult for people with schizophrenia. People with schizophrenia may be less familiar or comfortable with touch compared to other populations for which massage therapy has been investigated. They may therefore find it more difficult to derive comparable benefits from this touch based intervention.

Moyer (2008) proposed that the benefits of massage may increase as the person learns how to receive it. This idea was based on the meta-analysis of paediatric massage therapy studies he co-authored (Beider & Moyer, 2007). Beider and Moyer found that when a series of massages were given, the effect on state anxiety was almost twice as large following the last massage compared to the first ($g = 1.10$, $p < 0.05$ for the last session compared to $g = 0.59$, $p < 0.05$ for the first.) Moyer proposed that a person's prior experience of massage therapy might predict how beneficial a current intervention will be.

Moyer's idea is an intriguing one and raises the question of precisely what it is which might be learnt through increased massage therapy experience. For example, one mechanism which has been proposed for how massage therapy derives its benefits is that it promotes a parasympathetic nervous system (PNS) response (Field, 1998; Moraska et al., 2008). Part of learning to receive massage therapy may therefore be learning to develop a stronger PNS response.

There are several reasons why learning to receive massage might be particularly difficult for people with schizophrenia. As outlined in the introduction, a diagnosis of schizophrenia can mean receiving little touch (SANE Australia, 2009; Tommasini, 1990; Salzmann-Erikson & Erikson, 2005) which in turn is likely to make the

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experience of massage therapy less familiar. Prior research has also linked schizophrenia with decreased tactile sensitivity, indicating they may be less sensitive to the benefits of a tactile based intervention (Blumensohn, Ringler & Ilana, 2002; Lenzenweger, 2000). Finally, symptoms of paranoia are likely to make it difficult to trust the massage therapist and relax into the experience of receiving massage.

At least some of these difficulties appear to have existed for participants in the current study. Many participants reported minimal experience of massage therapy before participating in the study and in some cases the experience was completely novel. The observation of the author is that as a group, participants took longer to relax during the massages, and found it more difficult to maintain a relaxed state when the massage ended compared to other populations encountered in the author's clinical experience as a massage therapist. These observations suggest that for participants in the current study, and for people with schizophrenia more generally, it may be more difficult and take longer to learn to receive massage therapy in a beneficial way when compared to other populations.

Future Research Directions and Conclusions

As stated in the introduction, there is a need for research investigating massage therapy for mental health symptoms in general. Future research directions which specifically relate to the results of the current study are testing Moyer's ideas (2008) regarding learning to receive massage therapy, and investigating massage therapy as a tool to alleviate anxiety related auditory hallucinations.

Moyer's theory (2008) that the benefits of massage therapy increase as the person learns how to receive it has not been tested in research. Future studies could test

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whether prior massage experience predicts the effect size of a massage therapy intervention or could measure dependent variables after each massage therapy session rather than at the end of a series of massages to enable a comparison of effect sizes at each time point.

Future studies could also investigate whether adding instructions or exercises to the massage therapy assists the process of learning to receive massage in a more beneficial way. Comparing the effect size of massage alone to an intervention combining additional instructions from the massage therapy such as asking the person to focus on body sensations or to let go of muscle contraction, could test potential ways to enhance the efficacy of a massage therapy intervention. Such instructions might prove to be particularly helpful for people with schizophrenia.

The finding that two participants in the study experienced a decrease in the frequency and intensity of their voices following massage therapy was unexpected and presents a new possible application of massage for people with schizophrenia. Future research could investigate massage therapy as an alternative or complementary therapy to the psychotherapy intervention described by Slade (1976) for the treatment of anxiety related auditory hallucinations.

Quantitative results from the current study generally did not support massage therapy as a beneficial intervention for people with schizophrenia. However, qualitative data suggests some benefits were subjectively experienced by participants. Future studies which build upon the findings and suggestions of the current study should continue to investigate massage therapy for this population.

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MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA**Appendix A****Massage safety screening questionnaire**

Do any of the following symptoms or conditions apply to you? (please circle)

Pregnancy	Any contagious disease
Cold/Flu/Fever	Any skin conditions (rashes, eczema, fungal infections etc)
Headaches/migraines	Broken bones (past or present)
Asthma	Any other injury (sprains, strains etc)
High or low blood pressure	Recent surgery
A cardiac condition	Numbness/tingling
Diabetes	Spinal or back problems (past or present)
Arthritis	
Osteoporosis	
Varicose Veins	
HIV/AIDS	

Do you have any other conditions which might affect the massage?

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Appendix B: Information sheet and Consent Form

Information Sheet

Title of the investigation: The Efficacy of Massage Therapy for people with Schizophrenia

Investigators: Dr Greg Hannan: Senior Lecturer

Dr Raimondo Bruno: Lecturer

Rebecca Urie: Master of Clinical Psychology student

You are invited to take part in a study examining whether massage therapy might be beneficial for people with schizophrenia. This study aims to investigate whether massage has a beneficial effect on blood pressure, the side effects of antipsychotic medications such as muscle tension and tremors, and on areas related to quality of life such as ratings of mental and physical wellbeing. By participating you will be helping build the scientific understanding of the effect of massage therapy for people with schizophrenia and will therefore be helping to establish whether massage should be available in mental health settings.

What does the study involve? What will I be asked to do?

Participants in this study will be asked to come to four assessment sessions and receive eight 30 minute massages. This will occur over a period of 3 months.

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In the first session, you will be asked questions about your medical history, your experiences of schizophrenia, and any symptoms or feelings you have been having recently. You will also be asked to do things such as walk, turn and stand still, have your blood pressure taken, and answer written questions about your age and sex, the medications you are currently taking, and your current level of physical and mental wellbeing. This session is expected to last between 1 and 1 ½ hours.

At the end of this session the researcher will ask your permission to speak with one of your support workers about things they've noticed about you, such as how much you like to participate in activities, whether you're generally a calm person or if you tend to get frustrated and angry, and how well you manage with things such as dressing and washing yourself. If you agree, the researcher will ask you to sign a consent form. If you do not wish for this to happen, this wish will be respected and you will still be able to participate in the study.

The remaining 3 assessment sessions will use only some of the measures from the first assessment and so will be shorter, taking 30-40 minutes.

After your 2nd assessment session, you will receive your first massage. This will take place in a private room. You will be left alone to undress down to your underwear, lay face down on a massage table and cover yourself with a towel. The massage therapist will then come back into the room and use massage oil to massage your back, arms, the back and front of your legs and your neck. You will be covered with a towel throughout the massage and only the body part being massaged will be exposed. If the pressure is too light or too deep you will be able to let your massage therapist know, and they will adjust to suit your level of comfort. You will also be able to stop the massage

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at any time if you become uncomfortable. You will receive a total of 8 massages, which will be given to you twice a week for 4 weeks.

At the end of your last massage you will again be asked to complete the 30-40 minutes of measurement tasks. 4 weeks after this, the researcher will come and ask you to complete the measures for the last time. All the massage and assessments will occur at your residential facility.

Who can take part?

For you to participate, you must be over 18 years old, have a diagnosis of schizophrenia, and feel comfortable with receiving massage. People who have recently changed the type or dosage of their psychiatric medication or who are likely to change the type or dosage of their medication in the near future are asked not to participate. If you are unsure whether you meet these requirements you can talk to either the researchers of this study or to an appropriate member of staff at your care facility.

Are there any risks from taking part?

Based on past massage therapy research, it is expected that participation in this study will be comfortable and enjoyable for you.

However there are two areas of this study which have the potential to cause you some discomfort.

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The interview about your medical history and recent feelings or symptoms may cover quite personal and sensitive issues. To get a better understanding of how massage therapy may benefit schizophrenia, it is important to get a clear understanding of your experiences with schizophrenia. However, you do not have to answer any questions that make you feel uncomfortable. If you feel upset at any time and wish to temporarily stop the interview, or stop the interview completely, you can let the interviewer know, and the interview will be stopped straight away, without hurting your relationship with the researchers, the University or your health services.

Although very unlikely, for some people receiving massage can make them feel uncomfortable, or can bring up unexpected emotions. While seeing a massage therapist can be beneficial even for people who are uncomfortable with being touched, for the purposes of this study if you think that receiving massage therapy is likely to make you uncomfortable or is likely to bring up strong emotions for you, we would ask you not to participate. However, if you decide to participate and do experience discomfort or strong emotions, you do not have to continue with the massage. You can stop the massage either temporarily or permanently and there will be no negative consequences to your relationship with the researchers, the University, or with your care facility.

Is my participation confidential?

All information collected will be kept confidential. The only exceptions to this would come if one of the researchers or massage therapists believed there was a serious risk of harm to you or someone else, that a child may be at risk of abuse or neglect or if they are ordered by a court to provide information. In addition, if you decide to participate, a member of staff will be told this to make sure it is safe for you to do so.

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However this staff member will only know that you wish to participate, they won't have access to the information you give during the study. All forms will be coded with a number in a way only known to the researchers and your name will not be recorded with any data. All information will only be available to the investigators listed on this form and stored in lockable cabinets within the School of Psychology at the University for at least five years. Once the data is no longer required it will be destroyed. If the study is published, it will not be able to identify any individual as information will only be reported in terms of group results.

Voluntary participation and withdrawal

Your participation is entirely voluntary. You have the right to withdraw at any stage without having to explain your reasons and without any negative effect on your relationship with the researchers, the university or your health services. You also have the right to withdraw your data from the study. This can be done at any point before the data analysis for the research project begins.

How can I access a copy of the results of the study?

A summary of the results will be available on the University of Tasmania, School of Psychology web page, at www.scieng.utas.edu.au/psychol once the study has been completed. Alternatively, a copy of the results of the study can be made available to you, by contacting the researchers at the details listed below.

Ethical Approval

This research project has been given ethical approval by the Human Research Ethics Committee (Tas) Network (Reference No H10247) If you have any concerns, questions or complaints with regard to the ethical conduct of this research, please

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contact the Executive Officer of the Human Research Ethics (Tasmania) Network, on 6226 7479 or human.ethics@utas.edu.au.

Contact Persons

This study is being undertaken by Rebecca Urie as part of the requirements for a Master in Clinical Psychology degree and is being supervised by Dr Greg Hannan and Dr Raimondo Bruno, who are both lecturers in the School of Psychology. If you have any further questions please contact Rebecca Urie, (e-mail: rurie@utas.edu.au, phone, 62262516, 0450417281), Dr Greg Hannan (Greg.Hannan@utas.edu.au, 62267520) or Dr Raimondo Bruno (Raimondo.Bruno@utas.edu.au, 6226 2240).

Thank you for your interest in this study. We hope you are willing to take part.

Dr Greg Hannan

Dr Raimondo Bruno

Rebecca Urie

MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Statement of Informed Consent

The Efficacy of Massage Therapy for people with Schizophrenia

I have read and understood the Information Sheet for this study.

I understand that participating in this study will involve approximately 3 hours of time answering verbal and written questions and 4 hours of receiving massage therapy and that this will take place over a period of 3 months.

I understand that some of the questions I will be asked will be about my experiences with schizophrenia, and that this might include questions about my medications, treatment history, and the symptoms or feelings I have had recently. I understand that I do not have to answer any questions I am not comfortable with, and that the interviewer will stop asking these questions if I ask.

I understand that during massage therapy sessions I will be asked to underdress down to my underwear and lie face down on a massage table. I understand that my privacy will be respected, that I will be left alone to undress and dress and that the draping of the towel will ensure that only the body part being massaged will be exposed. I understand that massage will be given to my back, arms, legs and neck. I understand that if I wish, the massage can be temporarily or permanently stopped at any time.

MESSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

I understand that all the information I supply to the researcher will be treated in a confidential manner, except if the researcher believes there is a serious risk of harm to me or to somebody else, or that a child may be at risk of abuse or neglect or if they are ordered by a court. I understand that all the information I give will be used only for the purposes of the research and that it will be securely stored in the School of Psychology for at least five (5) years after which time it will be shredded or deleted.

I agree that research data gathered from this study can be published as long as I cannot be personally identified as a participant.

All questions that I have asked have been answered to my satisfaction.

I agree to participate in this investigation and understand that I am free to withdraw at any time without penalty or prejudicing my relationship with the University or my health service.

Name of Participant

Signature of Participant Date:/...../.....

Statement by investigator:

I have explained this project and the implications of participation in it to this volunteer and I believe that the consent is informed and that he/she understands the implications of participation

Name of investigator: Rebecca Urie

MESSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Signature of Investigator:.....

Date: .../...../.....

I also give permission for the researchers of this study to speak to staff member at Richmond Fellowship about how I am at Richmond Fellowship, such as how much they notice me participating in activities, how much time I like spending time with others compared to time by myself, and specific aspects of my mood and behavior such as whether I seem tense, relaxed, angry etc.

I understand that the researcher will only ask questions that specifically relate the current study.

I understand that this is optional, and that if I don't want this to happen I can still participate in the study

I give my permission for the researchers to talk to a member of staff about me

(please tick the appropriate box)

Yes

☐
☐

Signed: _____

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Appendix C: Massage Procedure

The portable massage table was covered with a large sheet then towels. A pillow was placed as a foot rest. Massage oil was rested on the heater to warm.

Participants were left alone to undress down to their underwear, lie face down on the massage table and cover themselves with a towel.

On returning to the room, the massage therapist wrapped the participant in the sheet and, if necessary, covered them in a blanket to keep them warm. Areas not being massaged were covered in a towel and wrapped in the sheet. The wrapping was intended to keep the participant warm and induce feelings of security and comfort.

Participants were encouraged to keep conversation to a minimum to ensure they were able to focus on the massage. If necessary, repeated prompts were given for participants who found it difficult not to talk during massages to try and relax, and to be still and quiet so they could focus on the massage.

Pressure varied from gliding strokes which were done with light-moderate pressure, to moderate-deep pressure applied to specific areas of tension in the tops of the gluteals. However, as the overall effect of the massage was intended to stimulate a parasympathetic response, pressure was reduced if the participant indicated that it was uncomfortable.

MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

With participant prone (15min):

While the participant was still covered by the sheet and towels, the massage therapist placed their right hand on the participant's sacrum and their left hand on the occipital ridge. This was to introduce the participant to the experience of touch. The participants hips were then gently rocked back and forth using palm pressure of the right hand on the sacrum.

The towel was removed from the back and oil applied.

Back:

Long gliding strokes to the back (2min)

Kneading and friction to the shoulder area and upper arms then general kneading to the back muscles (3min)

Kneading and pressure was applied to the upper gluteal muscle area, including application of pressure to specific points where muscle tightness or tender points are noted until the muscles relax (2min)

Friction to tight tendons (1min)

Thigh:

Kneading and friction to the hamstrings (2min)

MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Calf:

Kneading and friction to the back of the calf with emphasis on the Achilles tendon, attending to tight areas or tender points found (2min)

Feet:

General kneading of the feet

With the knee slightly bent, the foot was flexed towards the back of the calf (2min)

With the person supine (15min):

A soft piece of cloth was placed over participants' eyes to keep out light and encourage them to continue relaxing while lying supine.

Thigh:

Friction and pressure to the front, upper thigh area (2min)

Friction to the small muscles focused just above the knee (1min)

Lower leg:

Stretching (longitudinal and traverse) and small finger kneading of the underside of the leg (2min)

Feet:

Kneading the foot followed by flexing the foot to stretch the Achilles tendon (1min)

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Range of motion:

Taking each joint (hips, knees, ankles) into flexion and lightly into other ranges of motion (2min)

Hands:

Kneading the hands and fingers (1min)

Forearms:

Kneading and friction to tendons and muscles (1min)

Upper arms:

Kneading and friction to biceps and triceps (2min)

Neck:

Gentle squeezing of muscles immediately inferior to the hairline and moderate pressure, using caution to avoid the major blood vessels (1min)

Face:

Circular finger tip kneading to the face, especially the forehead, under the eyes (all around the eyes) and around the jaw (1min)

Head:

Scalp kneading (i.e. “shampooing”) 1 min

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Appendix D

Examples of ClinTools output

Reliable & Clinical Change Generator

Study Details

Study / Client Identifier: participant 1
 Assessment Details: baseline to post treatment
 Measurement Device: Sf36v2Mental ComponentSummary
 Time 1 Score: 22.69
 Time 2 Score: 22.14
 Test-retest reliability of measurement device: 0.68
 Standard deviation of sample used to estimate reliability of device: 10.17
 Clinical Sample Mean: 36.43
 Clinical Sample Standard Deviation: 8.55
 Normal Sample Mean: 50.01
 Normal Sample Standard Deviation: 9.88

Standard error of measurement: 5.75302
 Standard error of the difference: 8.136

In order to change with:

68.26% confidence (1sd), there must be a change of at least: 8.136
 95% confidence (1.96 sd), there must be a change of at least: 15.94627
 99% confidence (2.58 sd), there must be a change of at least: 20.95695

Your client's score of -0.5500000000000001 suggests that he / she:
 Has NOT changed with at least 68.26% confidence.
 Has NOT changed with at least 95% confidence.
 Has NOT changed with at least 99% confidence.

Clinical Cut-Offs

*This Programme has computed that:
 It appears that normative samples score higher. Therefore, an increase in scores over time equates to improvement.
 This programme has made the necessary adjustments to the clinical change computations*

A). 1.96 standard deviations away from the clinical mean is: 53.188

So, has the client reliably changed (with at least 95% confidence) AND changed from being within 1.96 standard deviations of the clinical mean to now being 1.96 standard deviations away from the clinical mean?

Some Criteria Were Not Met

B). 1.96 standard deviations away from the normal mean is: 30.6452

So, has the client reliably changed (with at least 95% confidence) AND changed from being more than 1.96 standard deviations away the normal mean to now being within 1.96 standard deviations of the normal mean?

Some Criteria Were Not Met

C). Mid-way between the clinical and normal distributions is: 42.73

So, has the client reliably changed (with at least 95% confidence) AND changed clinical status according to the intersection of the clinical and normal distributions?

Some Criteria Were Not Met

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MESSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Reliable & Clinical Change Generator

Study Details

Study / Client Identifier: participant 1

Assessment Details:

Measurement Device: sf36v2Physical Component Summary

Time 1 Score: 21.57

Time 2 Score: 22.72

Test-retest reliability of measurement device: 0.86

Standard deviation of sample used to estimate reliability of device: 9.7

Clinical Sample Mean: 47.77

Clinical Sample Standard Deviation: 8.76

Normal Sample Mean: 49.79

Normal Sample Standard Deviation: 10.33

Standard error of measurement: 3.62941

Standard error of the difference: 5.13276

In order to change with:

68.26% confidence (1sd), there must be a change of at least: 5.133

95% confidence (1.96 sd), there must be a change of at least: 10.06002

99% confidence (2.58 sd), there must be a change of at least: 13.22111

Your client's score of 1.15 suggests that he / she:

Has NOT changed with at least 68.26% confidence.

Has NOT changed with at least 95% confidence.

Has NOT changed with at least 99% confidence.

Clinical Cut-Offs

This Programme has computed that:

It appears that normative samples score higher. Therefore, an increase in scores over time equates to improvement

This programme has made the necessary adjustments to the clinical change computations

A) 1.96 standard deviations away from the clinical mean is: 64.9396

So, has the client reliably changed (with at least 95% confidence) AND changed from being within 1.96 standard deviations of the clinical mean to now being 1.96 standard deviations away from the clinical mean?

Some Criteria Were Not Met

B). 1.96 standard deviations away from the normal mean is: 29.5432

So, has the client reliably changed (with at least 95% confidence) AND changed from being more than 1.96 standard deviations away the normal mean to now being within 1.96 standard deviations of the normal mean?

Some Criteria Were Not Met

C). Mid-way between the clinical and normal distributions is: 48.69694

So, has the client reliably changed (with at least 95% confidence) AND changed clinical status according to the intersection of the clinical and normal distributions?

Some Criteria Were Not Met

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MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Reliable & Clinical Change Generator

Study Details

Study / Client Identifier: participant 1
 Assessment Details: baseline to post treatment
 Measurement Device: WHOQOL Question1
 Time 1 Score: 4
 Time 2 Score: 2
 Test-retest reliability of measurement device: 0.57
 Standard deviation of sample used to estimate reliability of device: 0.8
 Clinical Sample Mean: 3.9
 Clinical Sample Standard Deviation: 0.57
 Normal Sample Mean: 4.3
 Normal Sample Standard Deviation: 0.8

 Standard error of measurement: 0.5246
 Standard error of the difference: 0.74189

In order to change with:

68.26% confidence (1sd), there must be a change of at least: 0.742
 95% confidence (1.96 sd), there must be a change of at least: 1.45408
 99% confidence (2.58 sd), there must be a change of at least: 1.91098

Your client's score of -2 suggests that he / she:

HAS changed with at least 68.26% confidence.
 HAS changed with at least 95% confidence.
 HAS changed with at least 99% confidence.

Clinical Cut-Offs

*This Programme has computed that:
 It appears that normative samples score higher. Therefore, an increase in scores over time equates to improvement.
 This programme has made the necessary adjustments to the clinical change computations.*

A). 1.96 standard deviations away from the clinical mean is: 5.0172

So, has the client reliably changed (with at least 95% confidence) AND changed from being within 1.96 standard deviations of the clinical mean to now being 1.96 standard deviations away from the clinical mean?

Some Criteria Were Not Met

B). 1.96 standard deviations away from the normal mean is: 2.732

So, has the client reliably changed (with at least 95% confidence) AND changed from being more than 1.96 standard deviations away the normal mean to now being within 1.96 standard deviations of the normal mean?

Some Criteria Were Not Met

C). Mid-way between the clinical and normal distributions is: 4.06642

So, has the client reliably changed (with at least 95% confidence) AND changed clinical status according to the intersection of the clinical and normal distributions?

Some Criteria Were Not Met

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MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Reliable & Clinical Change Generator

Study Details

Study / Client Identifier: participant 1
 Assessment Details: baseline to post treatment
 Measurement Device: WHOQOL Question2
 Time 1 Score: 2.5
 Time 2 Score: 2
 Test-retest reliability of measurement device: 0.67
 Standard deviation of sample used to estimate reliability of device: 0.9
 Clinical Sample Mean: 3.5
 Clinical Sample Standard Deviation: 0.78
 Normal Sample Mean: 3.6
 Normal Sample Standard Deviation: 0.9

Standard error of measurement: 0.51701
 Standard error of the difference: 0.73116

In order to change with.

68.26% confidence (1sd), there must be a change of at least: 0.731
 95% confidence (1.96 sd), there must be a change of at least: 1.43305
 99% confidence (2.58 sd), there must be a change of at least: 1.88335

Your client's score of -0.5 suggests that he / she:
 Has NOT changed with at least 68.26% confidence.
 Has NOT changed with at least 95% confidence.
 Has NOT changed with at least 99% confidence.

Clinical Cut-Offs

*This Programme has computed that,
 it appears that normative samples score higher. Therefore, an increase in scores over time equates to improvement.
 This programme has made the necessary adjustments to the clinical change computations*

- A). 1.96 standard deviations away from the clinical mean is: 5.0288
 So, has the client reliably changed (with at least 95% confidence) AND changed from being within 1.96 standard deviations of the clinical mean to now being 1.96 standard deviations away from the clinical mean?

Some Criteria Were Not Met

- B). 1.96 standard deviations away from the normal mean is: 1.836
 So, has the client reliably changed (with at least 95% confidence) AND changed from being more than 1.96 standard deviations away the normal mean to now being within 1.96 standard deviations of the normal mean?

Some Criteria Were Not Met

- C). Mid-way between the clinical and normal distributions is: 3.54643
 So, has the client reliably changed (with at least 95% confidence) AND changed clinical status according to the intersection of the clinical and normal distributions?

Some Criteria Were Not Met

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MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Reliable & Clinical Change Generator

Study Details

Study / Client Identifier: participant 4
 Assessment Details: baseline to post treatment
 Measurement Device: SAS
 Time 1 Score: 0.2
 Time 2 Score: 0.6
 Test-retest reliability of measurement device: 0.86
 Standard deviation of sample used to estimate reliability of device: 0.24
 Clinical Sample Mean:
 Clinical Sample Standard Deviation:
 Normal Sample Mean:
 Normal Sample Standard Deviation:

Standard error of measurement:
 Standard error of the difference:

In order to change with:
 68.26% confidence (1sd), there must be a change of at least:
 95% confidence (1.96 sd), there must be a change of at least:
 99% confidence (2.58 sd), there must be a change of at least:

Your client's score of suggests that he / she:
 changed with at least 68.26% confidence.
 changed with at least 95% confidence.
 changed with at least 99% confidence.

Clinical Cut-Offs

This Programme has computed that:

- A). *1.96 standard deviations away from the clinical mean is:*
 So, has the client reliably changed (with at least 95% confidence) AND changed from being within 1.96 standard deviations of the clinical mean to now being 1.96 standard deviations away from the clinical mean?
- B). *1.96 standard deviations away from the normal mean is:*
 So, has the client reliably changed (with at least 95% confidence) AND changed from being more than 1.96 standard deviations away the normal mean to now being within 1.96 standard deviations of the normal mean?
- C). *Mid-way between the clinical and normal distributions is:*
 So, has the client reliably changed (with at least 95% confidence) AND changed clinical status according to the intersection of the clinical and normal distributions?

MASSAGE THERAPY FOR PEOPLE WITH SCHIZOPHRENIA

Reliable & Clinical Change Generator

Study Details

Study / Client Identifier: participant 4
 Assessment Details: baseline to post treatment
 Measurement Device: AIMS
 Time 1 Score: 5
 Time 2 Score: 2
 Test-retest reliability of measurement device: 0.7
 Standard deviation of sample used to estimate reliability of device: 1.37
 Clinical Sample Mean:
 Clinical Sample Standard Deviation:
 Normal Sample Mean:
 Normal Sample Standard Deviation:

 Standard error of measurement: 0.75038
 Standard error of the difference: 1.0612

In order to change with:

68.26% confidence (1sd), there must be a change of at least: 1.061
 95% confidence (1.96 sd), there must be a change of at least: 2.07991
 99% confidence (2.58 sd), there must be a change of at least: 2.73346

Your client's score of -3 suggests that he / she:

HAS changed with at least 68.26% confidence.
 HAS changed with at least 95% confidence.
 HAS changed with at least 99% confidence.

Clinical Cut-Offs

This Programme has computed that:

Not all clinical change statistics can be computed as the necessary data have not been entered

A). 1.96 standard deviations away from the clinical mean is:

So, has the client reliably changed (with at least 95% confidence) AND changed from being within 1.96 standard deviations of the clinical mean to now being 1.96 standard deviations away from the clinical mean?

B). 1.96 standard deviations away from the normal mean is:

So, has the client reliably changed (with at least 95% confidence) AND changed from being more than 1.96 standard deviations away the normal mean to now being within 1.96 standard deviations of the normal mean?

C). Mid-way between the clinical and normal distributions is:

So, has the client reliably changed (with at least 95% confidence) AND changed clinical status according to the intersection of the clinical and normal distributions?

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