



OJNI INVITED ARTICLE

Complementary Alternative Care for Persons with Schizophrenia - Living in the Community: A Pilot Study

**Phyllis M. Connolly PhD, PMHCNS-BC, Mark C. Crider, PhD, MSN, RN,
Ronald Henninger, D.C., D.A.B.C.O. and Carol Irwin D.C.**

Citation:

[Connolly, P., Crider, M., Henninger, R. & Irwin, C. \(October, 2009\). Complementary Alternative Care for Persons with Schizophrenia Living in the Community: A Pilot Study. Online Journal of Nursing Informatics \(OJNI\), 13, \(3\). Available at http://ojni.org/13_3/Connolly_Crider_Henninger_Irwin.pdf](http://ojni.org/13_3/Connolly_Crider_Henninger_Irwin.pdf)

Editor in Chief's Note:

This article was invited for inclusion in OJNI since these nurses used the Omaha System and other tools such as SPSS to engage in interdisciplinary research to improve patient care.

ABSTRACT

This interdisciplinary pilot project between Chiropractic medicine and Nursing offered Complementary Alternative Medicine (CAM), chiropractic care to clients with Schizophrenia or Schizoaffective Disorder.





OJNI

INVITED
ARTICLE

Research Questions:

1. Does the application of chiropractic care improve the Quality of Life and perceived general health based on the SF-12v2 Health Survey?
2. Is the medication side effect of Tardive Dyskinesia (TD) present?
3. Are participants at risk for cardiometabolic syndrome?
4. Are participants at risk for hypertension?
5. What are the Omaha System problems?

Five participants between the ages of 18 and 65 participated: No statistically significant difference was found (p value = .14), in pre post t-test scores. Qualitative statements indicated a perception of improved health. No TD was present, and 80% were at risk for cardiometabolic syndrome and two, pre-hypertension. The Omaha System problems were Nutrition, Neuro-Musculo-Skeletal, Medication Regimen, Pain, Circulation, Sleep and Rest Patterns, Physical Activity, and Substance Use (smoking).





OJNI

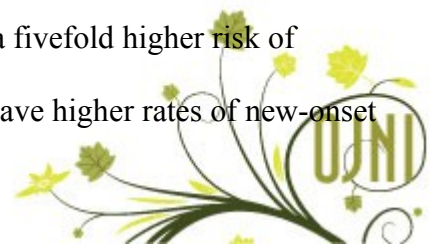
**INVITED
ARTICLE**

The purpose of the interdisciplinary collaborative pilot study between Chiropractic medicine and Nursing was to offer Complementary Alternative Medicine (CAM), chiropractic care, spinal manipulation, to clients diagnosed with Schizophrenia DSM-IV-TR 295, or Schizoaffective Disorder, DSM-IV-TR 295.70 by two Doctors of Chiropractic. Clients were screened by nursing for hypertension, tardive dyskinesia, cardiometabolic risk and common Omaha System problems.

Rationale for focusing on the population of interest

The mentally ill have been traditionally underserved and the health care services rendered have been crisis driven. Traditionally patients with Schizophrenia are hospitalized, may become homeless, or in various stages of recovery (Schultz, North & Shields, 2007; USDHHS, 1999). The devastating affect of mental illness, having lasted in some cases as much as decades, have robbed the client of many opportunities for gainful employment, adequate housing and a meaningful quality of life. New models of treatment need to be explored.

The surgeon General's report of 1999 states that, mental-health clients often have limited access to necessary health services, suffer from chronic physical problems, frequently neglect physiological problems because their psychiatric diagnosis interferes with appropriate identification and treatment (USDHHS, 1999). The mortality rate for persons with schizophrenia is four times higher than the prevalent rate for the general population; they have a fivefold higher risk of myocardial infarction; a higher risk for cardiovascular disease and have higher rates of new-onset





OJNI

INVITED ARTICLE

diabetes than that of the general population (Chafetz, et al. 2005; Chwastiak et al. 2006; Enger et al. 2004; Mitchell & Malone, 2006; Muir-Cochrane, 2006; Salokangas, 2007). Furthermore, the prevalence of the metabolic syndrome is higher among patients receiving second-generation antipsychotics (Lamberti et al. 2006; Straker et al. 2005). Chafetz et al. (2006) found that physical functioning for persons with a diagnosis of schizophrenia was significantly less than the normed group and that the decline started as early as the age of 25. The extrapyramidal side effects of the antipsychotic medications are physically noticeable. Sedation, muscle stiffness, akathisia, (Foster, Miller & Buckley, 2007; Sachdev, 2005) and pain further stigmatize patients by causing them to limit social interaction and participation in activities that others do freely (Artaloytia et al. 2006). Furthermore, side effects of the antipsychotic medications frequently leads to lack of adherence to treatment plans (Byerly, Nakonezn, & Lescouflair, 2007; Stawar, Allred, 1999).

The School of Nursing's Nurse Managed Centers involved with this study have a long history of providing services for persons with serious mental illnesses living in the community. Moreover, Omaha Outcome ratings have been collected and demonstrated statistically significant improvements from services provided by students and faculty (Barrera, Machanga, Connolly, & Yoder, 2003; Canham, Mao, Yoder, Connolly & Dietz, 2008; Connolly, & Elfrink, 2002; Connolly, Huynh, & Gorney-Moreno, 1999; Connolly, Mao, Yoder, & Canham, 2006; Connolly, & Novak, 2000). Thus, inclusion of the Omaha System for this study was relevant.

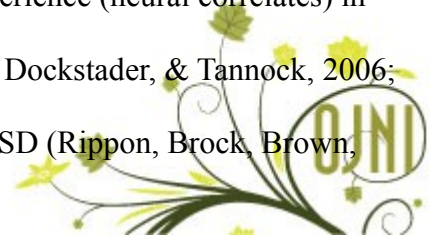




OJNI INVITED ARTICLE

Many who suffer from mental health problems also suffer from musculoskeletal conditions that respond well to chiropractic care (Mamtani & Cimitino, 2002). Moreover, outcome measures have indicated a decrease in pain and improved quality of life with chiropractic care (Secor, Blumberg, Markow, MacKenzie, & Thrall, 2004).

Chiropractic intervention is mainly directed to areas of spinal motion segment dysfunction, or chiropractic subluxations. Although most chiropractic patients seek chiropractic care for their musculoskeletal problems, they occasionally report nonmusculoskeletal responses to chiropractic care (Leboeuf-Yde et al., 1999; Leboeuf-Yde et al., 2005). Nonmusculoskeletal complaints have been reported to account for up to eight to ten percent of the chief complaints to chiropractors (Hawk, Long & Boulanger, 2001). Hartvigsen et al. (2003) found that most chiropractors are likely to see no more than three percent of present complaints being nonmusculoskeletal in nature; however, this may differ from one region to another (Leboeuf-Yde et al., 2005). Some of these complaints are neurological or psychological disorders that are closely associated with brain function, and in particular, activity in the cerebral cortices. Examples of such disorders include; attention deficit hyperactivity disorder (ADHD), autistic spectrum disorder (ASD), depression, anxiety, epilepsy and seizure disorders. Indeed, researchers have found electroneurophysiological states assumed by subsystems of the brain which correlate with specific content of experience (neural correlates) in many of these conditions and disorders, including: ADHD, (Toplak, Dockstader, & Tannock, 2006; Dickstein, S. G., Bannon, K., Casellanos, F. X., & Milham, 2006) ASD (Rippon, Brock, Brown,





OJNI

INVITED ARTICLE

Boucher, 2007), and depression disorder (Fernandez, et al. 2005).

How the Intervention Might Work

Information from somatosensory receptors is carried by primary sensory neurons, whose cell bodies are situated in the dorsal root ganglion (DRG). Axons enter the spinal cord via the dorsal horn and form branches that either terminate within the spinal gray matter (local branches), or ascend in the spinal cord before synapsing with second-order sensory neurons in the brain stem or diencephalon (ascending branches) (Kandel, Schwartz, & Jessell, 2000). While the local branches are known to activate local reflex circuits, ascending branches carry information to the brain (Kandel, Schwartz, & Jessell, 2000). Plasticity in the spinal cord is known to be activity dependent and to occur throughout life (Wolpaw & Tennissen, 2001). Furthermore, the spinal manipulation may reduce blood pressure (Bakris et al. 2007).

It is theorized that spinal motion segment hypomobility causes a reduction in mechanoreceptor input and increase in nociceptor input, and this imbalance in afferent input is referred to as dysaffrentation (Seaman & Winterstein, 1998). The clinical term applied by chiropractors to hypomobile spinal motion segments exhibiting dysaffrentation is “subluxation” (Vernon & Mrozek, 2005). Furthermore, Bakkum et al. (2007) has recently shown that chronic vertebral hypomobility indeed results in neuroplastic change within the spinal cord. Melzack and





OJNI

INVITED ARTICLE

Wall (1965) introduced the gate control theory, which describes how mechanoreceptor input can inhibit the response of the dorsal horn to nociceptor input. In a study on rats, Steinmetz et al. (1982) demonstrated that intense afferent input causes increase in neural excitability that persists for several hours. In one study by Terrett and Vernon, (1984) a reduction in pain sensitivity was demonstrated following SMT. Chiropractic SMT has indeed been shown to induce a barrage of mechanoreceptive afferent inputs, originating mainly from muscle spindle receptors and Golgi tendon organs, to the dorsal horn and spinal cord (Colloca et al., 2000; Pickar & Wheeler, 2001).

Research Questions

1. Does the application of chiropractic care improve the Quality of Life as measured by the SF-12v2 Health Survey (Quality Metric, Inc., Lincoln, RI) general health questionnaire (Ware et al., 2002) after 6 sessions?
2. Is the psychotropic medication side effect of Tardive Dyskinesia (TD) present among the participants?
3. Are the participants at risk for cardiometabolic syndrome?
4. Are participants at risk for hypertension?
5. What are the Omaha System problems of the participants?





OJNI

INVITED
ARTICLE

METHODS

The research design for this study was a quasi- experimental pre and post test design. There was no control or comparison group. The intervention, chiropractic care consisting of spinal manipulation was applied to a group of voluntary subjects diagnosed with Schizophrenia DSM-IV-TR 295 or Schizoaffective Disorder, DSM-IV-TR 295.70 (APA, 2000) for 6 weekly sessions.

Subjects

Five participants receiving psychiatric/mental health care diagnosed with Schizophrenia (DSM-IV-TR 295) or Schizoaffective Disorder, DSM-IV-TR 295.70 between the ages of 18 and 65 were selected for the study. Clients who were conserved were excluded as well as clients who were not receiving medical management and prescribed medications.

Procedure for Selecting Subjects

After obtaining approval of the Institutional Review Board of San Jose State University the feasibility study was conducted during April and May 2008. The participants were recruited through the National Alliance on Mental Illness (NAMI) of The Santa Clara County; San Mateo County NAMI, and Santa Cruz NAMI; Asian Americans for Community Involvement (ACCI); Consumer Self-Help Groups in Santa Clara County in California. The NAMI Newsletter and Meetings were





OJNI

INVITED ARTICLE

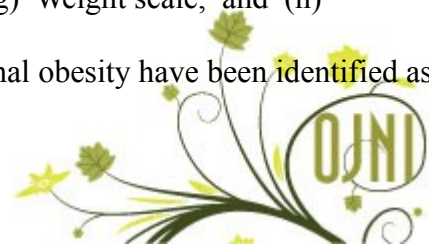
used to recruit clients using flyers and oral presentations. Potential participants were interviewed by phone by one of the Chiropractors.

Description of the Intervention

Chiropractic spinal manipulative therapy (SMT) typically consists of a high-velocity and low-amplitude (HVLA) thrust directed to areas of spinal motion segment dysfunction or hypomobility (Vernon & Mrozek, 2005). The positive effect of SMT on musculoskeletal conditions, in particular those related to the spinal column, is well documented in chiropractic literature (Hawk, Long & Boulanger, 2001; Hurwitz et al., 1996; Leboeuf-Yde et al. 1999; Leboeuf-Yde et al. 2005). Chiropractic intervention is not restricted to SMT, but consists of a range of other therapeutic modalities such as: joint mobilizations, soft tissue techniques, and cryotherapy, to name a few (Hoskins et al, 2006).

Materials and Devices

Several survey instruments were used for this study including: (a) SF-12v2TM Health Survey (Ware et al. 2002), (b) Omaha System Assessment (Martin, 2005), (c) Health Questionnaire, (d) Abnormal Involuntary Movement Scale (AIMS), (e) Chiropractic assessment tools, (f) Sphygmomanometer cuffs (blood pressure cuff) and stethoscopes, (g) Weight scale, and (h) Measuring tape. Although fasting blood glucose along with abdominal obesity have been identified as





OJNI

INVITED ARTICLE

cost-effective screening for high risk cardiovascular morbidity (Straker et al. 2005). Furthermore, given the population all attempts were made to keep the requirements for the participants and engagement in the study reasonable. Requesting participants to submit to a fasting blood glucose before engaging in the study did not seem reasonable. All participants that were at risk were referred for further medical evaluations recommending fasting blood glucose at their next medical examination with their primary physicians. It has been the experience of the researchers that if too many demands are made of the population (persons with schizophrenia or schizoaffective disorders), that they are much more likely to drop out of programs.

Procedures

Potential subjects were interviewed by phone and in person for acceptability into the study. The interview consisted of an explanation of the purpose of the study, the qualifications to be in the study, the length of the time of the study, approximate date that it would begin and if they were interested in participating. If they qualified and also wanted to participate they were added to the list of prospective subjects. Two weeks before the start of the study intake forms and a letter were sent to the participants as to the start date of their care for the study and what they needed to bring. The intake form requested information concerning the reason they were seeking chiropractic care, the history of their mental illness, other medical history, and a list of the medications and dosages they were currently taking. This form further assisted in determining eligibility for acceptance into the





OJNI INVITED ARTICLE

study.

Once subjects were assessed to meet the criteria for inclusion, they met at a local behavioral health agency and were given an overview of the study and they signed three consents: (a) SJSU General Research Consent form, (b) the SJSU School of Nursing, Nurse Managed Center Consent, and (c) the Chiropractic Consent. Participants completed the SF-12v2TM Health Survey (2002) and were assessed by one of the nurse researchers on the AIMS; weights, heights, blood pressure, and waist measurements were obtained, as well as a general health assessment. The Omaha System Problem assessment for Neuro-Musculo-Skeletal, Medication Regimen, Pain, Circulation, Sleep and Rest Patterns, Physical Activity, Substance Use and Nutrition was completed. Patients were then assigned to a chiropractor, taking into account personal preference, schedules, and availability.

The chiropractor reviewed the intake forms, followed by taking a history of the participant's chief complaint and any other medical history pertinent to their chief complaint. An exam was performed to evaluate the chief complaint. The elements of this exam were inspection, range of motion, palpation, appropriate orthopedic and neurological testing. A diagnosis and treatment recommendations were determined and discussed along with the risks and benefits of chiropractic care. The patient then signed an informed consent to treat. Treatment was initiated at this time and future appointments were scheduled.





OJNI

INVITED
ARTICLE

The documentation of the subluxation used in this feasibility study consisted of the four components commonly called the PART system. At least two of the four components must be present and at least one of the asymmetry/misalignment and or range of motion abnormality must be present. The four components of PART are PAIN AND TENDERNESS, ASYMMETRY/MISALIGNMENT, RANGE OF MOTION ABNORMALITY, and TISSUE, TONE CHANGES. This study did not utilize x-ray examination. The subluxation was documented by physical examination and verbal responses from the patient.

Results and Data Analysis

Five participants started the study; one male dropped out after the first treatment. They ranged in age from 26 to 55 years; 3 were males and 2 were females. They were all Caucasian and lived within the County. They all completed the pre test, SF-12v2® Health Survey. The SF-12v2® Health Survey is a validated 12-question quality-of-life measurement tool (Ware et al., 2002). Four participants completed the post test after 6 weekly sessions with the chiropractor. The survey was self-administered; it was easy to comprehend, and only requires approximately 5 minutes to complete. The survey provides scores in 8 subscales: Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional, and Mental Health. The 8 subscales comprise 2 general categories: Physical Health (Physical Component Summary) and Mental Health (Mental Component Summary).





OJNI INVITED ARTICLE

An SPSS data file was created from the completed surveys, and responses were coded as the scoring manual indicated. Frequency distribution tables were prepared for responses to each individual item and total pre and post scores. There was a gain in overall score and the variability of the scores at the post test was lower. In addition, a Wilcoxon test on the medians was computed because the assumption of normality was not met. No statistically significant difference was found (p value = .14) (quite likely due to small sample size) in terms of practical significance the change was indeed significant.

There were other unanticipated changes reported by the subjects by the second treatment reflected by the following comments:

“I look better and my self esteem is better.” “ I think that the chiropractic care helped me transition on my new meds. I didn’t have psychotic episodes. It was much easier this time.” “ I feel great, this is good stuff.” “ I usually sleep 10-12 hours per night, now I am sleeping 8 hours and have a lot more energy during the day.” “ After my stroke I wasn’t able to think clearly. It seems that after I get adjusted I am able to think clearly.” “ I was able to go on a 5 mile walk for the Breast Cancer Drive with my mother. This is the first time I ever went on a fund raiser.” “ I have been cleaning my house, first time in a long while.” “ I have been cleaning my place, even the bathroom.” “ I can’t remember ever being able to move my neck as far as I can now.”





OJNI INVITED ARTICLE

The second research question: *Is the psychotropic medication side effect of Tardive Dyskinesia (TD) present among the participants?* A recognized standard test the Abnormal Involuntary Movement Scale (AIMS) was administered by the nurse researchers. This particular group of participants did not have TD, a serious side effect of the medications they were taking, as evidenced by negative results of the AIMS Test. All 5 participants were negative for TD.

The third research question: *Are the participants at risk for cardiometabolic syndrome?* The body mass index (BMI) was computed for each participant and waist measurements were taken. All but one participant was at risk for cardiometabolic syndrome (http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/risk.htm). Participants were given this information and strongly urged to follow up with health care providers. Lifestyle changes for healthy nutrition and exercise such as walking were discussed and recommended for the participants. In some of the newer medications side effects may lead to metabolic illnesses, related to the increase of weight due to the increase in appetite.

The fourth research question: *Are participants at risk for hypertension?* Two of the five participants' blood pressures indicated that they were in the prehypertension category (http://www.nhlbi.nih.gov/health/dci/Diseases/Hbp/HBP_WhatIs.html). The two participants were given the results of the hypertension screening and encouraged to see their health care providers as soon as possible. Furthermore, recommendations about weight loss and increased activity were made.





OJNI

INVITED ARTICLE

In order to avoid the problem of differentiating the effect of the chiropractic intervention and life style changes of nutrition and exercise, which are recommended to reduce the risk factors for cardiometabolic syndrome, participants were provided referrals, and educational materials emphasizing the need for further follow up after completing the six chiropractic care sessions.

The fifth research question: *What are the Omaha System problems of the participants?* The most common problem was Nutrition, all but one participant had BMI's over 25 indicating obesity. Other problems were: Neuro-Musculo-Skeletal, Medication Regimen, Pain, Circulation, Sleep and Rest Patterns, Physical Activity, and Substance Use (smoking).

Limitations

The limitations of the pilot study include (a) small non-random sample, (b) lack of a control or comparison group, (c) sessions which were limited to 6, (d) QOL tool that may not have been appropriate for this specific sample, (e) treatment effectiveness that may have resulted from the therapeutic relationship between the participant and chiropractor rather than the spinal manipulation, and (f) lack of funding for the feasibility study.

Discussion and Recommendations for Future Research

The researchers are encouraged that with a larger random sample with a comparison group that there will be significant improvement in the QOL for participants. In addition, outcome measures





OJNI INVITED ARTICLE

which include the qualitative component need to be included to measure changes. Several measurement tools should be incorporated to evaluate the effectiveness of 10-12 sessions of chiropractic care for the participants. While there was improvement for participants with 6 sessions, best practice suggests that 10-12 sessions would yield better outcomes. After consultation with the statistician and concerns regarding the comparison of the results of the SF-12v2® Health Survey normed data with the population under study an additional search was completed. And, another Quality of Life tool which was developed specifically with persons with schizophrenia was identified. The Schizophrenia Quality of Life Scale (SQLS) (Wilkinson et al., 2000) will be used for future studies.

In addition, post test data should be collected to determine the effectiveness of the educational program on the conditions of blood pressure; pain; sleep and rest; mental health; and neuro-musculo skeletal as measured by the Outcome Rating Scale of the Omaha System. The Omaha System has been used extensively in research and has established reliability and validity (Bowles, 2005; Martin & Scheet, 1992; Martin, Scheet, & Stegman, 1993; Martin, Norris & Leak, 1998). These will provide additional measures of the results of the chiropractic care and nursing educational interventions.





OJNI

INVITED
ARTICLE

Improvement in Care in Nurse Managed Centers

As a result of the pilot study the assessment for cardiometabolic syndrome has been integrated into the Nurse Managed Centers as well as an education program focused on life style changes which will assist in decreasing the risk for cardiometabolic syndrome. An evidence based curriculum for client education is being developed as well as a possible pathway for all psych/mental health Nurse Managed Centers. Furthermore, referrals will continue to primary physicians or nurse practitioners for medical evaluation, and for treatment if necessary.

Conclusion

Professionals who intend to meet the needs of consumers, provide quality care, and be cost-effective need to develop interdisciplinary collaborative relationships (Connolly, 1995; Connolly & Novak, 2000). Thus this pilot study modeled an interdisciplinary collaboration of chiropractic professionals and nursing and has the potential to include other disciplines for future projects. An R21 was developed and submitted to the National Institute of Health Center for Alternative Medicine, while not funded, other funding sources may be explored. Clearly, the needs of people with psychiatric disabilities are complex and require the expertise of multiple disciplines; however, few opportunities exist for faculty or students to learn collaboration skills. Thus, this project has the potential to integrate undergraduate and graduate students into research.





OJNI

INVITED
ARTICLE

There may be an improvement in selected physical and mental health indicators as well as improved adherence with mental health treatment and a reduction in stress following chiropractic care, as well as cost-savings in health care. Furthermore, subjects may experience fewer side effects from psychotropic medications and may be encouraged to participate in volunteer opportunities or become gainfully employed. More interdisciplinary research is needed to study the outcomes of patients with Schizophrenia or Schizoaffective Disorder, subject to the use of Chiropractic, spinal manipulation.





OJNI INVITED ARTICLE

References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (Text revision, ed.). Washington, DC: APA.
- Artaloytia, J. F., Arango, C., Lahti, A., Sanz, J., Pascual, A., Cubero, P., Prieto, D., & Palamo, T. (2006). Negative signs and symptoms secondary to antipsychotics: A double-blind, randomized trial of a single dose of placebo, haloperidol, and risperidone in health volunteers. *American Journal of Psychiatry*, 163(3), 488-493.
- Bakkum, B. W., Henderson, C. N. R., Hong, S. P., & Cramer, G. D.,(2007). Preliminary morphological evidence that vertebral hypomobility induces synaptic plasticity in the spinal cord. *Journal of Manipulative Physiological Therapy*, 30(5), 336-342.
- Bakris, G., Dickholtiz, M., Meyer, P. M., Kravitz, G., Avery, E., Miller, M., Brown, J., Woodfeild, C., and Bell, B. (2007). Atlas vertebra realignment and achievement of arterial pressure goal in hypertensive patients. A pilot study. *Journal of Human Hypertension*, 21, 347-352,
- Barrera, C., Machanga, M., Connolly, P. M., & Yoder, M. (2003). Nursing care makes a difference: Application of the Omaha documentation system. *Outcomes Management*, 7(4),





OJNI INVITED ARTICLE

181- 185.

- Bowles, K. (2005). Use of the Omaha System in research. In K. S. Martin, *The Omaha System: A key to practice documentation. And information management* (2nd ed.) (pp. 105 – 136) St. Louis: Elsevier.
- Byerly, M.J., Nakonezn, P.A., & Lescouflair, E. (2007). Antipsychotic medication adherence in schizophrenia. *Psychiatric Clinics of North America*, 30, 437-452.
- Canham, D., Mao, C., Yoder, M., Connolly, P., & Dietz, E. (2008). The Omaha System and quality measurement in academic nurse-managed centers: Ten steps for implementation. *Journal of Nursing Education*, 47(3), 105-110.
- Chafetz, L., White, M. C., Collins-Bride, G. & Nickens, J. (2005). The poor general health of the severely mentally ill: Impact of schizophrenic diagnosis. *Community Mental Health Journal*, 41(2), 169-184).
- Chafetz, L., White, M. C., Collins-Bride, G. Nickens, J. & Cooper, B. A. (2006). Predictors of physical functioning among adults with severe mental illness. *Psychiatric Services*, 57(2), 225-231.
- Chwastiak, L. A., Rosenheck, R. A., McEvoy, J. P., Keefe, R. S., Swartz, M.S., &





OJNI INVITED ARTICLE

Lieberman, J. A. (2006). Interrelationships of psychiatric symptom severity, medical comorbidity, and functioning in schizophrenia. *Psychiatric Services*, 57(8), 1102-1109.

Colloca, D. J., Keller, T. S., Gunzburg, r., Vandeputte, K., & Fuhr, A. W. (2000).

Neurophysiologic response to intraoperative lumbosacral spinal manipulation. *Journal of Manipulative Physiological Therapy*, 23(7), 447-457.

Connolly, P. M., & Elfrink, V. (2002). Using information technology in community-

based psychiatric nursing education: The SJSU/NT project. *Home Health Care Management and Practice*, 14 (5), 344 – 352.

Connolly, P. M., Huynh, M. T., & Gorney-Moreno, M. J. (1999, Winter). On the cutting

edge or over the edge? Implementing the Nightingale Tracker. *On-Line Journal of Nursing Informatics* [On-Line], 3(1), Available: <http://www.eaa-knowledge.com/ojni/> .

Connolly, P. M., Mao, C., Yoder, M., & Canham, D. (2006). Evaluation of the Omaha

System in an academic nurse managed center. *Online Journal of Nursing Informatics*, 10(3) [online]. Available: http://eaa-knowledge.com/ojni/ni/10_3/connolly.htm

Connolly, P. M., & Novak, J. (2000) Teaching collaboration : A demonstration project.

Journal of American Psychiatric Nurses Association, 6(6),_183 -190.

Dickstein, S. G., Bannon, K., Castellanos, F. X., & Milham, M. P. (2006). The neural





OJNI INVITED ARTICLE

correlates of attention deficit hyperactivity disorder: An ALE meta-analysis. *Journal of Child Psychology & Psychiatry*, 47(10), 1051-1062.

Enger, C., Weatherby, L., Reynolds, R. F., and Walker, A. M. (2004). Serious cardiovascular events and mortality among patients with schizophrenia. *Journal of Nervous and Mental Disease*, 192(1), 19-27.

Fernandez, A., Rodriguez-Palancas, A., Lopez-Ibor, M., Zuluaga, P., Tuttero, A., Maestu, F., Amo, D., Lopez-Ibor, J. & Ortiz, T. (2005). Increased occipital delta dipole density in major depressive disorder determined by magneto encephalography. *Journal of Psychiatry & Neuroscience*, 30(1), 17-23.

Foster, A.F., Miller, D.D., & Buckley, P.F. (2007). Pharmacogenetics and schizophrenia. *Psychiatric Clinics of North America*, 30, 417-435.

Hartvigsen, J., Bolding-Jensen, O., Hviid, H., & Grunnet-Nilsson, N. (2003). Danish chiropractic patients then and now - a comparison between 1962 and 1999. *Journal of Manipulative Physiological Therapy*, 26(2), 65-9.

Hawk, C., Long, C. R., & Boulanger, K.T. (2001). Prevalence of nonmusculoskeletal complaints in chiropractic practice: Report from a practice based research program. *Journal of Manipulative Physiological Therapy*, 24(3), 157-69.





OJNI INVITED ARTICLE

Kandel, E. R., Schwartz, J. H., Jessell, T. M. (2000). *Principles of neural science (4th ed.)*. New York: McGraw-Hill.

Lamberti, J. S., Olson, D., Crilly, J. F., Olivares, T., Williams, G. C., Xin, T., Tang, W.

Wiener, K., Dvorin, S., & Dietz, M. B. (2006). Prevalence of the metabolic syndrome among patients receiving clozapine. *American Journal of Psychiatry*, 163, 1273-1276.

Leboeuf-Yde, C., Axen, I., Ahlefeldt, G, Liddefelt, P., Rosenbaum, A., Thurnherr, T.

(1999). The types and frequencies of improved nonmusculoskeletal symptoms reported after chiropractic spinal manipulative therapy. *Journal of Manipulative Physiological Therapy*, 22(9), 559–64.

Leboeuf-Yde, C., Pedersen E. N., Bryner, P., Cosman, D., Hayek, R., Meeker, W.C., et

al. (2005). Self reported nonmusculoskeletal responses to chiropractic intervention: A multi nation survey. *Journal of Manipulative Physiological Therapy*, 28(5), 294–302.

Mamtani, R., & Cimino, A. (2002). A primer of complementary and alternative medicine

and its relevance in the treatment of mental health problems. *Psychiatric Quarterly*, 73(4), 367- 381.

Martin, K.S. (2005). *The Omaha System: A key to practice, documentation, and*





OJNI INVITED ARTICLE

information management(2nd ed.). St. Louis: Elsevier.

Melzack, R. & Wall, P. D. (1965). Pain mechanisms: A new theory. *Science*, 150(699), 971-979.

Mitchell, A. J. & Malone, D. (2006). Physical health and schizophrenia. *Current Opinion in Psychiatry*, 19(4), 432-437.

Muir-Cochrane, E. (2006). Medical co-morbidity risk factors and barriers to care for people with schizophrenia. *Journal of Psychiatric and Mental Health Nursing*, 13, 447-452.

Pickar, J. G. & wheeler, J. D. (2001). Response of muscle proprioceptors to spinal manipulative like loads in the anesthetized cat. *Journal of Manipulative Physiological Therapy*, 24(1), 2-11.

Rippon, Brock, J. Brown, C. Boucher, J. (2007). Disordered connectivity in the autistic brain: Challenges for the new psychophysiology. *International Journal of Psychophysiology*, 63(2), 164-172.

Sachdev, P.S. (2005). Neuroleptic-induced movement disorders: An overview. *Psychiatric Clinics of North America*, 28, 255-274.

Salokangas, R. K. R. (2007). Medical problems in schizophrenia patients living in the





OJNI INVITED ARTICLE

community (alternative facilities). *Current Opinion in Psychiatry*, 20(4), 402-405.

Schultz, S. H., North, S.W., & Shields, C.G. (2007). Schizophrenia: A review. *American Family Physician*, 75(12), 1821-1829.

Seaman, D. R. & Winterstein, J. F. (1998). Dysafferentation: A novel term to describe the neuropathophysiological effects of joint complex dysfunction: A look at likely mechanisms of symptom generation. *Journal of Manipulative Physiological Therapy*, 21(4), 267-80.

Secor, E., Blumberg, J., Markow, M., MacKenzie, D., & Thrall, R. (2004).

Implementation of outcome measures in a complementary and alternative medicine clinic: Evidence of decreased pain and improved quality of life. *The Journal of Alternative and Complementary Medicine*, 10(3), 506-513.

Slack, M. K., & McEwen, M. M. (1999). The impact of interdisciplinary case management on client outcomes. *Family Community Health*, 22(3), 30-48.

Straker, D., Correll, C., Abdulhamid, N., Koshy, F., Rubens, E., Saint-Vil, R., Kane, J., &

Manu, P. (2005). Cost-effective screening for the metabolic syndrome in patients treated with second-generation antipsychotic medications. *American Journal of Psychiatry*, 162(6), 1217-1221.

Stawar, T., & Allred, B. (1999). Why people discontinue medications:





OJNI INVITED ARTICLE

Differences in staff resident perceptions in an intensive residential treatment

program. *Psychiatric Rehabilitation Journal*, 22(4), 410-412.

Steinmetz, J. E., Lupica, C. R., Secard, C. M., & Patterson, M. M. (1982). Effects of

manipulating stimulation intensity and duration on fixation of a peripherally induced spinal reflex alteration in rats. *Physiology Behavior*, 29(6), 103-144.

Terrett, A. C. J. & Vernon, H. T. (1984). Manipulation and pain tolerance: A controlled

study of the effect of spinal manipulation on paraspinal cutaneous pain tolerance levels.

American Journal of Physical Medicine, 63(2), 17-25.

Toplak, M. E., Dockstader, D., & Tannock, R. (2006). Temporal information processing

in ADHD: Findings to date and new methods. *Journal of Neuroscience Methods*, 151(1), 15-29.

U. S. Department of Health and Human Services. (1999). *Mental health: A report of the*

Surgeon General. Rockville, MD. Author.

Vernon, H. & Mrozek, J. (2005). A revised definition of manipulation *Journal of*

Manipulative Physiological Therapy, 28(1), 68-72.

Ware, J. E., Kosinski, M., Turner-Bowker, D., & Gandek, B. (2002). *User's manual for*





OJNI INVITED ARTICLE

the SF-12v2 health survey. Lincoln, RI.: Quality Metric Corporation.

Westra, B., & Solomon, D. (1999, Winter). The Omaha System: Bridging home care and technology. On-Line Journal of Nursing Informatics [On-Line], 3(1), Available: <http://www.eaa-knowledge.com/ojni/> .

Wilkinson, G., Hesdon, B., Wild, D., Cookson, R., Farina, C., Sharma, V., Fitzpatrick, R. & Jenkinson, C. (2000). Self-report quality of life measure for people with schizophrenia: The SQLS. *The British Journal of Psychiatry*, 177, 42-46.

Wolpaw, J.R., Tennissen, A. M. (2001). Activity-dependent spinal cord plasticity in health and disease. *Annual Review of Neuroscience*, 24, 807-843.





OJNI INVITED ARTICLE

Authors' Bios

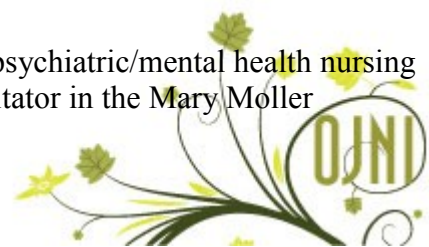
[Phyllis M. Connolly PhD, PMHCNS-BC](#)

Dr. Connolly is currently a full professor in the School of Nursing; Graduate Coordinator; Assistant Director of the School of Nursing; Coordinator for the Betty and Gordon Moore Funded Nurse Educator Option in the graduate program; Coordinator of the Psychiatric Nurse Managed Center; Past Chair for the Program Evaluation & Research Committee; Past Project Director for the FITNE Nightingale Tracker Project; Past-President of the American Psychiatric Nurses Association, past President of the Alpha Gamma Chapter of Sigma Theta Tau, International, and, past Co-Chair of the California Alliance for the Mentally Ill AB 1278 Task Force on Families and Mental Illness.

Dr. Connolly's areas of expertise, publications, presentations, and research include serious and persistent mental illness, crisis intervention, psychosocial rehabilitation, web-based teaching; education, assertiveness training, total quality improvement, cultural diversity; collaboration, and organizational development. She initiated the use of the Omaha System within the Psychiatric Nurse Managed Center and is one of a few users of the Omaha System with persons with psychiatric disorders in the community. She was one of the recipients of a Learning Productivity award for Community Service Learning: A Collaborative Model for Professional Curricula and has received several San Jose State University awards for her collaboration work.

Dr. Connolly's 46 years in nursing include acute care in medical surgical nursing; community health; a private practice in psychiatric/mental health nursing; crisis intervention in the community; administration; teaching, and consulting. Golden Gate University in San Francisco conferred her doctorate in public administration in 1987. Her clinical master's degree in psychiatric nursing was awarded in 1981 from Rutgers University in New Jersey. She graduated Magna Cum Laude with a baccalaureate degree in humanities in 1974 from Georgian Court College in New Jersey. She received a diploma and an award for excellence in nursing in 1963 from Jersey City Medical Center in New Jersey.

Dr. Connolly maintains certification as a clinical specialist in adult psychiatric/mental health nursing by the American Nurses' Credentialing Center. She is a trained facilitator in the Mary Moller Simultaneous Consumer/Family Education Model.





OJNI INVITED ARTICLE

Mark C. Crider, PhD, MSN, RN

Dr. Crider is currently Assistant Professor in the School of Nursing at San Jose State University, San Jose, CA. His primary teaching focus is psychiatric/mental health nursing as well as teaching in the nursing graduate program. He holds a Ph.D. in nursing with a focus in health policy from the University of California, San Francisco, an M.S.N. in nursing education from Villanova University, and a B.S. in nursing from the Pennsylvania State University. He has been an active member in ANA and APNA, serving on the board of directors of the CA state chapters of both organizations.

Currently, Dr. Crider is serving as president of the California League for Nursing and as a California Delegate to ANA.

Ronald Henninger, D.C., D.A.B.C.O.

Dr. Henninger is a Full Clinical Professor at Palmer College Chiropractic-West since 2000. He is a Diplomate of the American Board of Chiropractic Orthopedists since 1987. Along with his full time teaching and clinical duties he maintained a private practice until 2002. He has had many years of clinical experience and has had success providing chiropractic care to individuals with mental illness. Dr. Henninger has published many papers and is the recipient of numerous awards in his field. Dr. Henninger also has serves on the Santa Clara County Mental Health Board for the past 6 years.

Carol Irwin D.C.

Dr. Carol Irwin graduated from Palmer College of Chiropractic- West in 1986. She founded and directed the Spinal Health and Rehabilitation Clinic in Los Altos, California soon after graduation. Her practice was a family practice which specialized in nutrition, exercise and wellness.

During her successful practice as a chiropractor her daughter was diagnosed with schizophrenia and the direction of her work took a turn. After many years of navigating care for her daughter and spending years observing the mental health system and the patients that received this care, she joined the National Alliance on Mental Illness in Santa Clara County (NAMI) and graduated from the Family to Family class.





OJNI INVITED ARTICLE

In 2001 she was appointed to the Santa Clara County Mental Health Board. In 2008 she was elected President of the board and again in 2009. Most recently, Dr. Irwin has been appointed to be on many other boards within the system of care, which are directly involved with the Mental Health Services Act (Prop 63 MHSA) passed by the voters in California. She currently serves on the Stakeholder Leadership Committee as well as the Steering Committee for MHSA. This committee reviews and recommends programs for funding.

Her work has been focused on bringing family involvement into the system of care to minimize the trauma that stigma has on family relationships and the recovery of their loved one. She advocated for a county policy which circulated A.B.1424 laws in all county hospitals and clinics. She collaborated with the staff at Barbara Arons Pavilion, Santa Clara County Acute Psychiatric Hospital to implement a NAMI family/consumer resource table manned by a family or consumer NAMI member. The purpose of this resource table would be to foster collaboration between families and staff and inform families of the resources available in the community for their loved ones.

Dr. Irwin was appointed to the California State Traumatic Brain Injury Advisory Board in 2007. She brings her expertise as a mental health advocate to the board regarding systems of care, access to care and the relationship of TBI to PTSD, major depression and suicide. She is currently working on a mental health education forum at the Veterans Administration in Palo Alto, Ca. in collaboration with the Mental Health Board, NAMI and community leaders to open a dialogue about serious mental illness. There will be a viewing of the documentary: Minds On the Edge and a discussion to follow.

For the last several years Dr. Irwin has been advocating for wellness programming which brings the physical aspect of health into mental health treatment. As many patients suffer from obesity and lack of proper nutrition and exercise there is a need to incorporate new innovative systems of care into the traditional systems of care for the treatment of mental illness. Hence, our collaborative with nursing will be the start of many projects to collect data on chiropractic collaborative treatments for the mentally ill.

