

Chiropractors and collaborative care: An overview illustrated with a case report

John J. Riva, BA, DC*

Gloria D. Muller, RN, BA (SDS)§

Adrian A. Hornich, BA, MD, CCFP, FCFP*

Silvano A. Mior, DC, PhD†

Anita Gupta, PhD, C. Psych¶

Stephen J. Burnie, BSc, DC, MSc†

Although not typical, there appears to be a growing trend of chiropractors working within collaborative care settings. We use a case report to highlight features of patient care and education related to chiropractic practice within a collaborative care model. This paper hopes to offer some insight into how a chiropractor might fit into a collaborative setting and what training might help them to function effectively. The case report used is an example where a chiropractor provided a secondary diagnosis and complementary care not previously considered by the allied team resulting in symptom control and return to work by the patient. By the nature of a chiropractor's ability to provide a primary or secondary musculoskeletal diagnosis, they have the capacity to offer an additive approach to patient care within collaborative care models. However, chiropractors wishing to work in these environments, such as a family health team, would benefit from further education.

(JCCA 2010; 54(3):147-154)

KEY WORDS: chiropractor; collaborative care; education; family health team; electronic medical record

Bien qu'elle ne soit pas typique, il semble y avoir une tendance croissante chez les chiropraticiens de travailler dans un contexte de soins collaboratifs. Par le biais d'un exposé de cas, nous soulignons des caractéristiques relatives au soin des patients et à l'éducation en matière de chiropraxie en contexte de soins collaboratifs. Ce document souhaite offrir un aperçu des manières selon lesquelles un chiropraticien peut cadrer avec un contexte collaboratif, ainsi que de la formation qui peut l'aider à fonctionner efficacement. L'exposé de cas employé est un exemple dans lequel un chiropraticien émet un diagnostic secondaire et propose des soins complémentaires qui n'avaient pas été considérés par les membres de l'équipe paramédicale, ayant pour résultat le contrôle des symptômes du patient et son retour au travail. En raison de la capacité du chiropraticien d'établir un diagnostic musculosquelettique primaire ou secondaire, il peut offrir une approche additive au soin des patients, dans un contexte de soins collaboratifs. Cependant, les chiropraticiens qui souhaitent travailler dans de tels environnements, comme une équipe de santé familiale, profiteraient de formations supplémentaires.

(JCCA 2010; 54(3):147-154)

MOTS CLÉS: chiropraticien; soins collaboratifs; éducation; équipe de santé familiale; dossiers médicaux électroniques

* Department of Family Medicine, McMaster University, Hamilton, Ontario.

† Canadian Memorial Chiropractic College, Toronto, Ontario.

§ Hamilton Family Health Team, Rosedale Medical Group, Hamilton, Ontario.

¶ Diabetes Care and Research Program, Hamilton Health Sciences, Hamilton, Ontario.

Funding: No funds were received for the preparation of this manuscript.

Competing Interests: None.

Correspondence to: Dr. John J. Riva, Michael G. DeGroot School of Medicine, McMaster University, Niagara Regional Campus, Research Office, 142 Queenston Street, St. Catharines, ON L2R 7C6, tel: (905) 397-1908 x43862; email: rivaj@mcmaster.ca

© JCCA 2010

Introduction

Collaborative care models have been proposed to deal with the complexity underlying many human health conditions. Such models can also be complex, varying in philosophy, structure, process and outcome.¹ As a consequence, the blurring of roles and responsibilities in the treatment of shared patients may occur. In this report we use collaborative care as defined by Boon et al. (2009), namely, “an interprofessional process for communication and decision-making that enables the separate and shared knowledge and skills of health care providers to synergistically influence patient care provided.”¹

Although chiropractors typically practice independently of other health care providers, there is evidence that a growing number of chiropractors are collaborating or being integrated into multidisciplinary care environments.^{2,3} Successful co-management of patients in such environments in part relate to good communication, patient interest, and openness to discussion. As well, co-management has been found to be a key factor for developing a chiropractor’s involvement within a collaborative care setting.^{4,5} This co-management often involves a chronic musculoskeletal condition.

Conversely, studies suggest that communication between medical practitioners and chiropractors outside of collaborative care settings is often limited resulting in poor information sharing which leads to fragmented and compromised quality of patient care.^{5,6,7}

We use a case report to highlight the co-management of chronic tension-type headache (CTTH) and the additive effect chiropractic management played in achieving a return-to-work (RTW). This co-management intensified after the secondary diagnosis of CTTH by the chiropractor in a patient with a longstanding anxiety disorder. Chiropractors at this location have been co-located within a Family Health Team (FHT) setting for greater than five years.

Chronic Tension-type Headache Epidemiology and Pathophysiology

CTTH is common, contributing to significant loss of work and high socioeconomic costs.^{8,9,10} It also has considerable impact on work performance and daily functioning.^{11,12} It has been estimated that between 2% to 3% of patients suffer with CTTH for the greater part of a lifetime.¹² Chronic pain, including CTTH, can be de-

moralizing in addition to debilitating. Associated negative emotions such as helplessness, fear or anxiety, and depression can further exasperate the impact of physical pain or functioning.¹³

Both muscular and psychogenic factors are believed to be associated with tension-type headache.¹⁴ The exact pathophysiology of CTTH is uncertain,¹⁵ as many people have no known mechanism of onset or underlying pathophysiological causes. One of the most prominent abnormal findings in patients with CTTH is a high degree of muscle tenderness.^{16,17,18}

Case History

Prior to a diagnosis of CTTH, a 44-year old female was referred by her family physician to a mental health counselor with concerns of anxiety attacks. She complained of anxiety attacks on a daily basis with heart palpitations, nausea, increase in perspiration, and dizziness. She was prescribed an antidepressant but stopped the medication after one month because of unwanted side effects. She had been using Lorazepam, a benzodiazepene, as needed for anxiety for approximately two years in addition to over-the-counter analgesics for her headache pain.

At age 25, she worked in an office where her job worries led to significant weight loss and her first anxiety attack. Her anxiety attacks continued through her adult life and were provoked by work stress, driving on highways and taking a bus. Occasionally, she also experienced anxiety upon leaving the house and during the long commutes to work.

She complained of sleep disturbance during workdays that contributed to her feeling exhausted. This was compounded by her having to wake up very early in the morning to commute to work. She attributed all of the above symptoms to causing her muscle tension, headaches and “feeling on edge”.

The patient was laid off from her project management position approximately 3 years ago and was unemployed. She was motivated for change and had good insight into her health problems.

Path of Co-Management

The following summaries highlight the perspectives taken by the various health care providers and the eventual team co-management. At their initial visit, each provider fo-

cused on their related area of expertise to address the patient's anxiety condition and later the secondary diagnosis of CTTH.

Family Physician

With the establishment of her medical diagnosis of panic disorder with agoraphobia, the treatment and subsequent management process was initiated. Due to the patient's goal of decreasing her pharmacologic load, alternative possible therapies were explored with the input from various health care providers on the team.

Mental Health Counselor

The patient was subsequently referred for counseling. As described in the case history, the patient presented to the counselor with the goal of stopping her use of benzodiazepine and over-the-counter analgesics. As with this case, patients with CTTH often use self-administered pain-relieving medications with little efficacy.¹⁹

She reported experiencing anxiety attacks in a variety of situations. She avoided driving on highways and taking a bus. She avoided situations in which she had experienced prior anxiety attacks and noted for a short time being unable to leave her house because of her anxiety. Thus, she was referred to an anxiety and treatment research centre for assessment and cognitive behavioural therapy (CBT) intervention.

Anxiety Treatment and Research Centre

She was referred to an anxiety treatment and research centre for consultation due to "excessive worry" and frequent anxiety attacks which interfered with her functioning. She underwent both medical consultation by a psychiatrist and a Structured Clinical Interview by a psychologist. She was provided a confirmatory diagnosis of Panic Disorder with Agoraphobia in keeping with her family physician's original conclusion. Although experiencing transient periods of depressed mood, her symptoms did not meet the criteria for the diagnosis of a mood disorder. She was also referred for a short-term, 12-week group CBT intervention for panic disorder under the joint supervision of a combination of a psychologist and psychiatrist.

CBT, either individually or in a group format, has been shown to be effective in reducing anxiety, fear and avoidance²⁰ by providing individuals with the knowledge and

skills to identify and modify anxious thoughts and behaviours that help to maintain anxiety and anxiety-related difficulties.

Nurse Practitioner

As a result of her ongoing symptoms and accompanying milder musculoskeletal complaints, the patient attended a nurse practitioner. The patient complained of intermittent neck and chest pain on the left side radiating into the back of her chest and arm. There also was a repetitive strain injury of the right side of the chest wall for which she wished some form of therapy to regain function. She conveyed she was quite anxious.

The patient was then referred by the nurse practitioner for chiropractic care for her neck tension and headaches, repetitive strain injury of the right side of the shoulder girdle and the chronic nature of neck and thoracic pains. The patient's history of panic attacks and chest pain was also highlighted.

Chiropractor

On examination, the chiropractor noted sub-occipital and trapezius muscular pain and tightness. Active and passive ranges of motion were decreased in flexion and bilateral lateral flexion and rotation. The patient reiterated her insomnia, recurrent sinus infections and ongoing daily headaches.

In this multidisciplinary care setting, it is commonplace for hallway consultations to occur on mutual patients. These consultations are often triggered by review of the electronic medical record (EMR) to determine common benefits of concurrent care. Thus further discussions by the chiropractor with the counselor and with the patient indicated that the muscular pain, tension and headaches acted as a threshold trigger for the patient's panic attacks. The patient was hoping the care would offer a way to teach her how to control her pain.

A secondary diagnosis of CTTH was made by the chiropractor in this case to quantify the pain-related headache symptoms. To this point her other care providers had only managed the anxiety disorder, as providing a headache diagnosis is typically out the scope of practice of non-medical providers in this setting. Previous authors have noted that co-morbid headaches are common with anxiety disorders reflecting the burden of the disease.^{21,23,23}

How Chiropractic Practice is Different in this Model

Chiropractors within this FHT setting are offered some distinct advantages over traditional solo practice. Co-location offers them the ability to interact in person with all other health care providers, each with their own area of expertise, to draw from for their patient care decisions. Questions on patient care can be directed immediately and in person to the appropriate co-located provider to further answer clinical queries or streamline patient flow for testing, referrals or follow up. This potentially reduces patient visits and wait times as well as assists in timely clinical care decisions by the chiropractor.

Sharing of information from the EMR provides the chiropractor the ability to review the entire patient's health record including all labs, imaging, specialist notes, counseling visits, dietitian records, demographics and medications. With patient consent and authorized records release, clinical notes from all providers are available to the chiropractor and vice versa. This complete clinical picture allows the chiropractor to formulate an appropriate diagnosis and treatment plan.

In order to clarify a differential diagnosis or treatment plan, the chiropractor can immediately recommend additional imaging, labs, or specialist referrals to the appropriate authorizing provider in person. Their recommendations can be subsequently arranged with the assistance of either nursing or support staff depending on the nature of the request.

As part of the culture of this FHT setting, students from disciplines of medicine, chiropractic, pharmacy, dietetic, social work, midwifery and nursing attend for placements. Students will crossover multiple disciplines depending on their interests and often do shadowing observations with chiropractors. Having a student from a different profession offers opportunity for the chiropractor to explain the profession and learn the skill of communicating in common terminology for the benefit of identifying additive solutions to patient care delivery. As well, the chiropractor gains knowledge on how the student from a different profession may approach a clinical situation. Related to this particular case report, a medical student was present for a portion of this patient's chiropractic care.

Lastly, over the long term, group rounds or education sessions with various professions using mutual complex patient cases offers providers a better understanding of

each other's scope of practice to demonstrate both the limitations and potential for additive solutions to improve patient care through co-management.

Collaborative Management

Following each of the patient's initial assessments, hallway consultations occurred between health care providers to co-ordinate outcomes so a consistent message was conveyed to the patient in regard to lifestyle and the association between her neck pain, headaches and her panic attacks.

A hallway consultation involves literally walking down the hall and knocking on the provider's treatment room door. However, there are procedures in place within the practice setting that dictate levels of interruption such as immediate during emergency situations. Interactions also may occur between patient room transfers such as when a patient is waiting to see another provider or communication may proceed through either the provider's nurse or assistant in more process related queries such as imaging or lab requests. Lastly, there are internal electronic messaging mechanisms for lower category items such as arranging group meetings or conveying information at times when both providers work on separate days.

Such encounters involve the mutual viewing of the entire patient record by all providers via EMR and case consulting over each provider's goals respective to their profession. This process is used in times of general patient care and more importantly in times of follow-up on complicated cases to improve the continuity and delivery of patient care for future encounters. Initially, this process can be slow to a new provider; but once mutual trust and understanding of each other's scope is established these are very brief encounters. Charting of hallway consultations in the EMR usually occurs at the location of the encounter.

In this case report, discussions between the providers occurred at various times during the patient's care and across health care provider scopes of practice. This is a dynamic process based on each provider's ability to use a patient-centered approach to formulate additive solutions using the most appropriate provider and intervention at the most appropriate time. The ultimate goal was to improve patient outcomes. The value of these impromptu hallway consultations is that they require no more than one minute of time. Co-location of providers is the best

facilitator of these encounters. This form of informal consultation concerning a patient is common in collaborative care settings.^{24,25}

After hallway consultations, the treatment plan of the chiropractor was formulated in conjunction with the mental health counselor and nurse practitioner, and included:

1. explanation and reassurance on the lifestyle link between stress levels and neck pain with headaches.
2. home neck and shoulder stretching regularly and at times of increased stress.
3. periodic visits as needed for manipulation and myofascial release techniques related to the neck and upper thoracic spine.

In this instance, the additive approach was a consistent message to the patient from the counselor and chiropractor at periodic visits, and confirmed in the EMR, on the linkage between stress and neck pain with encouragement of neck stretching during times of anticipated stress to elicit a sustained behaviour change in the patient.

As a result of this multidisciplinary intervention of CBT and manual therapy spanning 4 months, the patient reported a return to gainful work. She also reported a cessation of medications through the support of her family physician. SF-12 measures²⁶ improved by 5 points to a score of 49 on the physical and by 7 points to a score of 54 on the mental component summaries between pre-treatment baseline and 4 weeks. Despite the subjective improvement in symptoms, there were no differences in neck pain or the neck disability index between pre-treatment baseline measures and at 2, 4, and 8 weeks. A recent systematic review describes the occurrence of a floor-ceiling effect of this measurement tool, where a measurement cannot take a wider range value due to the limitation of the measurement scale, that may explain this finding as a too minimal sensitivity of scale difference to be significant.²⁷

The patient also reported as part of the subjective portion of her re-assessment that both her depressive and anxiety symptoms that were present over the last 20 years were now under control, yet she still experiences pain. She described that the collaborative care she received appeared to increase the threshold for the trigger of her CTTH and panic attacks thereby improving her ability to sustain her activities of regular work. This subjective outcome was of interest to the providers involved and when

further questioned, the patient described the cumulative effects of the included chiropractic care being beneficial over previous attempts in her long past history to address these concerns.

Psychosocial Implications

In addition to physical implications, chronic pain, including CTTH, can have wide ranging and interdependent impact on cognitive, affective, behavioural, and social factors.¹³ Stress and mental tension, such as depression, are the most common factors that cause CTTH.²⁸

A biopsychosocial approach views chronic pain and disability as a complex and dynamic interaction among physiological, psychological and social factors that may perpetuate or worsen clinical presentation.²⁹ There is evidence from a review of seven randomized controlled trials and two systematic reviews of the therapeutically efficacious nature of comprehensive pain programs for chronic non-malignant pain conditions, including headaches.²⁹ These are programs in which various pain-related disciplines work as a team to provide comprehensive, interdisciplinary care (e.g. physicians, physical therapists, psychologists) with a focus on functional restoration rather than cure. Given their expertise and scope of practice, chiropractors appear ideally suited as team members able to provide a unique and complementary perspective within comprehensive pain programs.

Implications for Clinical Education

Part of the scope of chiropractic in Canada is the requirement to communicate a musculoskeletal diagnosis to the patient. In a collaborative care model, few health care providers outside of medicine are afforded this responsibility due to their scope of practice. This case is an example of the contribution chiropractors can make in reducing the burden on the mainstream health care system in the management of complex chronic disease populations with secondary musculoskeletal conditions. This change in care delivery takes time to build both health care provider and patient trust within a collaborative setting.

Chiropractors who wish to operate in collaborative care environments would benefit from some form of further education. The importance of this education would be to facilitate the transition from operating in a solo fashion to the dynamic of team-based care. Specific learning objectives could be to:

- communicate verbally via concise hallway consultations and thoroughly while writing clinical notes using a terminology other health care providers understand
- understand the scope of practice of other health care providers through case-oriented clinical rounds
- be able to mentor students from various health care professions on the role chiropractic care plays in the treatment of musculoskeletal conditions in a collaborative clinical setting
- understand and be able to communicate both chiropractic treatment limitations and the instances of added effects of concurrent chiropractic care
- be able to traverse health care system processes in an additive versus alternative approach to streamline care and wait-times for patients
- be aware and able to make suggestions on referral for the appropriate use of other musculoskeletal care providers within the broader health care system to improve patient care
- review and understand how to access appropriate patient information
- further clarify the musculoskeletal diagnosis through use of imaging, labs and medical specialist documentation
- effectively use the EMR as a follow up feedback tool to assess the impact of chiropractic interventions for complex conditions
- champion quality improvement measures from their knowledge of solo practice to reduce challenges within collaborative care models³⁰

In our case report all these learning objectives were useful to the outcome for this patient. As well, for all future similar cases an additive feedback effect occurs on reviewing multiple similar case progressions through the EMR. This likely improves the skill level of the chiropractor in identifying important secondary musculoskeletal diagnoses and formulating additive treatment plans for subsequent complex chronic disease patients.³¹

As a result of cases such as this one, quality improvement measures were attempted at a process level within this FHT setting to help with earlier identification of chronic pain secondary diagnosis patients for triage to chiropractic management. To be sustainable these measures require effective communication strategies within the provider team to change perceptions on utility.⁵ Time is

required for this to develop as perceptions regarding chiropractic by medical practitioners are likely to be formed after medical school as described in a recent survey by orthopedic surgeons.³² Interprofessional communication may be the most common route of education that occurs between solo practice chiropractors and other health care professionals and vice versa. A multidisciplinary collaborative setting allows for a positive change in communication beyond secondhand patient feedback as a form of learning.

Factors such as a patient-centered approach with structured team discussions, information sharing, framing team tasks as intellectual and a team climate of collaboration has been found to enhance a team's ability to process information.³³ Lastly, co-location or regular face-to-face contact with mutual trust is an essential component to facilitating the ease of communication between collaborative care providers.³⁴

Conclusion

Chronic diseases, such as CTTH, are costly to manage and profoundly impact a patient's ability to work.⁹ This report highlights multidisciplinary care provided in a functioning collaborative clinical environment. It offers some suggested educational goals that would be useful to a chiropractor to function effectively in a FHT setting.

Collaborative care provides patients with therapeutic options within an environment where health care providers and patients are informed. Communication is increased thus limiting the fragmentation of care, while optimizing the continuity and quality of care offered to patients suffering from multiple chronic conditions.⁵ It also matches current literature review findings on the emerging models of RTW settings for musculoskeletal disorders where factors of clinical, psychosocial, work environment and involvement of stakeholders are taken into account.^{35,36}

This case provides an example of the coordinated functionality within a FHT. With all health care providers on site, working collaboratively through both hallway consultation and the EMR, this patient's multi-dimensional health care needs were easily met. Ultimately, cross-referral to the chiropractic arm of the health care team appeared beneficial to the patient from an occupational and therapeutic perspective.

Limitations of our conclusions were the rigor of a case report, applicability of education initiatives over time, and

relevance to other collaborative care models. There were also strengths to our conclusions. There was a greater than five-year time span that chiropractors were integrated into the model. This indicates the inclusion of chiropractors in a collaborative care model is sustainable over time.

In closing, by the nature of a chiropractor's responsibility to provide a primary or secondary musculoskeletal diagnosis, they have the capacity to offer an additive approach to patient care within collaborative care models.

Key Points

- Co-location or regular face-to-face contact facilitates communication and helps build trust between health care providers
- Chiropractors wishing to pursue integration into a collaborative model would benefit from further education
- Health care system processes may realize quality improvements from the application of a chiropractor's additive approach to care in a collaborative setting

Acknowledgements

We would like to thank Jason Busse, DC, PhD who reviewed this manuscript.

References

- 1 Boon HS, Mior SA, Barnsley J, Ashbury FD, Haig R. The difference between integration and collaboration in patient care: results from key informant interviews working in multiprofessional health care teams. *J Manipulative Physiol Ther.* 2009; 32:715–22.
- 2 Dunn AS, Passmore SR. Consultation request patterns, patient characteristics and utilization of services within a veterans affairs medical center chiropractic clinic. *Mil Med.* 2008; 173:599–603.
- 3 Johnson C, Baird R, Dougherty PE, Globe G, Green BN, Haneline M, Hawk C, Injeyan HS, Killinger L, Kopansky-Giles D, Lisi AJ, Mior SA, Smith M. Chiropractic and public health: current state and future vision. *J Manipulative Physiol Ther.* 2008; 31:397–410.
- 4 Allareddy V, Green BR, Smith M, Haas M, Liao J. Facilitators and barriers to improving interprofessional referral relationships between primary care physicians and chiropractors. *J Ambulatory Care Manage.* 2007; 30:347–54.
- 5 Mior SA, Barnsley J, Boon H, Ashbury FD, Haig R. Designing a framework for the delivery of collaborative musculoskeletal care involving chiropractors and physicians in community-based primary care. *J Interprof Care.* Pages 1–12, DOI 10.3109/13561821003608757. Posted online 4 May 2010.
- 6 Greene BR, Smith M, Haas M, Allareddy V. How often are physician and chiropractors provided with patient information when accepting referrals? *J Ambulatory Care Manage.* 2007; 30:344–6.
- 7 Zanchin G, Maggioni F, Granella F, Rossi P, Falco L, Manzoni GC. Self-administered pain-relieving manoeuvres in primary headache. *Cephalalgia.* 2001; 21:718–26.
- 8 Gerstle DS, All AC, Wallace DC. Quality of life and chronic nonmalignant pain. *Pain Manag Nurs.* 2001; 2:98–109.
- 9 Stovner L, Hagen K, Jensen R, Katsarava Z, Lipton R, Scher A, Steiner T, Zwart JA. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia.* 2007; 27:193–210.
- 10 Scascighini L, Sprott H. Chronic nonmalignant pain: a challenge for patients and clinicians. *Nat Clin Pract Rheumatol.* 2008; 4:74–81.
- 11 Rasmussen BK. Epidemiology of headache. *Cephalalgia.* 2001; 21:774–7.
- 12 Jensen R. Diagnosis, epidemiology and impact of tension-type headache. *Curr Pain Headache Rep.* 2003; 7:455–9.
- 13 Gardea MA, Gatchel, RJ. Interdisciplinary treatment of chronic pain. *Current Review of Pain.* 2000; 4:18–23.
- 14 Goadsby PJ. Chronic tension-type headache: where we are. *Brain.* 1999; 122:1611–2.
- 15 Jensen R. Pathophysiological mechanisms of tension-type headache: a review of epidemiological and experimental studies. *Cephalalgia.* 1999; 19:602–21.
- 16 Bendtsen L, Jensen R, Olesen J. Decreased pain detection and tolerance thresholds in chronic tension-type headache. *Arch Neurol.* 1996; 53:373–6.
- 17 Metsahonkala L, Anttila P, Laimi K, Aromaa M, Helenius H, Mikkelsen M, et al. Extracranial tenderness and pressure pain threshold in children with headache. *Eur J Pain.* 2006; 10:581–5.
- 18 Fernández-de-las-Peñas C, Cuadrado ML, Arendt-Nielsen L, Ge HY, Pareja JA. Increased pericranial tenderness, decreased pressure pain threshold, and headache clinical parameters in chronic tension-type headache patients. *Clin J Pain.* 2007; 23:346–52.
- 19 Zanchin G, Maggioni F, Granella F, Rossi P, Falco L, Manzoni GC. Self-administered pain-relieving manoeuvres in primary headache. *Cephalalgia.* 2001; 21:718–26.
- 20 Butler AC, Chapman JE, Forman EM, Beck AT. The empirical status of cognitive-behavioral therapy: A review of meta-analysis. *Clinical Psychology Review.* 2006; 26:17–31.
- 21 Beghi E, Allais G, Cortelli P, D'Amico D, De Simone R, d'Onofrio F, Genco S, Manzoni GC, Moschiano F, Tonini MC, Torelli P, Quartaroli M, Roncolato M, Salvi S, Bussone G. Headache and anxiety-depressive disorder

- comorbidity: the HADAS study. *Neurol Sci.* 2007; 28(Suppl 2):217–9.
- 22 Schur EA, Afari NA, Furberg, H, Olarte M, Goldberg J, Sullivan PF, Buchwald D. Feeling bad in more ways than one: comorbidity patterns of medically unexplained and psychiatric conditions. *J Gen Intern Med.* 2007; 22:818–21.
- 23 Torelli P, Lambru G, Manzoni GC. Psychiatric comorbidity and headache: clinical and therapeutical aspects. *Neurol Sci.* 2006; 27:S73–76.
- 24 Keating NL, Zaslavsky AM, Ayanian JZ. Physicians' experiences and beliefs regarding informal consultation. *J Amer Med Assoc.* 1998; 280:900–4.
- 25 Kuo D, Gifford DR, Stein MD. Curbside consultation practices and attitudes among primary care physicians and medical subspecialists. *J Amer Med Assoc.* 1998; 280:905–9.
- 26 Ware J, Kosinski M, Keller SD. A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care.* 1996; 34:220–33.
- 27 MacDermid JC, Walton DM, Avery S, Blanchard A, Etruw E, McAlpine C, Goldsmith CH. Measurement properties of the neck disability index: a systematic review. *J Orthop Sports Phys Ther.* 2009; 39:400–17.
- 28 Torelli P, Abrignani G, Castellini P, Lambru G, Manzoni GC. Human psyche and headache: tension-type headache. *Neurol Sci.* 2008; 29(Suppl 1):S93–5.
- 29 Gatchel RJ, Okifuji A. Evidence-based scientific data documenting the treatment and cost-effectiveness of comprehensive pain programs for chronic nonmalignant pain. *J Pain.* 2006; 7:779–793.
- 30 Øvretveit J, Bate P, Cleary P, Cretin S, Gustafson D, McInnes K, McLeod H, Molfenter T, Plsek P, Robert G, Shortell S, Wilson T. Quality collaboratives: lessons from research. *Qual Saf Health Care.* 2002; 11:345–351.
- 31 Sequist TD, Singh S, Pereira AG, Rusinak D, Pearson SD. Use of an electronic medical record to profile the continuity clinic experience of primary care residents. *Acad Med.* 2005; 80:390–4.
- 32 Busse JW, Jacobs C, Ngo T, Rodine R, Torrance D, Jim J, Kulkarni AV, Petrisor B, Drew B, Bhandari M. Attitudes towards chiropractic: a survey of North American orthopedic surgeons. *Spine.* 2009; 34:2818–25.
- 33 Mesmer-Magnus JR, DeChurch LA. Information Sharing and Team Performance: a meta-analysis. *J Appl Psychol.* 2009; 94:535–46.
- 34 Bradley F, Elvey R, Ashcroft DM, Hassell K, Kendall J, Sibbald B, Noyce P. The challenge of integrating community pharmacists into the primary health care team: A cast study of local pharmaceutical services (LPS) pilots and interprofessional collaboration. *J Interprof Care.* 2008; 22:387–98.
- 35 Schultz IZ, Stowell AW, Feuerstein M, Gatchel RJ. Models for return to work for musculoskeletal disorders. *J Occup Rehabil.* 2007; 17:327–52.
- 36 Plsek P. Innovative thinking for the improvement of medical systems. *Ann Intern Med.* 1999; 131:438–444.