

**A survey to determine post-graduate student confidence in their
knowledge and skills acquired during the Chiropractic course at the
University of Johannesburg.**

A research proposal presented to the
Faculty of Health Sciences, University of Johannesburg
as partial fulfillment for the Magister Technologiae: Chiropractic

By



Jacquelin Ann Bunge

(Student number: 802014232)

Supervisor: _____

Dr. T. Tyrans

Date

M. Tech. Chiropractic (S.A.)

DECLARATION

I declare that this is my own, unaided work. It is being submitted for the Degree of Master of Technology in Chiropractic at the University of Johannesburg. It has not been submitted before for any degree or examination in any other Technikon or University.



(Jacquelin Ann Bunge)

On this ___ day of _____

DEDICATION

I dedicate this study to my family for all their encouragement, support and patience. My mother for standing by me no matter what path I may choose. To my siblings, Greg, Kate & John for all your enthusiasm and interest.

To Chris, for your love and support through the years.



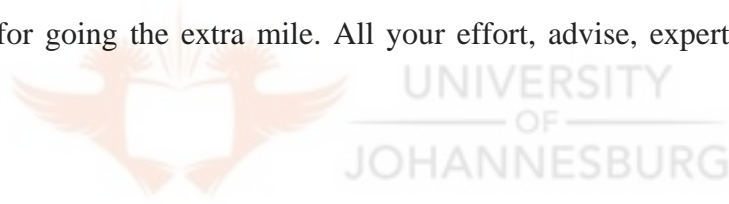
ACKNOWLEDGEMENTS

I would like to thank the following people for making this all possible, without them this dissertation would not be possible.

Dr Tyranes, thank you for all your time and dedication, all your constant reassurance and assistance.

Riette Eiselen, for your professionalism, efficiency and attention to detail. Wilhelm Koster and the staff at Statkon for their advice and time.

Dr Yelverton, for going the extra mile. All your effort, advise, expertise and time was invaluable.



ABSTRACT

The main purpose of the study was:

- To determine the satisfaction and confidence of the graduates of the University of Johannesburg's Chiropractic program.

Additional objectives included:

- To discuss the differences between the educations received at South African Chiropractic programmes and internationally recognized Chiropractic programmes by comparing the syllabus offered in each program.
- To determine from the data received which areas of the program could be improved.

There are 132 graduates from the University of Johannesburg's Chiropractic program. These doctors of Chiropractic have the same skills and knowledge as internationally qualified doctors of Chiropractic however the South African programmes do not have international accreditation. The university is currently going through a process to obtain international accreditation.

The postgraduate student surveys are important tools that can be used to determine where the course could be improved and where it is excelling. Being in daily practice these Doctors of Chiropractic are able to objectively point out the strengths and weaknesses of the current programme at the University. This is integral to the advancement of both the practitioner and the profession.

A questionnaire-based study comprising a convenience sample was used to determine postgraduate student confidence in the Chiropractic course. A total of 47 Chiropractors responded which comprises the sample group that was used in this study.

Results showed that the graduates of the University of Johannesburg's Chiropractic course are confident in their adjustment skills, diagnostics and the knowledge pertaining to these subjects. As experience increases so does the overall confidence in adjusting techniques. With treating paediatric patients, approximately half the respondents were confident and majority of respondents think it is essential to have paediatrics incorporated into the course. With regards to pharmacology, only 43 of the respondents had had pharmacology as part of the syllabus, all of the respondents were not confident. With regards to research, approximately half of the participants were not confident in doing research. Upon qualifying most postgraduate students open up their own practices.

In conclusion, on the whole the graduates of the University of Johannesburg were confident; however the data indicates that areas relating to research, pharmacology and paediatrics may need investigation.

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CHAPTER ONE: INTRODUCTION

1.1. General Introduction

A Chiropractic education must enable the graduate to be a specialist in this field and to be able to accurately diagnose a patients' systemic condition and refer where necessary. Five years of intense academic and practical training is required at the University of Johannesburg one of South Africa's two Chiropractic training institutions, the other being the Durban University of Technology.

An undergraduate Chiropractic curriculum must include an integrated and evidence-based approach to learning the necessary skills; also to be included is a vast amount of basic science, diagnostic, therapeutic and clinical knowledge to prepare the student for clinical practice. There is intensive psychomotor development, which is strengthened by an in-depth biomechanical approach to the neuromuskuloskeletal system; this is the hallmark of Chiropractic manipulative sciences (Byfield, 2005).

Chiropractic is a profession that is gaining increased recognition from other primary care physicians especially in South Africa. To be able to communicate and work together professionally would allow patients the most affordable and appropriate care.

Chiropractic has been defined as a health profession that concentrates on the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system. This includes the effects of these disorders on the function of the nervous system and general health. There is an emphasis on manual treatments, most notably the spinal manipulation or adjustment (World Federation of Chiropractic, 1999).

The practice of Chiropractic is a professional service usually preformed by a formally qualified Chiropractor, to restore and maintain health, and includes:

1. The diagnosis, treatment and prophylaxis of functional disturbances, pathomechanical states, pain syndromes and neurophysiological effects related to the locomotor system, focusing on the spine and pelvis.
2. The treatment includes adjustment and/or manipulation of the spine or other joints.
3. The use of x-rays for diagnostic purposes.
4. The use of supportive therapies, including heliotherapy, thermotherapy, hydrotherapy, electrotherapy, mechanotherapy and patient hygiene, as deemed necessary.
5. Nutrition: Making sure the patients diet is including and utilizing the materials necessary for the maintenance and adequate functioning of the body and for growth and renewal of its components (Gatterman, 2004).

Chiropractic is the largest natural primary health care profession in the world. It is one of the most praised yet most misunderstood of all the health care disciplines, although more than twenty-five million Americans utilize it each year (Rondberg, 1998). Chiropractic is no longer taught to high school graduates with no college education. Chiropractic has rapidly evolved in to the second largest health care profession in the world, and is the largest profession that heals without using drugs. To get to this point of recognition has not been an easy task, but today the doctor of Chiropractic is now well schooled in the art and science of Chiropractic as well as general medicine (Wyatt, 1992).

1.2. Aims and Objectives of the Study

The main purpose of the study was:

- To determine the satisfaction and confidence of the graduates of the University of Johannesburg's Chiropractic program.

Additional objectives included:

- To discuss the differences between the educations received at South African Chiropractic programmes and internationally recognized Chiropractic programmes by comparing the syllabus offered in each program.
- To determine from the data received which areas of the program could be improved.

1.3. Benefits of the Study

This study would allow the South African Chiropractic programmes to ascertain whether their course matches or exceeds the desired outcome or where it may fall short in terms of comprehensive education according to the graduates. A review of documentation was used as to compare the syllabi of the various Chiropractic programmes worldwide. The study only questioned practitioners from the University of Johannesburg therefore no comparison can be made between the confidence levels of the various practitioners from the various programmes.

The confidence level in practitioners who are currently in practice, using the skills they acquired during their training daily is influenced by the training they have received. If the practitioners leave the course confident in their abilities as a Chiropractor and a primary care physician the course structure is ideal. Practitioners can however recommend various subjects/subject matter that they feel would be beneficial to graduating students. The information gained would be valuable to both lecturers and students alike.

CHAPTER TWO: LITERATURE REVIEW

2.1. Chiropractic Education

The purpose of a Chiropractic education is to provide the student with a core of knowledge in basic sciences, clinical sciences and related health subjects. These subjects are necessary for the doctor of Chiropractic to perform the professional obligations at a primary contact level (Life Chiropractic College West, 2006).

The aim of any Chiropractic program is to produce competent, knowledgeable care providers specializing in Chiropractic care. In addition a Chiropractor should be someone who will go out into the community to promote the well-being of patients and the name of Chiropractic. Doctors of Chiropractic should continue to further their education once they have graduated as lifelong learners will be able to give more back to their communities and make better doctors.

Many people don't realize that the Chiropractic education is on par with the medical doctors. Chiropractic education is as rigorous and demanding as any other primary care provider. Chiropractic doctors must complete the prerequisite undergraduate education and almost the same amount of academic hours as Medical doctors do in medical schools (Chiropractic Education, 2007).

The main purpose of the undergraduate Chiropractic education is for Chiropractors to be seen as primary health care providers, and not just as spinal specialists. The curriculum should therefore provide the students with an education that would enable them to practice and feel competent within their practice. The goal therefore in educational terms is to attain clinical competence, defined as 'the mastery of a body of relevant knowledge and the acquisition of a range of relevant skills, which would include interpersonal, clinical and technical components'. Mastery however takes time to acquire and will of

course differ from student to graduate to experienced clinician; it refers to the expected level of achievement depending on training and experience (Byfield, 2005).

The education of any professional is the foundation of that profession. A strong educational base will give you a strong profession. Any educator will ask if the formal training they have taught a student clinically will translate to good clinical practice and what the impact on performance by doctors is as a result of their initial training (Leone, 1999). Are the students understanding and using the information being lectured to them and utilizing it to become outstanding Doctors of Chiropractic, setting good examples in the medical field?

It is our professional responsibility and obligation to maintain a high standard of practice and patient care that includes skillfully applied spinal manipulation (Byfield, 2005). Spinal manipulation forms the basis of a Chiropractic treatment; it is an extremely complex skill to master. If Chiropractic programmes are producing confident, high quality adjusters the profession can only move from strength to strength.

South Africans Qualifications Authority (SAQA) dictates the exit level outcomes that prescribe the course content and outcomes of qualifications in South Africa. SAQA states that any person qualifying with the Master of Technology in Chiropractic will be eligible to register as interns with the Allied Health Professions Council and be able to provide a service that includes prevention, cure and rehabilitation of disease and promotion of health. Interns must be able to apply primary health care principles and practice including the management of neuromuskuloskeletal conditions. Once internship has been completed, interns will be able to practice independently as Chiropractors, interacting with other health care professionals and conducting research.

SAQA states that the exit level outcomes are:

1. The qualifying person will be able to diagnose diseases and demonstrate knowledge and skills in clinical practice.

2. They must be able to demonstrate knowledge of science and necessary skills in the scientific knowledge.
3. They must have knowledge of how to establish and run a practice.
4. They must have knowledge of philosophy, logic and world views on Chiropractic.

2.2. Education

The process of creating the rich cognitive network of interconnecting information has been termed 'elaborated learning'. It is essential that a student learns to relate theory to practice. Earlier exposure of students to theory does not necessarily mean that the students will understand or utilize the information in the latter years of study. More importantly we need to look at the way in which student acquire their knowledge; helping the students to relate the knowledge that they learn in each subject to each other is vital, especially the linking of theory to clinical practice (Byfield, 1996).

2.3. Basic Medical Sciences

The foundations of medical science must be included in the Chiropractic course to allow the doctor to diagnose, treat and refer the patient if required. However Chiropractors do not treat infectious diseases nor can they manage 90% of the problems in the population without referral (Sandefur, Febbo & Rupert, 2005). They do however need to know how to communicate with and refer to other medical professions. Knowledge of the basic medical sciences is necessary for a doctor of Chiropractic to know when to refer and who to refer to.

The basics of any medical degree would be anatomy and physiology; you would have to know what you are looking at, what lies where and pain referral patterns of organs. Doctors of Chiropractic need to know all neuroanatomy, spinal and spinal nerve anatomy, knowledge of all joints, muscles and related vasculature. To know how the body functions as whole would also be extremely important, to allow you to understand disease

processes. Moore and Dalley (1999) state that anatomy, which is the study of the structure of the body, is one of the oldest basic medical sciences. Moore and Dalley (1999) also stated that Hippocrates (460-377BC) is regarded as the Father of Medicine and a founder of the science of anatomy. He stated that the nature of the body is the beginning of any medical science. Martini (1998) states that Anatomy and Physiology have to be studied together as they are closely related both theoretically and practically. Physiology is the study of how living organisms perform their vital functions.

This shows that anatomy and physiology go hand in hand to lay the foundations of a medical education. To understand the disease processes and to be able to accurately diagnose and treat a patient will allow a person to be able to practice in a medical career. Haslett, Chilvers, Boon, Colledge & Hunter, (2002) states that to be able run a medical practice it is important to obtain a clear history and elicit important physical signs which are a prerequisite for an accurate diagnosis. Medical students are expected to learn a bewildering mix of facts about various conditions; they must also develop an analytical, problem-based approach to allow them to formulate a differential diagnosis and a logical plan of investigations for patients who present with particular symptoms or signs of disease.

However, in order to understand the disease process and how a disease presents, one must have knowledge of the pathology of the disease. Underwood (2000) says that pathology is the scientific study of disease. In clinical practice and medical education, pathology has a wider meaning: pathology constitutes a large body of scientific knowledge, ideas and investigative methods essential for the understanding and practice of modern medicine.

Deciding on the most appropriate form of treatment is critical and requires integration of all knowledge acquired. Jamison (1991) states that decision making lies at the very heart of the art and science of health care. Clinical decision making is performed only once all of the patients data has been accurately collected. The integration of such data taking into consideration the disease pathogenesis, and the comparison of such integrated data with contemporary health management concepts.

When a patient presents to a Chiropractor for back or neck pain, the Chiropractor must be able to diagnose any systemic disease that the patient may have within the primary care setting. Sandefur *et al*, (2005) stated that the curricula of selected medical schools and Chiropractic schools were compared. The authors concluded that in the basic sciences, Chiropractic and medical curricula are quite similar. The medical schools however exceeded Chiropractic institutions in the number of hours needed. The Council on Chiropractic Education has mandated that Chiropractic institutions need to educate and train competent doctors of Chiropractic. Chiropractors will need to provide quality patient care and must be able to serve as a primary care physician as a requirement for accreditation. Chiropractic institutions looking for accreditation, strive to meet these standards therefore include in their curricula courses such as pathology and diagnosis, despite philosophical objections that some colleges may have.

The University of Johannesburg's (UJ) Chiropractic program includes the basic medical sciences in the first two years. Anatomy and Physiology consist of 945 hours and 405 hours respectively over two years. In the second year Microbiology, Biochemistry and Epidemiology combined are a total of 324 hours. This forms a strong basis for the clinical subjects that are a part of the senior years. Diagnostics falls over the third and fourth years with a total of 459 hours. Pathology is part of the third year syllabus consisting of 189 hours. This allows students to understand the body, its functions and any pathological process's that may occur. Having this basis allows students to accurately diagnose and be a primary care physician confidently.

A Chiropractor needs to accurately diagnose and refer patients when necessary. Often patients present with numerous complaints where quick and accurate referral is vital for the patients' wellbeing. Mootz & Vernon (1999) state that a patient usually presents with a chief complaint or a secondary complaint that appears visceral. The Chiropractor needs to determine whether the pain is visceral and whether or not he could accurately and effectively manage the condition. Diagnosis and referral, if necessary, needs to be done immediately and may have serious consequences for the patient concerned if it is not

done timeously. Inappropriate or unnecessarily surgical referral may result in nonessential or inappropriate surgery with varying consequences.

Patient referral for further diagnosis or therapeutic care is often helpful and many times a necessity. Referrals could occur within the Chiropractic profession or to another branch of health care. As there are improvements in communication, technology, and education, health care professionals are forming relationships thought in the past to be improbable, if not impossible. Chiropractors today must understand how, when, why, and where to refer a patient. To be able to converse with other disciplines about patients, it is necessary to be fluent in spinal and biomechanical related disorders as well as general health care (Wyatt, 1992).

What is the role of a primary care physician? Does a Chiropractor fit into the primary health care aspect? If Chiropractors are seen as primary health care practitioners then is the medical knowledge they receive adequate for this role? As stated by the World Health Organization (2006), primary health care needs to address the most common problems in the community. It also needs to provide preventative, curative, and rehabilitative services to maximize health and wellbeing.

Chiropractors seem to be a gatekeeper for direct access to the health delivery system; therefore responsibilities of the doctor of Chiropractic as a primary care physician may include wellness promotion, health assessment, diagnosis, and the Chiropractic management of the patient's health care needs. The doctor of Chiropractic must consult with, co-manage or refer to other health care providers when necessary (Life Chiropractic West College, 2006).

An important part of medical care includes emergency medicine and first aid. A Chiropractor should be knowledgeable in this area as they may encounter a situation that requires emergency treatment whether it is in their rooms or field-side. Woo (2000) states that the aim of a first aid and/or emergency care course is to allow Chiropractic students to be able to perform the basics of first aid and emergency care i.e., to help them

recognize and respond confidently and appropriately to potential emergency situations. Emphasis on Chiropractic related topics, such as potential medical and traumatic conditions (including complications of spinal manipulation and prevention in Chiropractic settings), is essential in the first aid and emergency care course. CPR training with mannequins and of automatic external defibrillator training is highly recommended for Chiropractic students. The UJ's Chiropractic program makes it essential to complete a basic first aid training course this is required before the student may enter the clinic to treat patients.

Radiography and radiology is a vital subject in any primary healthcare field. For a Chiropractor being able to read and understand x-rays is of utmost importance. A Chiropractor should be able to rely on their own knowledge and not only that of the radiographer and radiologists. Yochum and Rowe (1996) state that diagnostic imaging has a vital role in the care of patients with musculoskeletal complaints.

2.4. Chiropractic Subjects

Chiropractic subjects are divided into philosophy, diagnostics and techniques all of these combined allow a person to practice Chiropractic.

Chiropractic techniques are vital in teaching a student to adjust/ manipulate a joint. The UJ Chiropractic program consists of a course called Principles and Practice of Chiropractic (PPC). PPC is lectured in third year (243 hours), fourth year (270 hours) and fifth year (108 hours). PPC lectures consist of a theoretical and practical component. PPC theoretical component looks at the spine and extremities, patient management, Chiropractic theories, indications and contraindications and clinical anatomy of the joints. The practical component teaches the student to motion palpate and adjust the joints in the body. Each regional that is taught has alternatives such as mobilization and a variety of techniques for each joint.

Principles and practice of Chiropractic allows students to learn and perfect the basics in the practice of Chiropractic technique and adjustments both spinal and extremity. A Chiropractor must also be able to assess the joint by means of motion palpation to determine where the subluxation or restriction in movement exists. Motion palpation forms a part of the principles and practice of Chiropractic course and usually is taught before the adjustments to allow the joint to be properly evaluated.

The foundation of Chiropractic treatment is the adjustment. An adjustment is a Chiropractic therapeutic procedure, using a controlled force, leverage, direction, amplitude, and velocity which is directed at specific joints or anatomic regions (Gatterman, 2004). Chiropractic manipulative techniques are a complex interaction of numerous practiced psychomotor skills. The techniques are the foundation of Chiropractic clinical therapeutics, and are an important part of the treatment protocol for the management of musculoskeletal dysfunction (Byfield, 1996).

Many students have difficulty in their first few years of adjusting to master the technique. To be entirely confident in all adjustments students are taught would be the ultimate goal of any Chiropractic program. Practice and dedication allows a student to master the technique. To learn a psychomotor skill, especially one as complex as manual manipulation, requires a considerable amount of practice (Byfield, 1996).

Schafer (1991) commented that it is surprising how many graduates are not able to properly “deliver” a Chiropractic adjustment. Although the students have been adequately taught the mechanics of the adjustment they have not yet mastered the finesse. The latter is the “art”, and it is parallel in importance to the “scientific” mechanical objective. Byfield (2005) states that skills of adjusting must be lectured with understanding and reasoning, not merely by aimless repetition of the adjustments. Structured practice with constant supervision is vital in the learning of complex motor skills and also in placing manipulative skills and procedures into clinical perspective.

The more a student learns the more tools the student has to treat a patient. With a diversity of conditions, shapes and sizes of patient's Chiropractors would need to know a variety of techniques to be able to treat each person adequately. Leone (1999) states that an association exists between technique curricula and the techniques that are used in the Chiropractic setting. Results show that a college that teaches a more diversified technique curriculum will produce graduates who use more diversified treatment protocols.

An extremely important part in the performance of the adjustment techniques is vast knowledge of spinal and extremity joint architecture, facet plane orientations and arthrokinematics. When subluxation/dysfunction of the joint is identified, the Chiropractor should be able to successfully deliver the adjustment causing joint separation and corrective joint movements at the desired segment, without producing joint compression, injury or distraction at other levels (Bergmann, 2000).

The human body is an extremely complex structure composed of a number of components. These components combine to produce a variety of postures and movements. Knowledge of the physical principles that govern the body is a prerequisite to examination of the structure and function of individual components (Levangie & Norkin, 1992). To be able to assess a joint the mechanics of the affected joint need to be understood. Clinical biomechanics is the study of the joints of the body and their mechanics.

Part of the course structure of the UJ Chiropractic program is clinical biomechanics and kinesiology. This is a fourth and fifth year subject. In fourth year the students are introduced to the subject and concentrate on spinal biomechanics. The fifth year syllabus looks at the extremity joints in the body and how they function together.

Diagnostic techniques that are Chiropractic specific are extremely important in musculoskeletal conditions. These cannot however be separated from the primary health care diagnostics. The UJ's Chiropractic course structure includes Clinical Chiropractic in the fourth and fifth year consisting of 270 and 243 hours respectively.

Clinical Chiropractic is essentially an extensive study of the spine and extremity joints and their related conditions. This subject enables a student to accurately assess, diagnose and treat any joint and associated muscular dysfunction. A vast knowledge is required as the anatomy, biomechanics and pathology of the joint need to be assessed, the treatment specific to that pathology is also vital.

Chiropractic philosophy is what distinguishes Chiropractic from other medical professions. An introduction to Chiropractic philosophy and history is part of the first year syllabus. Further philosophy is added into the PPC lectures, however UJ focuses on current evidence based approaches to Chiropractic.

It has been said that one adjustment in a child is worth fifty in an adult (Anrig and Plaughter, 1998).

Upon opening their own practice the range of patients will widen vastly. Many babies and children will present to you with a wide variety of conditions, which will require knowledge and skills that differ from treating adults. Paediatrics requires additional training both from a Chiropractic perspective and medical perspective. Paediatrics only began emerging as a medical specialty late in the 19th and early 20th centuries in response to the growing need and awareness that the health problems affecting children are different from those affecting the adult population (Davies, 2000).

Paediatrics is incorporated into the UJ's Chiropractic program both from a medical perspective and Chiropractic perspective. Diagnostics III looks at paediatrics from a medical perspective; Clinical Chiropractic V and Chiropractic Principles and Practice V looks at paediatric Chiropractic.

Acquiring a case history with any patient is extremely important in accurately diagnosing the patient. Questioning the parents and obtaining a record of the child's milestones are vital in obtaining a clear concise history as babies are unable to communicate with adults.

Communication with babies occurs through different types of cries, body movements and facial expressions; the ability of the clinician to be able to interpret all this information requires additional knowledge and experience. Being able to interpret the child's behavior will assist you in finding out exactly what is wrong with the child. Neurological presentations can be very confusing in children, with wide ranging manifestations (Davies, 2000).

The ability of a clinician to obtain a thorough clinical history and to conduct an adequate physical examination not only allows the diagnosis of disease but is extremely important in the evaluation of a normal child, especially the child who may have slight deviations from the normal but still falls in the normal range (Davies, 2000).

Adjusting a child or infant is not just like adjusting a miniature adult and normal techniques cannot just be adapted to a small body. Care needs to be taken to understand their bodies and the way they function biomechanically.

All adjustments, especially those applied to the paediatric population require a high level of skill. Nonspecific introduction of forces through the delicate spine of an infant, due to ignorance of biomechanics cannot be tolerated (Anrig and Plaughner, 1998). Treatment of an infant should be to the best of ones ability. The best you can offer a patient would be recent updated information and skills. Clinicians who are not familiar with the adjustive care of children, or those who have been applying techniques in a nonspecific fashion to paediatric patients, should refocus their efforts toward the correction of the subluxation in as specific a manner as possible and with the least likelihood of doing harm (Anrig and Plaughner , 1998).

The role of a Chiropractor is not simply adjusting and inducing movement into a “stuck joint” as many have wrongly stated, but to correct patterns of functional neuropathology (Davies, 2000).

There is a change in the focus of health care professionals due to the ageing of the population (Gleberzon, 2001). Why is there a special concern for older people? Why is it necessary for educational institutions to devote time in already-crowded core curriculum for a course specific to geriatrics (Gleberzon, 2001)? The UJ's Chiropractic program incorporates geriatrics into Chiropractic Principles and Practice V.

Over the last century there have been many advances in medicine and an improvement in health care that has increased life expectancy. The majority of people will reach old age and will come to expect the best care and medical attention that they have received throughout their lives. The ageing population needs an interdisciplinary approach to allow the full benefits of any treatment with minimal side effects. Chiropractic care is essential for musculoskeletal conditions of the geriatric patient to try and decrease the amount of medication the patient may already be on.

Geriatrics is defined as the branch of medicine which concentrates on treating all problems peculiar to old age and the aging, including the clinical problems of senescence and senility (Gleberzon, 2001).

Many physiological changes take place which the clinician would need to be aware of. What is normal in old age and what is a cause for concern? Changes especially in the nervous, muscular and skeletal systems are important. Posture and gait need to be carefully monitored. Bone mass is an important factor when considering adjustment of an aged person. Neurological examination, changes in motor co-ordination and proprioception are essential in monitoring the patient's ability to look after themselves and their quality of life.

Health care and treatment of a geriatric patient is involved and requires knowledge not only on treatment and diagnosis the patient, but also to improve the quality of life.

2.5. Chiropractic Philosophy

Chiropractic philosophy plays a huge role in defining Chiropractic. In South Africa it is a subject in first year and is incorporated into Chiropractic Principles and Practice in third, fourth and fifth year. This is what distinguishes Chiropractic from modern medicine as it works towards a “holistic” or whole body approach looking at the body, spirit and mind.

Since Chiropractic philosophy was established in 1895 by D.D Palmer many people have developed other techniques, usually named after them, that generally fall under the Chiropractic umbrella. All practitioners will advocate the technique they use however a variety are used in Chiropractic practices all over the world. To be qualified to use these techniques usually a post-graduate course is required unless of course the college you attend lectures that specific technique. In South Africa many of the techniques that are being practiced are not seen as Chiropractic and in the future perhaps a standardized basis to what constitutes Chiropractic will be established.

To name just a few of the Chiropractic Techniques: Gonstead, Upper Cervical Specific, Cox, Sacro-Occipital technique, Applied Kinesiology, Activator methods, Chiropractic Biophysics, Pettibon, Diversified, Logan Basic, Motion Palpation, Network, Thompson Terminal Point, Toftness, Grostic, Pierce-Stillwagon, Meric, BEST, and many others (Cooperstein & Gleberzon, 2004).

2.5.1. Activator method

Activator methods technique conducts an analysis of basic body biomechanics, with the understanding that disturbed mechanics leads to disturbed function. The location of subluxations are found using a series of diagnostic provocative maneuvers and leg length checks. The therapeutic goal of the technique is to restore proper body mechanics through the application of low-force adjustments. To increase patient and doctor safety the use of the Activator adjusting instrument is used (Cooperstein & Gleberzon, 2004).

2.5.2. Applied Kinesiology

Applied Kinesiology (AK) creates a unified approach to identify and treat body distortion and dysfunction. AK is primarily concerned with functional disturbance, and how it relates to the disruption of homeostasis of the body and therefore the causation and maintenance of disease. AK methods find application in many different health related fields, and are therefore not seen as exclusively Chiropractic. AK aims to restore postural balance, correct gait impairment, and improve range of motion; and considers itself prophylactic of future degenerative changes (Cooperstein & Gleberzon, 2004).

2.5.3. Bioenergetic synchronization technique

BEST's (bioenergetic synchronization technique) primary goal is to improve the communication (confirmed by pulsation), to even leg length discrepancy and to remove spasticity of muscles (confirmed visually and by testing). Disease supposedly disturbs intercellular communication, and is manifested by abnormal palpable pulsations. The idea of BEST is to normalize the sensory system, to affect structural homeostasis and to reposition the vertebrae. BEST balances and synchronizes the body's energy, by removing nerve interference, which is especially high in the nervous system (Cooperstein & Gleberzon, 2004).

2.5.4. Cranial Therapies

The purported aim or therapeutic intent of cranial therapies (CT) changes depending on the source. While a group of cranial therapist's states that its intention is the restoration of functional motion rather than structural change, the more traditional cranial therapists maintain that, since structure governs function, they physically alter the cranial environment, including the alignment of the cranial bones (Cooperstein & Gleberzon, 2004).

2.5.5. Distraction Technique

The treatment principle is squarely contained within the descriptive nature of the name of the technique: flexion plus distraction. This technique requires specialized treatment tables that allow the operator to apply these coupled movements of flexion and

distraction. These tables have a section underlying the lower part of the body from the pelvis down that the clinician can lower by means of a tiller, therefore flexing the lumbopelvis on the trunk, and tractioning the lumbar spine. Although distraction technique is primarily thought of as a treatment for a herniated lumbar disc, it is also used for most other commonly seen lumbopelvic conditions (Cooperstein & Gleberzon, 2004).

2.5.6. Diversified Technique

Diversified is the most generic of all technique systems. It has such a broad philosophy: Chiropractors adjust subluxations, to prevent nerve interference, therefore allowing the body to heal itself. Diversified practitioners identify subluxations using a thorough patient history, motion or static palpation, X-ray's, thermography, leg length discrepancy checks, and a variety of reflex procedures. Diversified practitioners treat full spinally and usually, but not always, treat the extremities. They perform both high- and low-velocity adjustive procedures (manipulation and mobilization, respectively), they can also use specialized tables (usually drop or flexion-distraction tables) or other equipment (such as padded wedges), and may use adjusting instruments as an alternative to manual interventions. Additional treatment procedures include physical therapy modalities, soft tissue and myofascial work, reflex methods, heel lifts, orthotic devices, nutritional advice and supplements, exercise instruction, rehabilitation procedures, and activities of daily living counseling (Cooperstein & Gleberzon, 2004). Diversified Technique is the standard technique taught in South African Chiropractic programmes.

2.5.7. Gonstead Chiropractic Technique

The Gonstead Chiropractic Technique (GCT) is a multifactorial examination procedure that is directed at identifying the various components of the vertebral subluxation complex, which is regarded as a multidimensional entity. The evaluation procedures include a history taking, visual inspection, general physical examination; static and dynamic (stress) radiography, and instrumentation (primarily thermography). The adjusting strategy emphasizes specificity, high-velocity, low-amplitude thrusting with an audible release, lines of drive that favor posteroanterior and eschew rotational vectors,

and avoiding thrusts directed against hypermobile compensations (Cooperstein & Gleberzon, 2004).

2.5.8. Logan Basic

Logan Basic (LBT) the primary goal is to reduce body distortion and promote health, through the elimination of nerve interference and facilitation of homeostatic self-regulation of the body. Logan's most well-known statement, "As the sacrum goes, so does the spine" which indicates the essence of LBT. Therefore meaning that if the sacrum is not subluxated, all other subluxations that occur would be self-correcting. Lower-extremity "deficiencies or distortion" are also taken into account as they may precipitate sacral base inferiority. The sacral subluxation is corrected by a light tugging pressure on the sacrotuberous ligament (Cooperstein & Gleberzon, 2004).

2.5.9. Network Chiropractic Technique

The primary purpose of Network Chiropractic Technique is to detect, classify, and adjust vertebral subluxations. These subluxations may impair the physiological, emotional, and mental options for growth and development, ultimately resulting in sickness and disease. Subluxations are classified as either Class A structural, or Class B meningeal/facilitated. A good outcome depended on addressing each class with the appropriate type of adjustment and in the right order. The adjustment was prophylactic and therapeutic in addressing subluxation (Cooperstein & Gleberzon, 2004).

2.5.10. Sacro-Occipital technique

Sacro-Occipital technique is 3-prolonged and consists of specific structural, neurological, and somatovisceral correction of subluxation-related problems. The goal is to "maximize the function of the Primary Cranial Sacral Respiratory Mechanism, to restore weight bearing postural dynamics of the body, and specifically to treat lumbar, vertebral, disc and sciatic nerve problems" (Cooperstein & Gleberzon, 2004).

2.5.11. Thompson Technique

The Thompson technique is a full-spine adjusting technique that emphasizes high-velocity, low amplitude, and some what low-force procedures, using a drop table as an indispensable adjunct. The Thompson Technique uses the Derrifield leg check, adapted from the original work of Dr. Romer Derrifield. The Derrifield-Thompson leg-check analysis helps the clinician to differentiate between primarily cervical and pelvic involvement, as well as distinguishing among various subentities within these primary diagnostic categories (Cooperstein & Gleberzon, 2004).

2.6. Intra-professional Struggle

Duenas, Carucci, Funk, Gurney, (2003) state that medicine concerns the science and the art of diagnosing, treating, curing and preventing disease. Medicine also focuses on relieving pain, improving and preserving health. Some Doctors of Chiropractic state that Chiropractic does not diagnose, treat, cure and prevent disease, or is even interested in addressing disease, however the mission statements and curricula of Council of Chiropractic education-accredited colleges are clear that the doctor of Chiropractic must be trained to address the diagnosis, treatment, cure, and prevention of diseases or conditions affecting the patient.

The scope of Chiropractic practice for which students need to be prepared for and the level of competence the students need in both the basic medical sciences and Chiropractic treatment and techniques are the two dimensions of Chiropractic educational standards, these two dimensions are of course related. When the scope of practice is broad in the range of illnesses treated, the techniques and methods used, the student's educational preparation needs to be broader and deeper and at a high level (Wardwell, 1992).

According to Gatterman (2004) there is an intra-professional struggle between the so-called "straights" and "mixers". Straight Chiropractors deal only with the spine and its subluxations; the philosophy they are taught deals with innate, the bodies ability to heal itself. Mixers deal with the entire musculoskeletal system and may use other equipment

or treatments to treat their patients. With this intra-professional split it is difficult to standardize the level of education between the Chiropractic colleges as the argument would arise of what to include and what not to include. In South Africa as majority of Chiropractors have graduated from local institutions where diversified technique is taught there is no problem with the standardization of the education or intra-professional struggle.

Do Chiropractic schools prepare their graduates to properly care for patients? A comprehensive study done by the U.S. Department of Health, Education, and Welfare in 1968 concluded they did not. Chiropractic schools have improved considerably since then but some still teach the subluxation theory, and may still instruct students to treat “subluxations” rather than diseases or “conditions” (Homola, 1999).

2.7. Comparison of Accredited Chiropractic Colleges

In the UK the General Chiropractic Council (GCC) has formulated and published strict criteria for accreditation of institutions and monitors activity at the educational level to help the institutions meet these criteria and keep within the statutory framework. This is a major step for Chiropractic education as it requires educators to raise their standards and comply with rules and regulations required by all those in higher education in the UK (Byfield, 2005).

The education provided to Chiropractic students is of utmost importance. A comparison of accredited college Anglo European Chiropractic College; New York Chiropractic College; Macquire University; Murdoch University; straight Chiropractic college Palmer and both South African Universities will compare the subjects taught at the relevant colleges.

Table 2.1 Comparison of AECC, UJ, DUT and Murdoch University

Year	AECC*	UJ**	DUT***	Murdoch University****
1 st	<ul style="list-style-type: none"> Anatomy Biomechanics Chiropractic concepts Clinical Problem solving Diagnosis Molecular Physiology Pathology Physiology/ Pharmacology Psychosocial Concepts Adjustive techniques Clinical observation Investigative imaging Radiography 	<ul style="list-style-type: none"> Anatomy I Physiology I Chemistry I Physics I Biology I Philosophy: Principles and history I 	<ul style="list-style-type: none"> Anatomy I Physiology I Philosophy History and Principles I Biology I Chemistry I Physics I 	<ul style="list-style-type: none"> Either: Age of Information or Evolution Revolution or Life and the Universe or Reinventing Australia or Structure thought and reality. Introduction to the Human body Introduction to Chemistry Principles of Vertebrate Physiology Cell Biology Chiropractic Skills and Principles Biostatistics and Information Retrieval Topics in Comparative Mammalian Anatomy
2 nd	<ul style="list-style-type: none"> Anatomy Molecular Physiology & Nutrition Pathology Physiology/Parmacology Psychosocial concepts Research Project Adjustive techniques Clinical observation Clinical problem solving Diagnosis Investigative Imaging Neurology Orthopaedics Radiography 	<ul style="list-style-type: none"> Anatomy II Biochemistry II Epidemiology II Immunology Medical Microbiology II Physiology II Social studies 	<ul style="list-style-type: none"> Anatomy II Biochemistry II Epidemiology II General Pathology Medical Microbiology II Physiology II Social Studies 	<ul style="list-style-type: none"> Human Anatomy I Chiropractic Biochemistry Biomedical Physiology Human Anatomy II Physical Examination Biomechanics and Chiropractic Skills
3 rd	<ul style="list-style-type: none"> Anatomy Clinical nutrition Pathology Physiology/Parmacology Research project Adjustive techniques 	<ul style="list-style-type: none"> Principles and practice of Chiropractic III (PPC) Diagnostics III Psychopathology II General Pathology Systemic 	<ul style="list-style-type: none"> Auxillary Therapeutics III Diagnostics III Psychopathology Chiropractic principles and practice III Systemic Pathology 	<ul style="list-style-type: none"> Diagnosis and Chiropractic Skills Processes in Human Disease Primary Practice I: Health Promotion and Disease Prevention

	<ul style="list-style-type: none"> • Clinical observation • Clinical problem solving • Diagnosis • Investigative imaging • Neurology • Orthopaedics • Psychosocial Concepts • Radiography 	<ul style="list-style-type: none"> • Pathology III • Auxillary Therapeutics III 		<ul style="list-style-type: none"> • Differential Diagnosis and Clinical Biomechanics • Immunology, Genetics and Microbiology • Chiropractic Skills and Principles III
4 th	<ul style="list-style-type: none"> • Current issues and philosophy of Chiropractic • Adjustive techniques • Clinical Audit • Clinical Chiropractic • Clinical Internship • Clinical observation mentorship • Professional Practice 	<ul style="list-style-type: none"> • Clinical Chiropractic IV • Diagnostics IV • PPC IV • Radiology IV • Research methods and techniques I • Clinical Biomechanics and kinesiology IV 	<ul style="list-style-type: none"> • Diagnostics IV • Clinical biomechanics and kinesiology IV • Clinical Chiropractic IV • Chiropractic principles and Practice IV • Radiology IV • Research methods and techniques 	<ul style="list-style-type: none"> • Primary Practice III: Differential Diagnosis I • Primary Practice IV: Differential Diagnosis II • Primary Practice II: Physical Rehabilitation • Radiography: Principles and Positioning • Physiological Therapeutics • Primary Practice V: Definitive Diagnosis and Pharmacology
5 th		<ul style="list-style-type: none"> • Clinical Chiropractic V • PPC V • Clinical Biomechanics and Kinesiology: V • Myofascial • Biomechanics • Practice Management & Jurisprudence • Research project and dissertation 	<ul style="list-style-type: none"> • Clinical biomechanics and kinesiology V • Clinical Chiropractic V • Chiropractic principles and techniques V • Research project and dissertation • Practice management and jurisprudence 	<p>Trimester 1</p> <ul style="list-style-type: none"> • Decision Making in Clinical Imaging • Practice Management & Law <p>Trimester 2</p> <ul style="list-style-type: none"> • Research Methods & Epidemiology • Community Health <p>Trimester 3</p> <ul style="list-style-type: none"> • Clinical Psychology • Topics Review <p>Whole Year</p> <ul style="list-style-type: none"> • Clinical Practicum
	* (Anglo European Chiropractic College, 2006)	** (University of Johannesburg, 2006)	*** (Durban University of Technology, 2006)	**** (Murdoch University, 2006)

Palmer College of Chiropractic (Palmer College, 2006) however breaks their course into quarters.

Table 2.2 Palmer College Course Curriculum

Quarter 1	Quarter 2
Gross Anatomy I	Gross Anatomy II
Histology & Cellular Physiology	Neuroanatomy
Human Embryology	Spinal Anatomy & Palpation II
Spinal Anatomy & Palpation I	Biochemistry
Fundamentals of Physiology	Neuromuscular Physiology/Pathology I
Chiropractic Philosophy & Practice I	General Pathology
Quarter 3	Quarter 4
Principles of Chiropractic Analysis	Radiographic Anatomy I
Gastrointestinal & Renal Physiology	Cardiac & Pulmonary Physiology
Microbiology	Endocrine & Reproductive Physiology
Neuromuscular Physiology/Pathology II	Chiropractic Clinical Evaluation II
Chiropractic Clinical Evaluation I	Chiropractic Philosophy & Practice II
Evidence Based Chiropractic I	Evidence based Chiropractic II
Emergency Procedures	Principles of Chiropractic Technique
Quarter 5	Quarter 6
Radiographic Anatomy II	Nutrition & Dietetics
Gastrointestinal, Endocrine & Urogenital Physiology	X-ray Physics & Principles
Cardiovascular & Pulmonary Physiology	Public Health I
Bone & Joint Pathology	Chiropractic Clinical Evaluation IV
Chiropractic Clinical Evaluation III	Clinical Chemistry Data Interpretation
Lumbopelvic Technique & Management	Thoracic Spine Technique & Management
	Lower Extremity Technique & Management
Quarter 7	Quarter 8
Public Health II	Diagnostic imaging II
Chiropractic Clinical Evaluation V	Differential Diagnosis II
Diagnostic Imaging I	Correlative Clinical Evaluation
Differential Diagnosis I	Obstetrics & Gynecology
Physical Therapy I	Physical Therapy II
Cervical Spine Technique & Management	Radiographic Technology I
Upper Extremity Technique & Management	Correlative Techniques and Management
Quarter 9	Quarter 10

Diagnostics Imaging III	Chiropractic Philosophy & Practice III
Differential Diagnosis III	Pain & Stress Management
Clinical Psychology	Occupational & Preventative Health
Paediatrics	Clinical Diagnostic Seminar I
Geriatrics	Rehabilitation & Exercise Management
Radiographic technology II	Clinic II
Ethics & Jurisprudence	
Clinic I	
Quarter 11	Quarter 12
Clinical Diagnostic Seminar II	Chiropractic Philosophy & Practice IV
Management of Chiropractic Practice	Clinical Diagnostic Seminar III
Clinic III	Clinic IV
Quarter 13	
Clinical Diagnostic Seminar IV	
Development of Chiropractic Practice	
Clinic V (Field Training Program)	

New York Chiropractic College (NYCC, 2006) breaks their course into trimesters.

Table 2.3 New York Chiropractic College Curriculum

First Trimester	Second Trimester
Cell & Tissue Biology	Biochemistry of Nutrition & Metab.
Principles of Biochemistry	Gross Anatomy II
Technique 1: Psychomotor skills	Spinal Radiology
Technique 2: Intro to palpation	Contemporary Chiro Philosophy
Gross Anatomy I	Neuroscience II
Chiropractic Philosophy & History	Systems Physiology
Neurosciences I	Chiropractic Tech III: Spinal Assessment & Intro to Tech.
NYCC Compass Course	
Third Trimester	Fourth Trimester
Extremities Radiology	Patient Assessment Methods I
Gross Anatomy III	Environmental Health
Clinical Microbiology	Visceral Pathology
Extremities Technique I	Chiropractic Technique V
Chiropractic Technique IV	Musculoskeletal Physiopathology
Principles of Physiopathology	Extremities Technique II
Basic Human Nutrition I	Issues in Chiro. Research
Subluxation & Neurophysiological Effect	
Fifth Trimester	Sixth Trimester
Patient Assessment Methods II	Radiographic Physics & Positioning
Bone and Joint Imaging	General Diagnosis

Emergency Procedures	Ancillary Therapeutic Procedures I
Clinical Laboratory Diagnosis	Ancillary Therapeutic Procedures II
Chiropractic Technique VI	Technique Practice Lab I
Soft tissue Techniques	Flexion Distraction Technique
Basic Human Nutrition II	Introduction to Student Clinic
Postural Assessment	Patient Communication
Seventh Trimester	Eighth Trimester
Clinical Nutrition	Concepts in Pharmacology
Human Development Diagnosis	Clinical Service Phase 1
Introduction to Clinical Services	Ethics and the Law
Advanced Imaging	Clinical Psychology
Evidence Based Clinical Case Management	
Diagnosis & Management of Extremities Conditions	
Ninth Trimester	Tenth Trimester
Clinical Service Phase II	Clinical Service Phase III
Business Practices	Getting into Practice

Macquire University (Macquire, 2006) divides their undergraduate Chiropractic course into semesters. The course is only a year long and thus consists of two semesters.

Table 2.4 Macquire University Course Curriculum

Semester I	Semester II
Human Biology	DNA: The Thread of life
Human Physiology	Physiology
Physiology	Introductory to chemistry B
Introductory to chemistry A	Chiropractic Principles and Skills I
Biochemistry & Molecular Biology	Chiropractic Principles and Skills IIB
Chiropractic Principles and Skills I	Chiropractic Principles and Skills IIIB
Chiropractic Principles and Skills IIA	Human Anatomy IIB
Chiropractic Principles and Skills IIIA	Introductory Histology
Human Anatomy IIA	Contemporary Health Issues
Introductory Human Anatomy	Radiographic Practice
Pathology I	Pathology II
Anatomy I	Anatomy II
Health Placement: Semester 1 or 2	Ethical and Legal Issues in Health
Special Interest Seminar: Pathology	Differential Diagnosis
Medical Microbiology	Research Methods for Health Sciences
Anatomy 3	Anatomy 4
Theoretical Foundations of Health Sciences	
Concepts in the Physical Sciences	

University of Glamorgan (University of Glaumorgan, 2006) is a 4 year full-time program.

Table 2.5 University of Glamorgan Course Curriculum

Year 1	Year 3
Chiropractic I	Research Project I
Behavioural Science	Clinical Imaging II
Overview of Clinical Science	Chiropractic III
Clinical Physiology I	Clinical Neuro-orthopaedics
Clinical Anatomy	General Diagnosis and Clinical Specialities
Quantitative Methods in Clinical Sciences	Functional Management II
Year 2	Junior Clinic
Clinical Imaging I	Year 4
Physiology and Anatomy of the Nervous System	Chiropractic Clinic
Pathology	Research Project II
Chiropractic II	Clinical Diagnosis
Functional Management I	
Clinical Physiology II	

The comparison shows that the colleges mentioned above all have the same basic medical science subjects, however the Chiropractic subjects are named differently according to the college.

On average three years/semesters/trimesters of anatomy and physiology are taught. Integrated into physiology is pathology or it is taught as a separate subject once the physiology and anatomy have been completed. Biochemistry is only a one year/trimester/semester course however Anglo European Chiropractic College does not include it in their course and Murdoch University has a year course on Chiropractic Biochemistry as a substitute. Chiropractic subjects are only started in the South African colleges in their third year besides the year of Philosophy they have in their first year. Palmer College includes paediatrics and geriatrics as a subject in their course.

Health promotion and prevention (public health), nutrition, physical rehabilitation, pain and stress management are subjects that are not always considered as part of the Chiropractors treatment. These are however subjects taught at Maguire University, New York Chiropractic College, Palmer College, Murdoch University and Anglo-European.

All the colleges have a year of clinical practice in which the students treat patients under the supervision of qualified Chiropractic doctors. Macquire University, University of Glamorgan, University of Johannesburg formally the Technikon of Witwatersrand, Durban University of Technology formally Natal Technikon, Murdoch University and Anglo-European Chiropractic college all have research as a subject, this ensures that a continuation of research into the field exists.

Many of the Chiropractic colleges have a pre-Chiropractic year which is available for students who do not meet the requirements for the Chiropractic course. Applicants for this course need to have demonstrated academic ability or have qualifications in another field. The applicant will need to go for an interview and have observed and discussed Chiropractic with a registered practicing Chiropractor. The content of this course depends on the college. It usually contains basic medical sciences and a few Chiropractic subjects.

2.8. Comparison with Medical Education and Training

Table 2.6 Comparison of Hours of Basic Sciences Education in Medical and Chiropractic Schools (Coulter, I.D., Adams, A.H., Sandefu, R., 2006)

Subject	Chiropractic Schools		Medical Schools	
	Hours	% of Total	Hours	% of Total
Anatomy	570	40	368	31
Biochemistry	150	11	120	10
Microbiology	120	8	120	10
Public Health	70	5	289	24
Physiology	305	21	142	12
Pathology	205	14	162	14
<hr/>				
Total Hours	1,420	100	1,200	100

According to the above study Chiropractic schools the total basic medical sciences education hours are longer than medical schools. Looking at separate subjects medical schools only exceed Chiropractic hours in the public health section.

Table 2.7 The University of Johannesburg Curriculum for the Chiropractic Program
(University of Johannesburg, 2006)

Year	Subject	Hours per year
First	Anatomy I	324
	Chemistry I	297
	History and Philosophy of Chiropractic I	54
	Physiology I	189
	Biology I	189
	Physics I	81
		Total:1134
Second	Anatomy II	621
	Physiology II	216
	Social Studies II	144
	Microbiology II	189
	Biochemistry II	54
	Epidemiology II	81
		Total:1305
Third	Principles and Practice of Chiropractic III	243
	Diagnostics III	189
	Pathology III	189
	Auxillary Therapeutics III	162
	Psychopathology III	81
		Total:864

Fourth	Principles and Practice of Chiropractic IV	270
	Clinical Chiropractic IV	270
	Clinical Biomechanics and Kinesiology IV	135
	Research Methodology	81
	Radiology IV	180
	Diagnostics IV	270
		Total:1206
Fifth	Clinical Chiropractic V	243
	Principles and Practice of Chiropractic V	108
	Clinical Biomechanics and Kinesiology V	270
	Research Project and Dissertation	+/- 400
	Clinical Experience (min 35 new patients and 350 follow ups)	920
		Total:1941
		Total 5 years: 6450

Focusing on the University of Johannesburg's program in comparison has total of 945 anatomy hours where as medical schools have 368 and Chiropractic schools have 570. This is almost double the average number of anatomy hours at a Chiropractic school. Biochemistry is 150 hours at Chiropractic schools, 120 hours at medical schools and 54 hours at the UJ's Chiropractic program. Microbiology is 120 hours at both medical schools and Chiropractic schools; UJ's Chiropractic program is 189 hours. Public Health is 289 hours at medical schools, Chiropractic schools only have 70 hours, UJ' Chiropractic program has epidemiology the equivalent to public health and this is 81 hours. Physiology in UJ's Chiropractic program has a total of 405 hours, Chiropractic colleges have 305 hours and medical schools have 142 hours. Pathology is 189 hours in the UJ Chiropractic program, 205 hours at Chiropractic colleges and 162 hours in medical schools. On average the University of Johannesburg's Chiropractic program exceeds the average Chiropractic college and medical college.

2.9. University of Johannesburg

The University of Johannesburg's Chiropractic course has an academic course that spans five years. The basic medical sciences are covered in the first two years, with a course in Chiropractic philosophy done in the first year. Once the student reaches the third year you start specializing more in Chiropractic related subjects. Principles and practice of Chiropractic (PPC) teaches students motion palpation, spinal biomechanics and a few basic adjustments. Auxiliary therapeutics teaches students more about additional treatments that could be used for patients such as I.F.C, massage, etc. The remaining third year subjects are the basic medical sciences. In fourth year intense spinal academia begins as PPC includes many spinal manipulations and mobilizations building on the basis that the third year has provided. Clinical Chiropractic (CC) is an intense course looking at all spinal pathology and spinal diagnostic techniques. Radiology is lectured in fourth year to enable students to be able to take and read x-rays, thus giving them the basic knowledge needed to be able to communicate with other doctors and radiographers. It also allows the graduate to legally take their own x-rays if necessary. Research methodology is the basis to allow students to start working on their thesis or research dissertation. Clinical biomechanics and kinesiology (CBK) expands on the knowledge learnt in third year with regards to spinal biomechanics. In the fifth year students start treating patients in the clinic, lectures run in the mornings and patients are seen in the afternoon in the clinic. In the fifth year extremities are studied in all subjects. PPC, CC and CBK provide intense detail of all extremity joints. The myofascial course part of clinical biomechanics and kinesiology V covers myofascial diagnosis and therapy of all major muscles in the body which includes dry needling techniques and stretching of the relevant muscles. Practice management and jurisprudence gives students the basics required for opening and marketing their own practice, as well as educating the students on legislative and regulatory issues. Research project and dissertation is a subject where the student completes their master's dissertation. This need not be completed in the fifth year, but needs to be completed before the student may qualify.

In the clinic year patients are seen under supervision of practicing doctors of Chiropractic (clinicians) and assistant clinicians. Assistant clinicians are chosen from the senior years and are available in the afternoons to assist the fifth years with extremity regional assessments that may not have completed in the course as yet. Entrance OSCE's are performed to ensure that the students entering the clinic are clinically competent to treat in the clinic. During the 6th year or other senior years more difficult OSCE's are performed twice a year to ensure students are maintaining their clinical knowledge and competence.

2.11. Course requirements

The World Health Organization (2005) states that to be accepted into the course the applicant must have a secondary education with university entrance or its equivalent containing appropriate training in basic sciences as required by each individual program. Basic training should contain no less than 4200 student/teacher hours or four years of full time academic training for those without relevant prior health care education or experience, irrespective of the model of education utilized. This includes not less than 1000 hours of supervised clinical training.

To successfully apply to the University of Johannesburg's Chiropractic program, students are required to have their senior certificate or qualification of equivalent standard with matric exemption. An M-score rating of 14 is also used in the selection process. This allocates points to the symbol gained in either standard or higher grade (see table 2.8 and table 2.9), only the 6 best points are used. Two of the following subjects are needed mathematics, science or biology with a minimum of a D symbol (above 50%) on higher grade or a C (above 60%) on standard grade. Biology is a highly recommended subject with the same mark criteria as above. Should you have obtained these result you would be invited for an interview, you are required to have visited three practicing Chiropractors who would give you a letter of recommendation.

Table 2.8 Senior Certificate/ Grade 12 M-Scores (Faculty of Health Sciences, 2007)

<u>Subject Symbol</u>	<u>Higher Grade</u>	<u>Standard Grade</u>
A	5	4
B	4	3
C	3	2
D	2	1
E	1	0

Table 2.9 Admission scores for other type of school-end certificates (Faculty of Health Sciences, 2007)

<u>UJ M-score</u>	<u>A-Level</u>	<u>O-Level</u>	<u>HIGCSE</u>	<u>IGCSE</u>	<u>AS-Level</u>	<u>IB</u>	<u>IEB</u>
5	A		1		A	7	5
4	B		2		B	6	4
3	C	A	3	A	C	5	3
2	D	B	4	B	D	4	2
1	E	C		C	E	3	1
0	F	D		D			0

2.12. Chiropractic Regulatory Bodies

The World Health Organization (2005) states that regulatory bodies are needed to monitor the entire profession in order to introduce qualified practitioners and the proper use of Chiropractic, to monitor the performance of practitioners and the education and training of practitioners.

A council or regulatory body that registers Chiropractors exists in the following countries: South Africa, United States of America, Canada, Australia and the United Kingdom. The students are only allowed to register if they have completed a course in Chiropractic and are qualified doctors of Chiropractic. There are often stringent entrance

requirements regarding education, training and competency. These requirements vary from council to council.

The Allied Health Professions Council of South Africa (AHPCSA) is the regulating body for Chiropractic in South Africa. Chiropractors, Homeopaths, Osteopaths, Naturopaths, Phytotherapists, Therapeutic Aromatherapists, Therapeutic massage therapists, Therapeutic Reflexologists, Chinese medicine and acupuncture practitioners are Allied Health Professions. The Council is expected to establish academic standards, criteria for registration and the right to practice any of the professions (Allied Health Professions Council, 2000).

The Chiropractic Association of South Africa (CASA) is a professional association formed by Chiropractors for the welfare of the Chiropractic profession. Registration to CASA is not compulsory however registration to the statutory council AHPCSA is compulsory for a practitioner to practice as it protects the interests of the public.

Once a student of Chiropractic has completed the academic and clinical requirements of their institution, internship has to be completed only then can a student register as a doctor of Chiropractic.

The quality of education is best monitored through an effective system of accreditation Wardwell (1992). There are many forms of accrediting and validating agencies for Chiropractic education around the world; the Council on Chiropractic Education (CCE) in the USA and the European Council on Chiropractic Education (ECCE) in Europe being the most prominent. They each set standards and there is a high degree of reciprocity between them. Meaning that a Chiropractor who has graduated from any institution recognized by one council, can usually practice in any country (subject to relevant statutory board exams, immigration/employment laws etc.) under the jurisdiction of another (Anglo European Chiropractic College, 2006). Graduating from an accredited program usually gives the graduate access to board exams.

2.13. WHO guidelines on basic training and safety in Chiropractic

The World Health Organization (WHO) met in December 2004 to provide the guidelines for the minimum requirements for Chiropractic education. The WHO guidelines (2005) states that the objective of a full Chiropractic education is to allow practitioners to practice as primary-contact health care providers. Entrance requirements are that the student has completed secondary schooling with university entrance or its equivalent. The syllabus/curriculum of a Chiropractic course should centre around acquiring knowledge; the ability to understand and solve problems; and the acquisition of psychomotor skills. All of these together develop into competency.

Table 2.10 Guidelines for four-year full time accredited Chiropractic program

Division	1 st Year (Hours)	2 nd Year (Hours)	3 rd Year (Hours)	4 th Year (Hours)
Biological Sciences	Human Anatomy (180) Microscopic Anatomy (140) Neuroanatomy (72) Neuroscience I (32) Biochemistry (112) Physiology (36)	Pathology (174) Lab Diagnosis (40) Microbiology & Infectious Diseases (100) Neuroscience II (85) Nutrition (60) Immunology (15)	Lab Diagnosis (32) Toxicology (12)	Clinical Nutrition (26) Community Health (40)
Clinical Sciences	Normal Radiographic Anatomy (16) Radiation Biophysics and Protection (44)	Intro. Diagnosis (85) Intro Bone Pathology (48) Normal Roentgen, Variants & Roentgenometrics (40)	Orthopaedics & Rheumatology (90) Neuro. Diagnosis (40) Diagnosis & Symptomatology (120) Differential Diagnosis (30) Radiological Technology (40) Arthritis & Trauma (48)	Clinical Psychology (46) Emergency Care (50) Child Care (20) Female Care (30) Geriatrics (20) Abdomen, Chest & Special Radiographic Procedures (40)
Chiropractic Sciences	Chiropractic Principles I (56) Basic Body Mechanics (96) Chiropractic Skills I (100)	Chiropractic Principles II (60) Chiropractic Skills II (145) Spinal Mechanics (40)	Chiropractic Principles III (42) Clinical Biomechanics (100) Chiropractic Skills III (145) Auxillary Chiropractic Therapy (60) Introduction to Jurisprudence & Practice Development (16)	Integrated Chiropractic Practice (90) Jurisprudence & Practical Development (50)
Clinical Practicum	Observation I (30)	Observation II (70)	Observation III (400)	Internship (750) Clerkships: Auxillary Therapy (30) Clinical Lab (20) Clinical X-ray Technology (70) Interpretation (70) Observer IV (30)
Research			Applied Research & Biometrics (32)	Research & Investigative Project
Totals	914	962	1207	1382
TOTAL HOURS Study Full-time over four years	4465 plus Research Project			

World Health Organization (2005)

When comparing the University of Johannesburg curriculum to the WHO course guidelines, it is shown that the UJ's Chiropractic program has a five academic year course as apposed to the recommended four years. Within the first two years the basic medical sciences are taught. The UJ Chiropractic course in the first two years extensively covers physiology and anatomy, branching into human anatomy, microscopic anatomy and neuroanatomy. The second academic year biochemistry was part of the syllabus. Radiology covering radiographic anatomy, roentgen, variants & roentgenometrics and radiation biophysics and protection was a fourth year subject. The Chiropractic related subjects are only introduced in the third year including subjects such as Principles and Practice of Chiropractic. This takes a look at the basic biomechanics of the body, spinal mechanics and Chiropractic skills. These subjects continue through out the program till fifth year. Clinic observation clinic begins in fourth year and is a prerequisite to treating patients in fifth year; however students are encouraged from first year to visit the clinic for treatment. Neuroscience is not taught as a separate subject in the UJ Chiropractic course however it is a recommended subject for both first and second year by WHO. The UJ Chiropractic program includes pathology, microbiology and immunology as second and third year subjects as per WHO guidelines, however nutrition and lab diagnosis are not taught as separate subjects. Lab diagnosis is added in as part of clinical Chiropractic and diagnostics. Diagnostics in the UJ Chiropractic course runs as a two year subject and this intergrates symptomatology, differential diagnosis and lab diagnosis. Clinical Chiropractic IV encompasses bone pathology, orthopedics & rheumatology, neuro diagnosis, differential diagnosis, symptomatology, arthritis and trauma. Auxillary Chiropractic therapy is taught as a third year subject and using these modalities in treatments, forms part of the clinical requirements. Jurisprudence and practice development and geriatrics is a part of the syllabus of principles and practice five. Clinical psychology is part of the first and second year course in the form of social studies and psychopathology. Emergency care is taught in fourth year. Child care and female care form part of the diagnostics section, however paediatrics and childcare could

be a subject on its own to include Chiropractic care. Clinical x-ray, internship and clerkship; auxillary therapy all form part of clinic requirements.

2.14. The Council on Chiropractic Education

The Council on Chiropractic Education (CCE) was established in 1974 and it sets standards for the curriculum, faculty and staff, facilities, patient care and research for Chiropractic programmes. The major function of the CCE is to assess Chiropractic institutional effectiveness and outcomes (Coulter *et al.* 1996). In January 2006 the council for Chiropractic education (CCE) drew up a commission on accreditation which provides educational guidelines for facilities to work towards to achieve international accreditation.

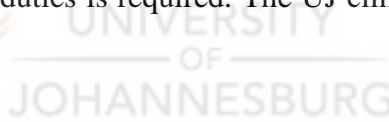
The CCE (2006) states that the curriculum should include anatomy; biochemistry; physiology; microbiology; pathology; public health; physical, clinical and laboratory; gynaecology; obstetrics; paediatrics; geriatrics; dermatology; otolaryngology; diagnostic imaging procedures; psychology; nutrition/dietetics; biomechanics; orthopaedics; neurology; first aid and emergency procedures; spinal analysis; principles and practice of Chiropractic; clinical decision making; adjustive techniques; research methods and procedures; and professional practice ethics. Should the course not be an individual course, how it is integrated into the syllabus should be documented.

The CCE (2006) also states that a graduate of Chiropractic should have successfully completed not less than 4200 instructional hours and must have earned no less than 25% of the total credits required for the D.C. degree from the program that confers the degree.

The core clinical training curriculum designed by the CCE (2006) states that each student should complete the following clinical requirements. A history on 20 different patients of which 16 must be non-student; an examination on 20 patients involving 15 different case types; interpretations of clinical lab tests including at least 25 urinalysis, 20 hematology procedures i.e. blood counts and 10 clinical chemistry, microbiology or immunology

procedures or profiles on human blood and/or other body fluids; 20 radiographic studies involving 15 different case types; a diagnosis on 20 different patients, 16 of which must be non student; 250 Chiropractic adjustments or manipulations at least 200 must be spinal adjustments provided during 250 separate visits, 200 of which must be non student encounters; and managing at least 15 cases (this number is to increase by 5 cases each year to a max of 35).

UJ students are required in their fifth year to start treating patients in the clinic under supervision of qualified doctors of Chiropractic. The clinical requirements are 35 new patients which consists of a case history, full physical examination, a regional examination, a minimum of 2 Chiropractic treatments and a case summary. A minimum of 350 follow ups which include either manipulations, mobilizations or McManus (flexion-distraction); 50 auxillary therapeutic treatments which includes ultrasound, I.F.C, cross-friction, laser, T.E.N.S, dry needling or ischemic compression. Full attendance to radiology and radiography duties is required. The UJ clinical requirements exceed those required by the CCE.



CHAPTER THREE: METHODOLOGY

3.1. Aims and Objectives

The main purpose of the study was:

- To determine the satisfaction and confidence of the graduates of the University of Johannesburg's Chiropractic program.

Additional objectives included:

- To discuss the differences between the educations received at South African Chiropractic programmes and internationally recognized Chiropractic programmes by comparing the syllabus offered in each program.
- To determine from the data received which areas of the program could be improved.

3.2. Study Design

A questionnaire-based study was designed to determine the confidence of post graduate Chiropractic students of the University of Johannesburg. The questionnaire consisted of demographic questions and subjective course based questions in the form of Lickert scale. Lickert scale questions were used to be able to put a numerical/quantitative value to a qualitative/subjective questionnaire.

The questionnaire (Appendix B) and a consent form (Appendix A) explaining the research was faxed or posted or e-mailed to the alumni of the University of Johannesburg Chiropractic department, who were asked to complete it and return it either by fax, post or e-mail.

The questionnaire (Appendix B) looked at the subjects that students will use in everyday practice. It also focused on possible methods to improve certain subjects.

A list of 132 post graduate students of the University of Johannesburg was used as a data base. An information form (Appendix A) was sent out with the questionnaire (Appendix B), informing participants about the aims of the study and contact details to return the questionnaire or should the participant require further details.

3.3. Sample Group

The respondents who were surveyed were Doctors of Chiropractic who have graduated from the University of Johannesburg, whether currently practicing or not. Anonymity of participants is ensured to prevent discrimination of participants by patients, colleagues, etc. A list of all graduates of the Chiropractic program from the University of Johannesburg was obtained, using this list contact information for the doctors was received from the Chiropractic Association of South Africa.

3.4. Sample Size

The total number of Alumni of the University of Johannesburg was 132. Of that only 94 were registered with the Chiropractic Association of South Africa (CASA) therefore a list of these e-mail addresses were obtained. A total of 47 alumni participated in the survey therefore forming the sample group.

3.5. Sample Selection and Procedure

Using information obtained from CASA, University of Johannesburg alumni were contacted. An email was sent out first due to this being the most cost and time effective method. E-mails were sent out with a covering letter and the attachment containing the information form (Appendix A) and questionnaire (Appendix B). Those who did not have email addresses were phoned and informed about the study, they were then asked for

preferred method of contact. Faxes and letters were sent out containing the information form (Appendix A) and questionnaire (Appendix B) if necessary. If no reply was received within two weeks the participant would be contacted to verify they had received the correspondence.

3.6. Questionnaire Design

As no previous questionnaire had been done for investigating post-graduate confidence in their knowledge and skills acquired in the Chiropractic course at the University of Johannesburg, the questionnaire was designed using literature and discussions with a Statistician.

The questionnaire (Appendix B) consisted of 20 questions. The first 8 questions were designed to obtain background information on the participant's i.e. demographic questions. The last 12 questions were Lickert scale questions which referenced the course.

Confidentiality is guaranteed as the involvement of or information received from participants would remain anonymous in order to protect the participants from discrimination by patients or colleagues.

3.7. Statistical Analysis

Once all the questionnaires were returned the data was analyzed by STATSCON at the University of Johannesburg. Descriptive statistics in the form of frequencies and percentages were used for categorical variables. Means and standard deviations were used for continuous variables. Factor analysis on opinion related questions were used to determine underlying constructs of confidence. The reliability of constructs was determined using Cronbach Alpha. Various biographical groups was compared using T-tests and analysis of variants (ANOVA).

CHAPTER FOUR: RESULTS

4.1. Introduction

The study was done using all graduates of the University of Johannesburg's Chiropractic program. As not all graduates replied it would be unfair to use this information as the view point of all graduates, it is only the viewpoint of the 47 participants who replied. This is only 35.6% of the postgraduate students of the University of Johannesburg's Chiropractic program.

4.2. Demographic Characteristics of the Sample Population

4.2.1. Gender Distribution

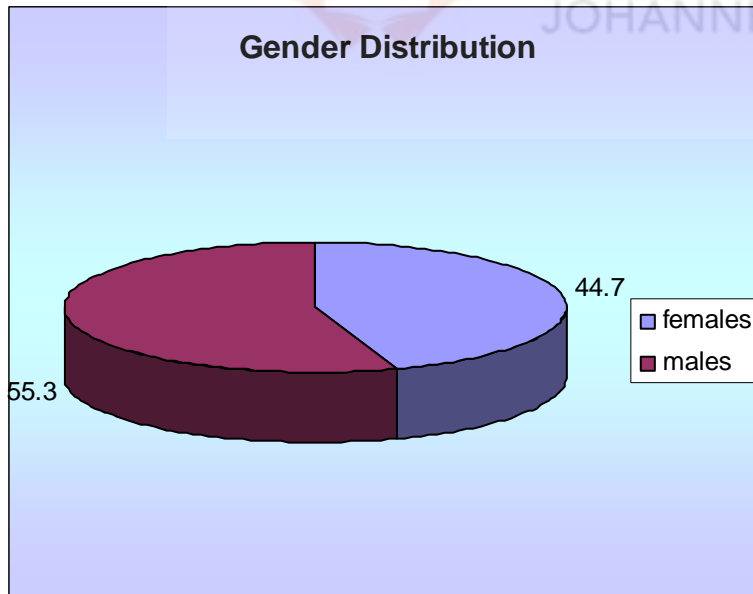


Figure 4.1 Pie Graph Indicating Gender distribution

A total of 47 subjects were included in this study. The sample consisted of 21 (44.7%) females and 26 (55.3%) males. Thus there is an almost equal gender distribution.

4.2.2. Age Distribution

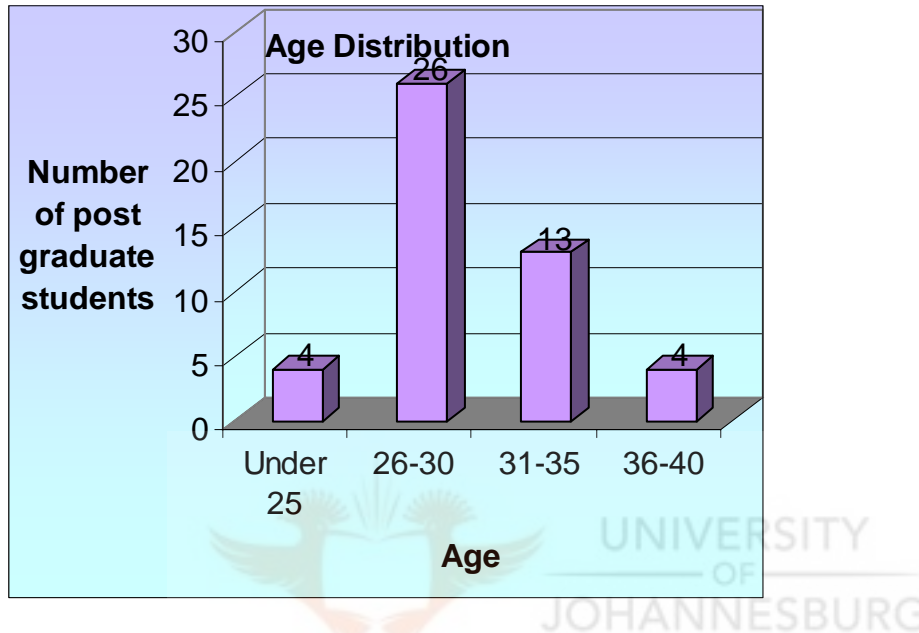


Figure 4.2 Bar Graph Indicating Age distribution

The majority of participants were in the 26-30 year age group (55.3% or 26); the second largest group was in the 31-35 age group (27.7% or 13). The last 2 groups under 25 and 36-40 were equal with 4 people each or 8.5%.

Age of Participant at Time of Qualification

The majority of participants fell into the 26-30 age group a total of 28 people or 59.6%. 15 people (31.9%) were under the age of 25 when graduating and only 4 (8.5%) were between the ages of 31-35.

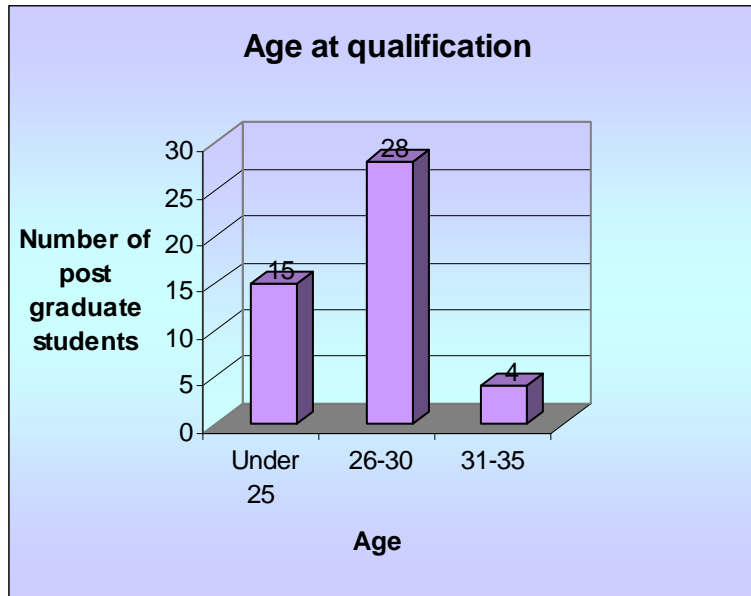


Figure 4.3 Bar Graph Indicating Participants Age at Qualification

4.2.4. Duration of Study in Years

Majority (22 or 46.8%) of the students took 6 years to complete their course. Overall 68.1% of people completed their course within the 6.5 year period.

Table 4.1 Duration of course in years

Duration in years	Number of people	Percentage
5	5	10.6%
5.5	3	6.4%
6	22	46.8%
6.5	2	4.3%
6.75	1	2.1%
7	9	19.2%
7.5	1	2.1%
8	3	6.4%
10	1	2.1%

4.2.5. Race Group

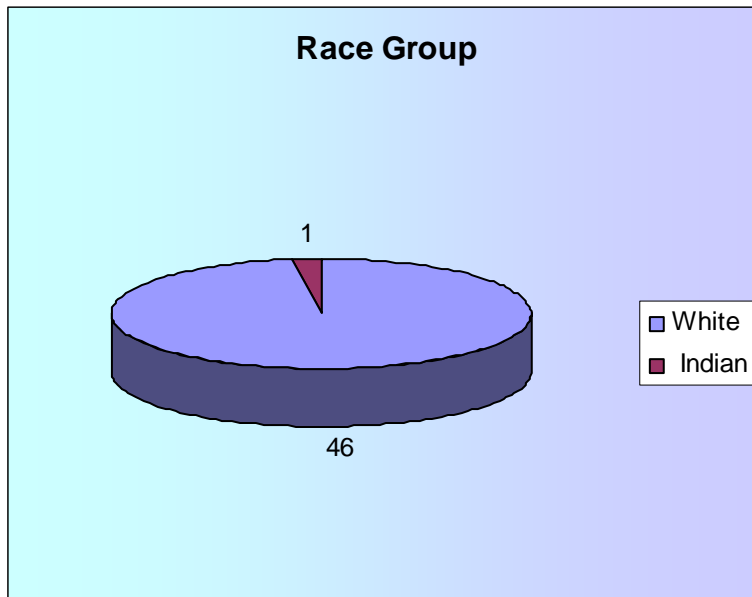


Figure 4.4 Pie Chart Indicating Race Group

This graph shows that only 1 of the 47 participants is Indian 2.1%. That leaves 97.9% or 46 of the participants as white. No other race groups were noted.

4.2.6. Years in Chiropractic Practice



Figure 4.5 Pie chart Indicating the Number of years in practice

The majority of the postgraduate Chiropractors have been in practice for 1-5 years. This amounts to 30 people, or 63.8%. 9 or 19.1% of the participants have been in practice for less than one year, and 7, or 14.9% have been in practice for more than 5 years. Only one 2.1% of the participants is not currently practicing.

4.2.7. Activity Upon Qualifying

Upon qualifying, 31 or 66% of the postgraduate students began their own practice, 17 or 36.2% joined an existing practice as an associate. Only 1 person or 2.1% lectured in Chiropractic, and 2 or 4.3% worked in an unrelated field.

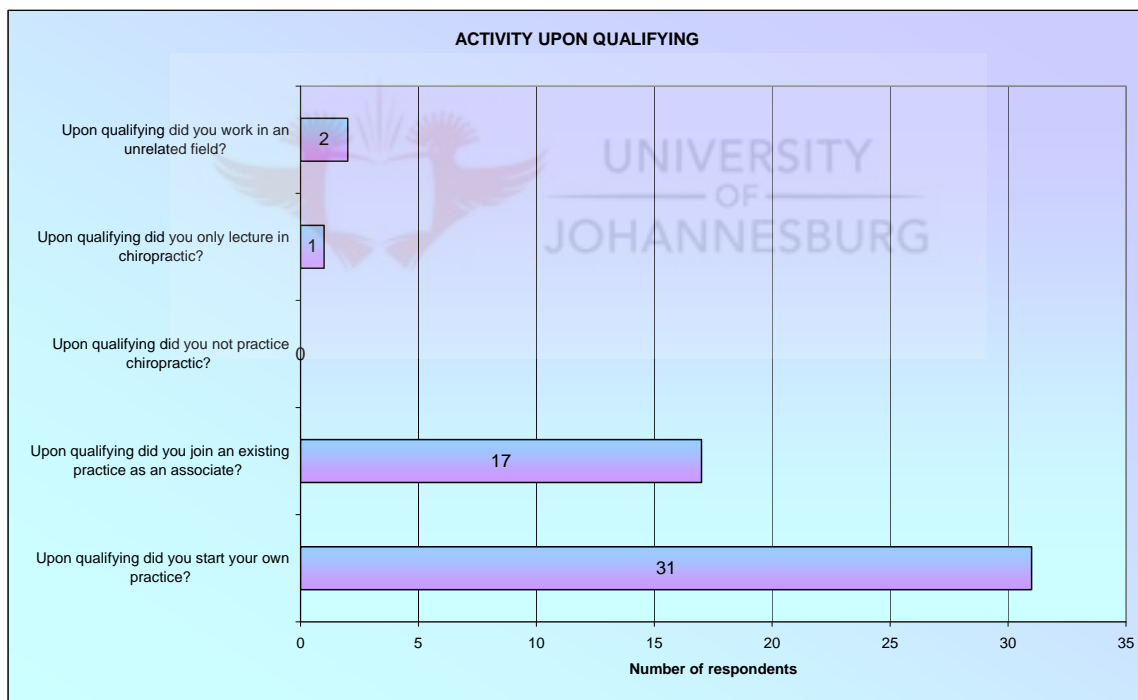


Figure 4.6 Bar Graph Indicating the Participants Activity upon Qualifying

4.2.8. Current Activity

Currently 39 or 83% of the participants are in their own practice. Eight or 17% of the participants work in a practice as an associate, five participants or 11% are lecturing in Chiropractic, three participants or 6% are working in an unrelated field and one or 2% is not currently practicing Chiropractic.

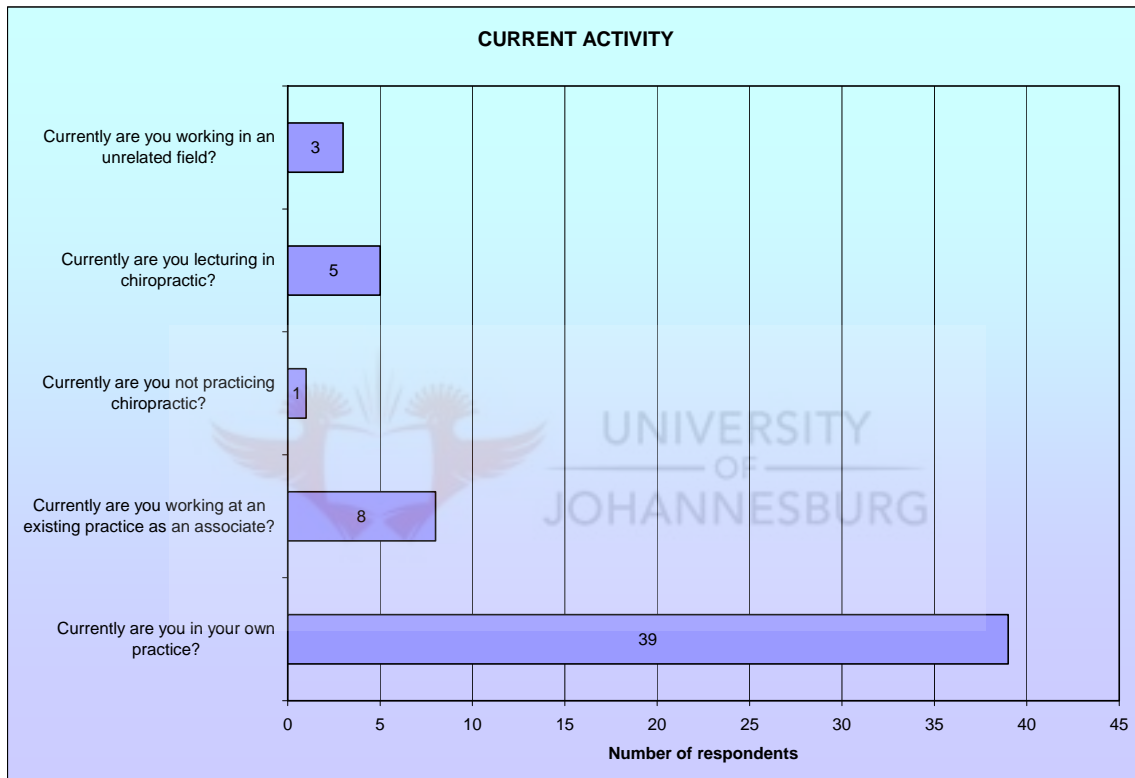


Figure 4.7 Bar Graph Indicating the Participants Current activity

4.3. Course Related Questions

4.3.1. Confidence in skills acquired during the course.

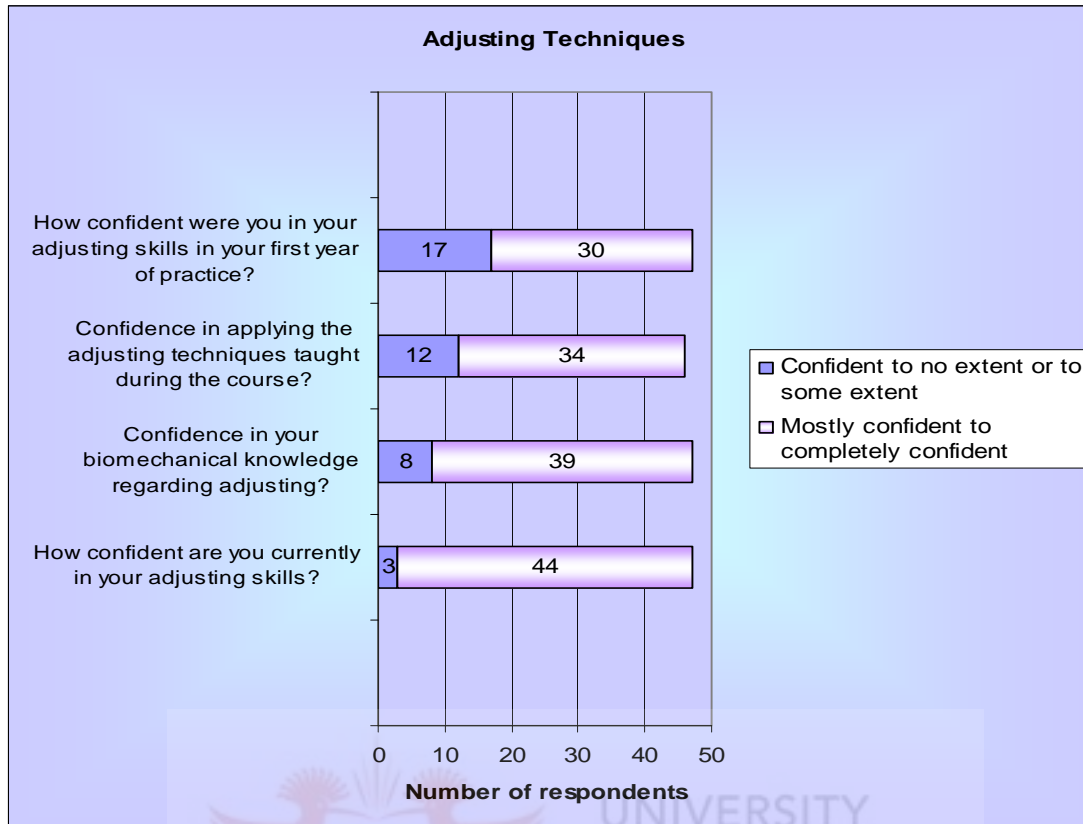


Figure 4.8 Bar Graph Indicating Participants Confidence regarding adjusting techniques

Regarding the question of the participant’s confidence in their adjusting skills in their first year of practice 17 participants or 36.2% were not confident to confident to some extent. The confidence in their adjusting skills has improved with experience as currently only 3 participants or 6.4% are confident to some extent and 44 participants or 93.6% are mostly confident to completely confident in their adjusting skills.

When questioned with regards to the participants confidence in applying the adjusting techniques taught during the course 12 participants or 26.1% were confident to no extent to some what confident and 34 or 73.9% were mostly to completely confident.

The participants were questioned as to their confidence in their biomechanical knowledge with regards to their adjusting 39 or 83% was mostly to completely confident only 8 or 17% were confident to some extent.

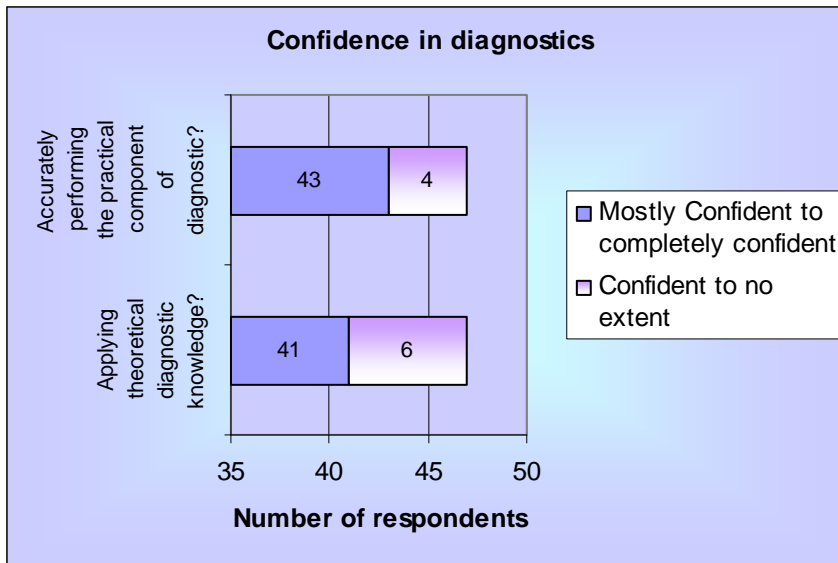


Figure 4.9 Bar Graph Indicating Participants Confidence in diagnostics

When questioned about their theoretical diagnostic knowledge participants confidence was high as 41 or 87.2% were mostly confident to completely confident. Six participants or 12.8% were confident to some extent. With regards to the participants being able to accurately perform the practical component 43 or 91.5% were mostly to completely confident and only 4 participants or 8.5% were confident to some extent.

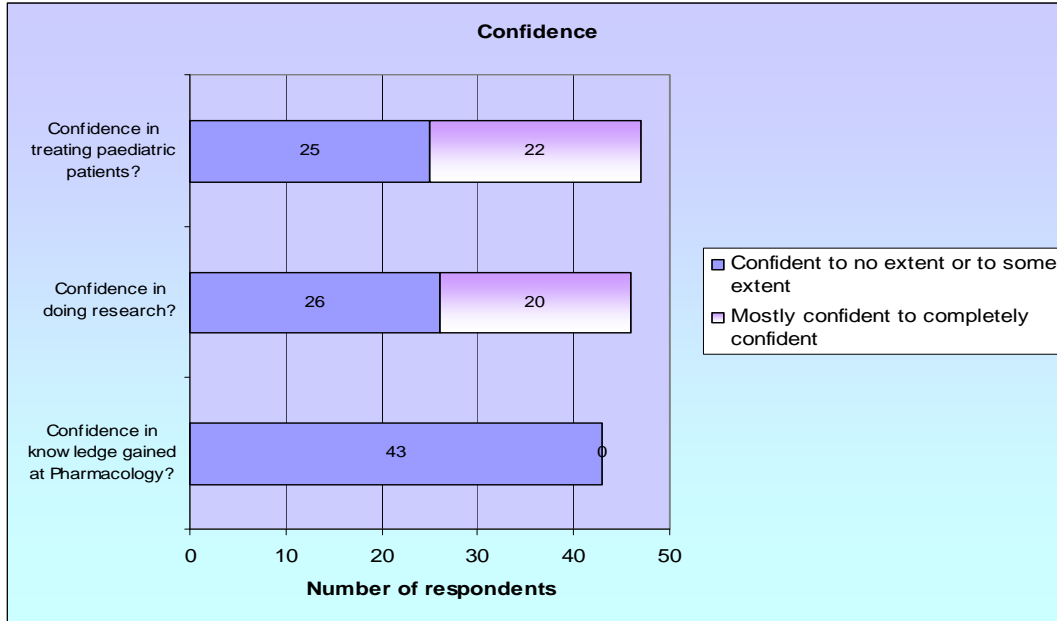


Figure 4.10 Bar Graph Indicating Participants Confidence in a variety of subjects

The participants were questioned with regards to their confidence in treating paediatric patients. Twenty five participants or 53.2% were confident to no extent to somewhat confident and 22 participants or 46.8% were mostly confident to completely confident.

With regards to the question pertaining to the participant's confidence in doing research only 46 respondents completed this question, of this 26 or 56.5% were confident to no extent to somewhat confident and 20 or 43.5% were mostly to completely confident.

For the pharmacology question only 43 people answered the question as this was not always a subject offered at the university for this course. Of this all 43 participants or 100% were confident to no extent to somewhat confident.

4.3.2. Experience That Could be Added to the Course

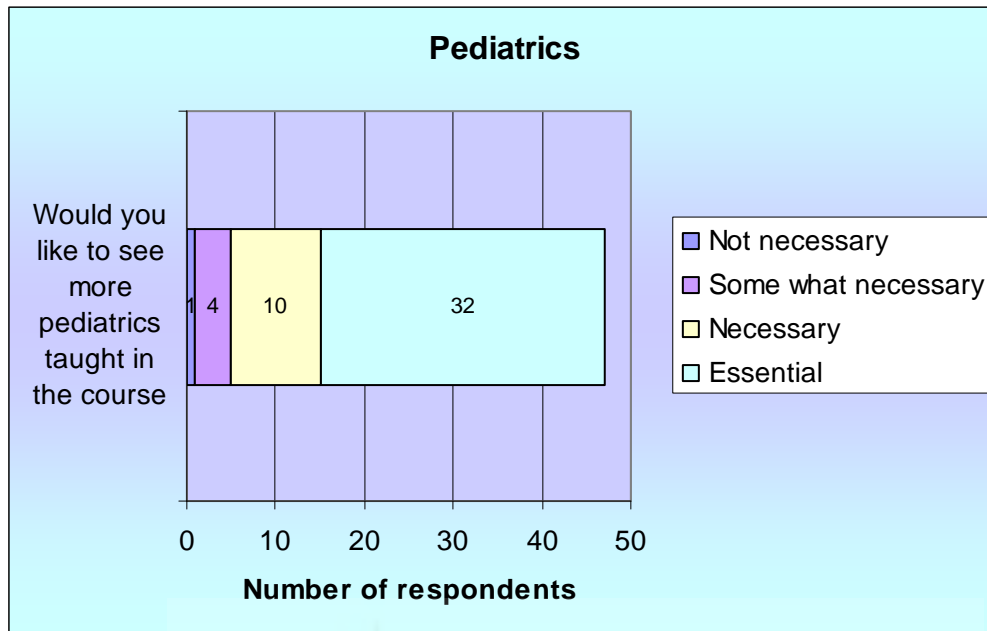


Figure 4.11 Bar Graph Indicating the Response to adding paediatrics to the course

The graph indicates that 32 of the participants or 68.1% think it is essential to have more paediatrics taught in the course, 10 participants or 21.3% say it is necessary, 4 or 8.5% say it is somewhat necessary and 1 person or 2.1% says it is not necessary at all.

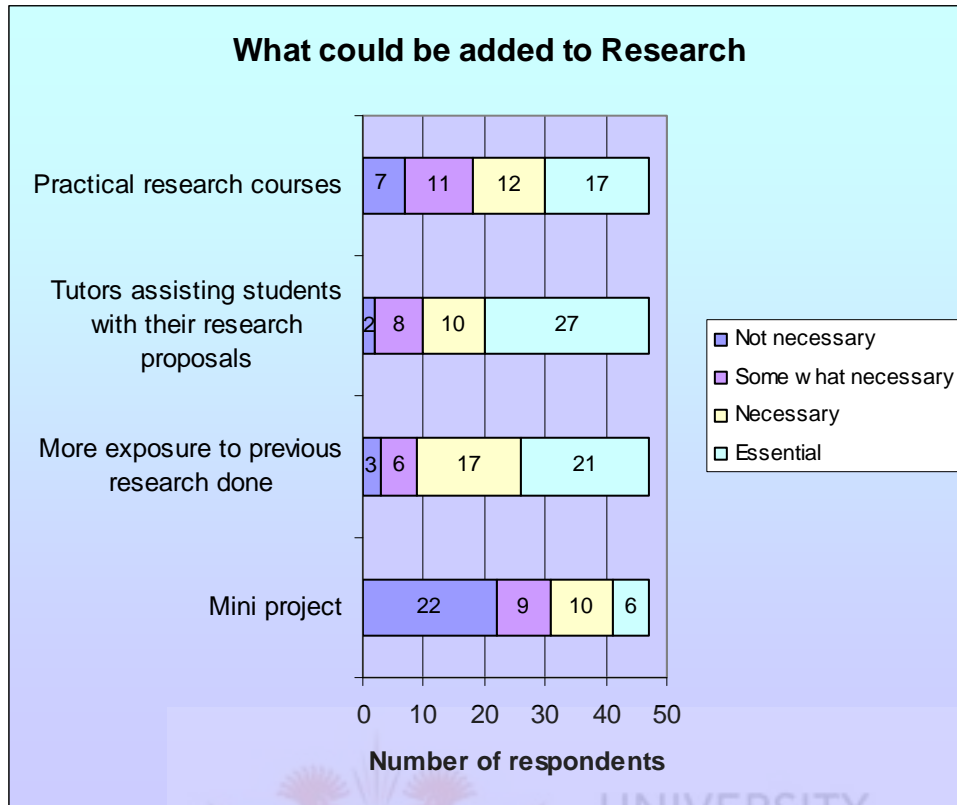


Figure 4.12 Bar Graph Indicating the Experience that could be added to research

When questioned regarding what experience could be added to the research process 27 participants or 57.4% think that having tutors assisting student with their research is essential. Ten participants or 21.3% think it is necessary, 8 participants or 17% think it is somewhat necessary and 2 or 4.3% think it is not necessary at all.

The graph indicates that 21 participants or 44.7% think it is essential; 17 participants or 36.2% think it is necessary. 6 participants or 12.8% think it is somewhat necessary and 3 participants or 6.4% think it is not necessary at all to have exposure to previous research done.

When questioned concerning adding practical research courses, 17 participants or 36.2% think it is essential, 12 participants or 25.5% think it is necessary. 11 participants or 23.4% think it is somewhat necessary and 7 or 14.9% say it is not necessary at all.

When questioned with regards to adding a mini project to the research course only 6 participants 12.8% said it is essential, 10 participants or 21.3% think it is necessary, 9 participants 19.1% say it is somewhat necessary and 22 or 46.8% say it is not necessary at all.

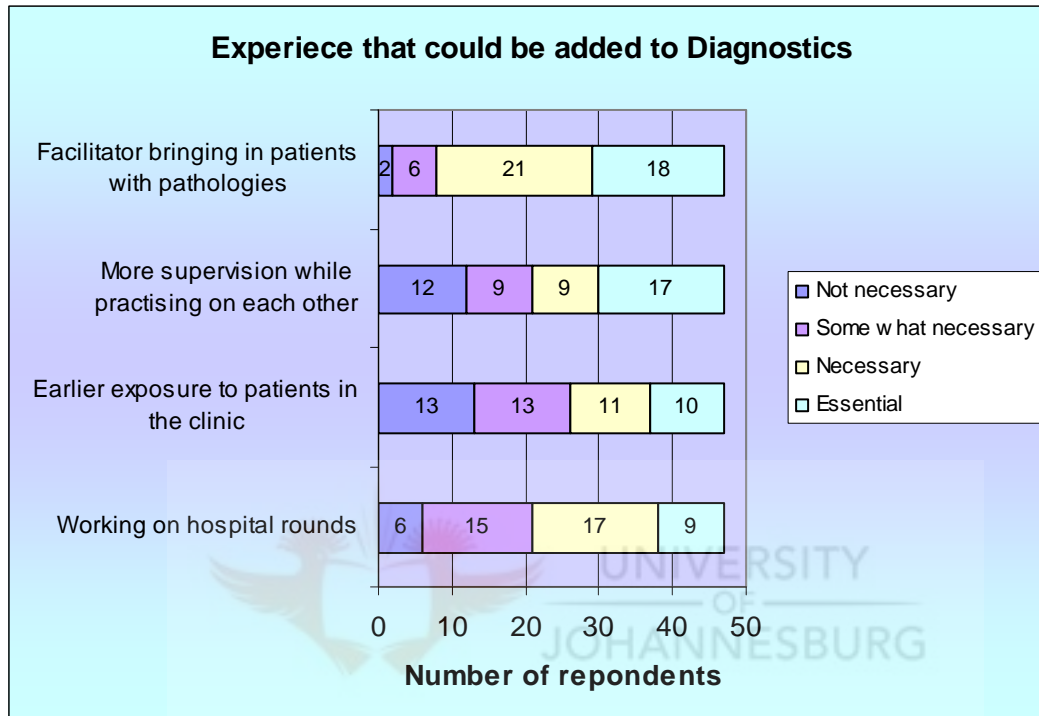


Figure 4.13 Bar Graph Indicating the Experience that could be added to diagnostics

The graph indicates that a facilitator bringing in patients with pathologies would be essential according to 18 participants (38.3%), 21 participants 44.7% said it would be necessary, 6 participants 12.8% said it would be somewhat necessary and 2 or 4.3% said it would not be necessary at all.

When questioned 17 participants 36.2% say it would be essential to have more supervision while practicing diagnostics on each other, 9 participants or 19.1% said it would be necessary, 9 participants or 19.1% said it would be somewhat necessary and 12 or 25.6% said it was not necessary at all.

When asked if earlier exposure to patients would benefit students 10 or 21.3% of the participants said it would be essential, 11 or 23.4% said it would be necessary, 13 or 27.7% said it would be somewhat necessary and 13 or 27.7% said it was not necessary at all.

The graph indicated that working on hospital rounds only 9 participants or 19.1% thought it was essential, 17 participants or 36.2% felt it was necessary, 15 participants or 31.9% thought it was somewhat necessary and 6 or 12.8% felt it was not necessary at all.



CHAPTER FIVE: DISCUSSION

5.1. Confidence in the University of Johannesburg's Chiropractic program

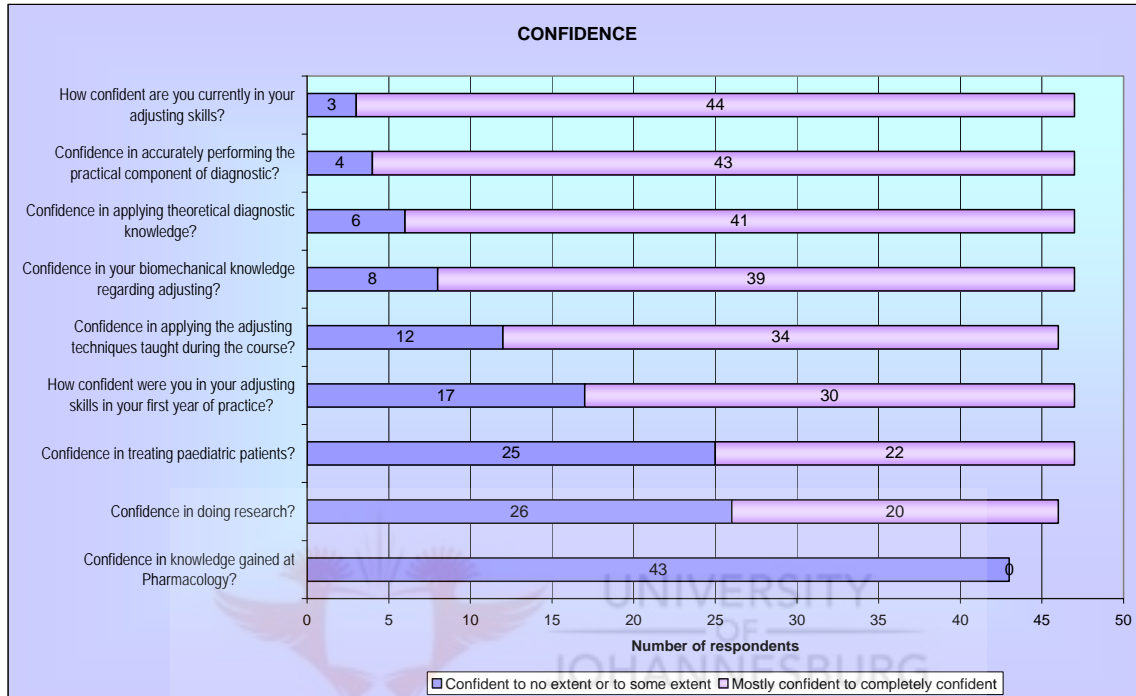


Figure 5.1 Bar Graph indicating the Confidence in UJ Chiropractic program

The survey was completed to determine the confidence of graduates from the University of Johannesburg's Chiropractic program. The graph above demonstrates a summary of the results. Each section will be discussed, relating to previous literature and research.

5.2. Adjusting Skills

Manual manipulation is a complex psychomotor skill and requires an incredible amount of practice (Byfield, 2005). It is still unknown how Chiropractic students objectively learn the various complex manipulative procedures (Byfield, 2005). When the graduates were asked about their confidence within their first year of practice 36.2% of the respondents were not completely confident with their adjusting skills, and 63.8% of the participants were confident with their adjusting skills. Thus showing that majority of the

students were confident in their adjusting skills once they had graduated from the University of Johannesburg's (UJ) Chiropractic program. Diligent practice with expert, thorough supervision can overcome any technique limitations a student may have. "Practice is fundamental to the expertise in any motor skill"(Broome, 2000).

The UJ Chiropractic program includes Chiropractic Principles and Practice that forms part of the curriculum of third through to fifth year with a total of 621 hours. This subject includes Chiropractic motion palpation, adjustments and mobilizations of all joints. Students are required to treat 35 new and 350 follow-up patients as part of their clinic requirements in fifth year. Follow-up treatments in the clinic must include at least one Chiropractic adjustment or mobilization. Looking at the number of hours dedicated to learning Chiropractic skills, theoretically graduates have adequate time to learn and perfect their adjusting skills. The results of the survey indicate more than half of the graduates of UJ's Chiropractic program were completely confident at the time of graduation.

Byfield, (2005), states that only hard work and practice can assimilate the wealth of practical dexterity that is needed to perform a good skillful Chiropractic adjustment; there is no other substitute for hard work and dedication. The age-old proverb "*knowledge without practice makes but half the artist*" goes without saying. Confidence in the graduates adjusting skills increases as experience increases, as only 6.4% were currently not completely confident in practice and 93.6% were completely confident. This shows that adjusting skills need experience which cannot be taught, but is gained through much practice. Manipulative techniques require many years of training to develop the learned psychomotor skills to allow the student to reach a level where their adjustments are consistent and competent i.e. to develop the student from beginner to a level of mastery/expertise. Research shows that it is a ten to twelve year process; Chiropractors should become more consistent after at least five years of practice (Byfield, 2005). Majority of the respondents have been performing these skills for between one and five years, thus their confidence should increase in the next five years in practice. Experience improves confidence, obviously it cannot be added to the course, but only acquired in

practice. The UJ Chiropractic program therefore provides a solid base to which the experience can be added onto.

When participants were questioned about the techniques taught at the UJ Chiropractic course, 26.1% were not confident whereas 73.9% of the respondents were completely confident. Diversified technique is the primary technique taught at UJ. Byfield (2005) states that majority of Chiropractors (91.1% in the USA 51.1% in Europe, 60-64% in the UK) practice using diversified technique therefore making it the most common form of spinal manipulation.

Diversified technique is the most extensive and popular technique, hence why this is the curriculum taught to the UJ students. Many programmes may concentrate on the diversified technique but will touch on other techniques. Anglo European College of Chiropractic teaches diversified, gonstead, drop table techniques, toggle, pelvic blocking, activator technique and flexion/distraction. Durban University of Technology and UJ lecture diversified technique as the main technique; they include flexion/distraction technique, drop table techniques and biomechanical blocking lectures. Inclusion of the focal points of other techniques into the course syllabus will allow the practitioner more “tools” to use on patients where adjustments are contra-indicated. Leone (1999), states that an association exists between technique curricula and the techniques that are used in the Chiropractic setting. Results show that a college who’s curriculum includes a wide variety of techniques will produce graduates who will use various treatment protocols. The more varied the technique, allows the Chiropractor to adapt and specify the treatment to the patients particular need or condition.

Adjunctive techniques to the Chiropractic adjustment, which are part of the curricula at UJ, includes Auxillary therapeutics III (including massage, electrotherapy, cryotherapy and thermotherapy) and myofascial trigger point therapy (part of Clinical Biomechanics and Kinesiology V). The myofascial component of Clinical Biomechanics and Kinesiology V includes the upper extremity, cervical spine, lower extremity, lower back, dry needling techniques, stretching techniques and treatment approaches. The Anglo

European College of Chiropractic, like UJ, includes trigger point therapy, active muscular relaxation techniques, rehabilitation and taping. This demonstrates that the UJ Chiropractic course is preparing students with skills other than just the normal Chiropractic treatments.

For a Chiropractor to be able to apply information in clinical situations, they must be an expert in spinal biomechanics (Plaughter, 1993). The practitioner needs know the biomechanical details of the forces involved in human motion or spine manipulation, but an understanding of the mechanical factors such as lever action and muscle force, improves the skill of a clinician (Gatterman, 2004).

The UJ Chiropractic program includes in its third year of Chiropractic Principles and Practice, an introduction to biomechanics of the spine. In fourth and fifth year clinical biomechanics and kinesiology are subjects that look at the spinal and extremity biomechanics. The survey showed that the confidence in the biomechanical knowledge regarding the adjusting techniques was high as only 17% were not completely confident, 83% of the participants were completely confident in their biomechanical knowledge. Thus reinforcing the confidence of the postgraduate students of the UJ Chiropractic course.

5.3. Diagnostic skills

Haslett *et al* (2002) states that to be able to run a medical practice it is important to obtain a clear history and elicit important physical signs which are a prerequisite for an accurate diagnosis.

Diagnostics is important for Chiropractors to be able to distinguish between a visceral disease and lower back pain. Mootz and Vernon, (1999) states a patient usually presents with a chief complaint or a secondary complaint that appears visceral. The Chiropractor needs to determine whether the pain is visceral and whether or not he could accurately manage the condition. Diagnosis and referral, if necessary, needs to be done immediately

and may have serious consequences for the patient concerned if it is not done timeously. Chiropractors must be able to refer patients with ample knowledge of who they are referring to and why. The WHO guidelines (2005) state that the objective of a full Chiropractic education is to allow practitioners to practice as primary-contact health care providers. For Chiropractors to be able to adequately diagnose a patient and to converse with their patients about any condition they may be suffering from will help the Chiropractic profession gain the respect and recognition that they as a profession deserve and strive towards.

Diagnostics not only consists of a massive theoretical component, but also of special diagnostic tests that need to be accurately performed to yield the desired responses. Some conditions require special tests such as blood, urine or x-rays. For a health provider to know when and if the patient requires these tests will save the patient time and money, as well as allow the patient the best possible treatment for their condition.

The UJ Chiropractic program contains all the basic medical subjects in the first two years of the course therefore preparing the students for the clinical subjects that begin in third year such as diagnostics. Diagnostics is part of the third and fourth year syllabus, with a total of 459 hours. Theoretically the graduating students of UJ should be confident in their diagnostic skills. The results of the survey showed that only 12.8% of the participants were not completely confident and 87.2% were completely confident in applying the theoretical knowledge of diagnostics.

The most important aspect of diagnostics is the ability to accurately perform the diagnostic tests which enables a practitioner to reach a diagnosis. In this component only 8.5% were not completely confident, 91.5% of the respondents were completely confident. Graduates from the UJ Chiropractic program therefore show strong capability and confidence in this area. This shows that the majority of the graduate students are confident in the knowledge they gained from the UJ Chiropractic course as a primary contact health care provider.

When the participants were asked what type of experience could be added to the course to benefit students, 83% of the respondents said it would be essential to bring in patients with pathologies. Of the respondents 55.3% said that more supervision when practicing on each other and working on hospital rounds would be essential and only 44.7% said it would be essential to have earlier exposure to patients in the clinic. Instead of mere textbook learning, the aid of being able to see patients with pathologies whether it being in the classroom or within hospital rounds will assist students in putting all the information and practical component of the subject together to allow a better understanding and easier learning.

5.4. Pharmacology

Pharmacology is the study of drugs including their sources, nature and property; as well as the bodies reaction to these drugs (Medicine net, 2007). It is vital for any health worker or primary care physician to be able to monitor the drugs effect on a patient. Adequate pharmacological knowledge is fundamental as drugs remain one of the most important instruments for the treatment of disease (Dreyer, 1996)

Pharmacology has not always been a subject at UJ. It was only introduced in 2003, therefore not all graduates have done the course. Of the 47 participants only 43 of the respondents had Pharmacology as a subject - of these respondents, 100% were not confident in the knowledge gained in pharmacology. This shows that the pharmacology course needed to become more relevant and Chiropractic specific, as it is a vital subject for adequate patient care. Since the graduates questioned qualified, the pharmacology course has been altered and adapted to ensure an increase in the confidence of future graduates. Pharmacology needed to be moulded specifically to the Chiropractic students needs as the subject is extremely important for the practicing Chiropractor. Not only do Chiropractors need to be able to converse with patients and other professionals, they also need to know the effects and side effects of drugs to be able to distinguish between a condition and a medically induced condition.

5.5. Research

The Research Dissertation is an essential part of the qualification process as it forms part of the partial fulfillment of the Master's Degree in Chiropractic at UJ. The Masters degree is specific to South African Chiropractic programmes. The participants were questioned about their confidence in doing research and only 43.5% of the participants were completely confident.

When respondents were asked what could have been added to the course to benefit students, 78.7% of the respondents said that having tutors assisting students with their research proposals was essential, 80.9% said having more exposure to previous research done would be crucial, 61.7% of the respondents said that a more practical research course would be fundamental and only 34.1% said a mini project would be necessary.

Research is perceived to be the subject that prolongs graduation from the course. Possible suggestions to motivate and assist students to start their dissertations earlier on is to expose students to research that is currently underway at the institution. Also possibly getting the interns or students doing their thesis's to assist the younger years with their proposals therefore easing the workload on the supervisors and allowing the students to claim internship hours for their work done.

In the research lectures, doing a more practical step by step process to assist students to do their proposals will also cut out unnecessary work for the supervisors. This class proposal could be handed in at the end of the subject to be included in the final mark; as a mini project that could be used as the final proposal handed in for your dissertation. The University of Glamorgan (2006) allow their students to select their research project title from a list, or after discussions with lecturers and approval from a research module leader. The University of Glamorgan has a Drop-in centre which offers students additional study support and post-graduate students access to reference materials and tutorial support for their thesis writing. The Palmer College of Chiropractic has a research webpage to which prospective students, current students and faculty have access, in its

graduate program the student is under direct guidance of scholars and practitioners. The graduate program consists of advanced lectures supplemented by recent publications; seminars where students and professors present reports of seminal investigations; supervision from a specialist in the field or of the graduate faculty and mentorship (Palmer College of Chiropractic, 2006).

5.6. Paediatrics

For a Chiropractor to have the ability to treat people of different ages they need to attain the knowledge of that specific age group and develop specific clinical examination procedures. The practitioner must become competent in the different manipulative skills and techniques necessary to treat children as the amplitude of the thrust is low and the force of the thrust is minimal at all times (Byfield, 2005).

In paediatrics the emphasis is placed on anticipatory guidance and prevention of disease therefore making it unique among medical disciplines (Hatheway, Hay, Groothuis, Paisley, 1993). UJ has not always offered paediatrics as a subject, they have however recently added it to their Clinical Chiropractic V curriculum, and it is available internationally as a postgraduate course that is completed via correspondence. Treating paediatrics is a necessity in practice, however only 46.8% of the participants were completely confident, that leaves 53.2% that are not confident at all. When questioned whether the participants felt paediatrics should be added to the course 89.4% of the respondents think it is a necessity.

In the comparison of courses, Palmer College of Chiropractic was the only college that offered paediatrics as a separate subject in their curriculum. New York Chiropractic College offers a short module in paediatrics in their advanced placement courses. Paediatrics is a growing market in Chiropractic and once qualified, patients expect that the Chiropractor has been adequately trained to treat their child. For a Chiropractor to be able to work with a paediatrician in combating colic and other ailments the Chiropractor need to be able to hold his own in conversation. Paediatrics have different requirements

to adults, their reflexes and growth patterns are specific and deviations from normal need to be recognized immediately should there be a problem.

5.7. Practice

Once Chiropractors graduated from UJ, 66% of the respondents have started up their own practices. When starting on their own, graduates need to be confident enough in what they have learnt to apply it with certainty. When respondents were questioned about their current status, 83% of the respondents are in their own practice.

Practice management and jurisprudence is a half semester course taught during the UJ Chiropractic course. The course should involve more specific skills that could be used to make the running of a practice an easier process, as we have seen many practitioners start out on their own. Looking specifically at legalities pertaining to opening a practice; how medical aids function; dealing with medical aids; receiving a loan and the procedures involved; acquiring an assistant; making bookings for a patient; teaching your assistant exactly how to speak to patients and to explain the procedures at your practice, all form an essential role in running a successful practice. All of these would help ease the transition from being a student to opening up a practice.

The University of Glamorgan does not include a practice management course, it does however offer a careers centre which has advisors to assist graduates with future employment.

5.8. Gender

Using the list of graduates received from UJ it was calculated that of the 132 graduates, 68 (51.5%) of those were male and 64 (48.5%) female. Looking at the response to the survey a total of 47 subjects were included in this study, the sample consisted of 21 (44.7%) females and 26 (55.3%) males.

5.9. Age

The Chiropractic course started in 1993 with the first graduates from the program being in 1999, this being only 8 years prior to the survey may indicate why 83% of the current graduates fall in the 26-35 age group range.

The age of graduates at qualification also demonstrates a majority (55.3%) of participants graduating in the age group of 26-30.

5.10. Duration of study in years

The Chiropractic course at the University of Johannesburg consists of 5 academic years and a research dissertation. The study shows that majority of students (46.8%) complete their research within a year of completing their 5 academic years, assuming none of the years had to be repeated.

5.11. Race



The survey revealed one Indian respondent and a majority of white respondents. No other races were noted. This is not a true reflection of the racial statistics, currently a few African students are completing their academic studies so in the next few years, this demographic profile should change. The lack of students of colour may possibly be due to profession demographics. Students are chosen according to the subjects they have taken and their marks on their senior certificates.

5.12. Current Activity

When the question on the participants current activity was calculated the total number of participants was higher than 47, this is due to the fact that participants may be involved in more than one of the activities listed. Currently graduates may be lecturing and practicing Chiropractic at the same time.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

The aims of this study were:

1. To determine the satisfaction and confidence of the post graduate students of the University of Johannesburg's Chiropractic program.
2. To discuss the differences between the educations received at South African Chiropractic programmes and internationally recognized Chiropractic programmes by comparing the syllabus offered in each program.
3. To determine from the data received which areas of the program could be improved.



Conclusions:

The following conclusions can be made from the previous discussion.

1. Graduates of Chiropractic from the University of Johannesburg are confident in their adjustment skills, diagnostics and the knowledge pertaining to these subjects. Their confidence in their adjusting skills improved with experience while their confidence in treating paediatric patients was average, and a high percentage of respondents felt it is essential to have paediatrics incorporated into the course. With regards to pharmacology respondents were not confident in this subject and research only half of the respondents were confident.
2. The University of Johannesburg's Chiropractic program contains all the subjects that WHO requires with UJ exceeding the amount of hours necessary. Comparing the University of Johannesburg's Chiropractic program to accredited colleges, the program is equal to the Chiropractic programmes accessed in this research.

6.2. Institutional Recommendations

The following areas were recommendations made by the respondents regarding areas they felt could be improved.

1. The structure of the Pharmacology course should be specified to a Chiropractors needs as it is an important subject and majority of the graduates did not feel confident in this subject.
2. The research process requires that all students complete a Masters dissertation. It was indicated that this process was a reason the respondents felt potentially slowed their process to graduate. The research dissertation is required for partial fulfillment of the Masters Degree which is specific to South African Chiropractic programmes. The department is currently restructuring the process of research to ease the work load on the supervisors and accelerate the research process.
3. Majority of the graduates were confident in diagnostics theoretically and practically. However it was felt that bringing in patients with pathologies, to allow students the opportunity of seeing the pathology in a practical sense would be beneficial.
4. Approximately half of the graduates were confident in treating paediatric patients, majority however felt that the incorporation of paediatrics into the curriculum would be beneficial.

6.3. Research Recommendations

The following recommendations are made pertaining to future research such as this may be performed in the future.

1. A similar study should be done at Durban University of Technology, which will compare the confidence levels of the postgraduate students at each institution. Theoretically UJ and DUT have the same curriculum and noting any remarkable differences would perhaps indicate areas for each institution to focus on.
2. A survey to determine what additional technique workshops Chiropractors would be interested in attending should be conducted. This will allow graduates to expand on knowledge gained. Although respondents were confident in the

- techniques they had been taught, perhaps additional techniques/philosophies may be valuable.
3. A follow on study, specific to all subjects within the curriculum, and additional subjects postgraduates would like to see taught at the course. This research was limited to a small selection of subjects and may not have covered all aspects of the curriculum adequately.
 4. A follow on study, focusing on current students in each year. Questions looking at what they think could be done to improve the course at their level, focusing on each subject. Research such as this one can be limited by the fact that the curriculum is constantly altered.
 5. A survey looking at the general public, what they think Chiropractic is and what they think the educational qualifications of a Chiropractor are. This will allow Chiropractors to see where they stand in the eye of the general public and possibly focus attention on public awareness.
 6. The Chiropractic programmes have no data to which techniques and diagnostic methods are used in practice and which are not. Having this data would allow colleges to focus more on relevant knowledge that is utilized daily by practitioners.

In conclusion, the majority of Chiropractors qualifying at UJ are confident in their abilities as Chiropractors. This research has therefore allowed confidence in the program to be established, by postgraduates, and should allow for potential areas where the program incorporates recommendations made to increase the confidence and satisfaction of the graduates in the program.

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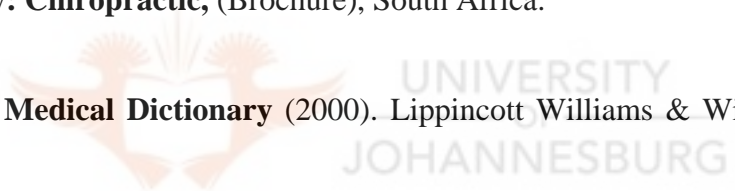
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APPENDICES

Appendix A: Subject information and consent form

Dear Participant

I am Jacqui Bunge, a M.Tech Chiropractic student of the faculty of Health Sciences, University of Johannesburg. I am conducting research on post-graduate student confidence their first few years in practice.

This questionnaire will only take a few minutes to fill out and may alter lecturing methods in years to come. Your privacy will be protected, however if you wish to have feedback regarding the outcomes please let me know and I will gladly oblige.

Should you have any concerns or queries, please do not hesitate to contact the following people.

Researcher: Jacqui Bunge 082 333 4228
Supervisor: Dr. Tzanos Tyranes 082 467 3326

Completed Questionnaires maybe returned to:

E-mail – jacquibunge@iafrica.com

Fax – (011) 609 3034

OR

P.O. Box 15232

Hurlyvale

1611

I, _____, hereby confirm my willingness to assist in the research of J. Bunge enrolled at the University of Johannesburg.

Signed at _____ on this _____ day of _____ 2006.

Signature

I would like to receive feedback on the research when it is completed	Yes	No
------------------------------------------------------------------------------	------------	-----------

E-mail Address for feedback: _____

Appendix B: Questionnaire

Survey to determine post-graduate student confidence in their knowledge and skills acquired during the Chiropractic course.

1) Gender

Male	
Female	

2) Age at last birthday

Under 25	
26-30	
31-35	
36-40	
41 plus	

3) Age when qualified from Chiropractic course

Under 25	
26-30	
31-35	
36-40	
41 plus	

UNIVERSITY
OF
JOHANNESBURG

4) Duration of study (in years, excluding internship)

5) Race group

White	
Black	
Coloured	
Indian	
Other (please specify)	

6) How many years have you been in practice?

Less than 1	
1-5 Years	
More than 5	
Not currently practising	

7) Upon qualifying did you:

Start your own practice	Join an existing practice as an associate	Not practice Chiropractic	Only lecture in Chiropractic	Work in an unrelated field
1	2	3	4	5

8) Currently are you:

In your own practice	Working at an existing practice as an associate	Not practicing Chiropractic	lecturing in Chiropractic	Working in an unrelated field
1	2	3	4	5

9) How confident were you in your adjusting skills in your first year of practice?

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

10) How confident are you currently in your adjusting skills?

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

11) Confidence in applying the adjusting techniques taught during the course

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

12) Confidence in your biomechanical knowledge regarding adjusting

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

13) Confidence in applying theoretical diagnostic knowledge

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

14) Confidence in accurately performing the practical component of diagnostics

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

15) What type of experience during training could have been added to benefit you?

	Not necessary at all	Not Necessary	Some what Necessary	Necessary	Essential
A. Working on hospital rounds	1	2	3	4	5
B. Facilitator bringing in patients with pathologies	1	2	3	4	5
C. More supervision while practising on each other	1	2	3	4	5
D. Earlier exposure to patients in the clinic	1	2	3	4	5

16) Confidence in knowledge gained in Pharmacology

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

17) Confidence in treating paediatric patients

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

18) Would you like to see more paediatrics taught within the course?

Not necessary at all	Not Necessary	Some what Necessary	Necessary	Essential
1	2	3	4	5

19) Confidence in doing research

Not confident at all	Mostly not confident	Confident to some extent	Mostly Confident	Completely Confident
1	2	3	4	5

20) What could be added to the research course to benefit you?

	Not necessary at all	Not Necessary	Some what Necessary	Necessary	Essential
A. Mini Project	1	2	3	4	5
B. Practical research courses	1	2	3	4	5
C. More exposure to previous research done	1	2	3	4	5
D. Tutors assisting students with their research proposals	1	2	3	4	5



Appendix C: Glossary of terms used

- a. Arthrokinematics – the science of the movement of the joints of the body. (Stedman's Medial Dictionary, 2000)
- b. Electrotherapy: the use of an electric current to stimulate a tissue with the objective of healing or restoring a lost function, and has many therapeutic applications. (Wikipedia, 2006)
- c. Heliotherapy: Heliotherapy is the treatment of disease by exposing the body to sunlight. Heliotherapy is a Chiropractic treatment used for muscular stimulation and relaxation (California Tan Scientific Research, 2006)
- d. Hydrotherapy: involves the use of water for soothing pains and treating diseases. (Wikipedia, 2006)
- e. Mechanotherapy: Medical treatment by mechanical methods, such as massage. (American Heritage Dictionary, 2000)
- f. Spinal manipulation or adjustment: involves specific short and long lever contacts through which a high-velocity thrust of low and controlled amplitude is directed, with the aim of restoring mobility to individual articulations. (Gatterman, 2004)
- g. Subluxation: In medicine, a subluxation is a partial dislocation or abnormal movement of a bone in a joint. In the Chiropractic system developed by Daniel D. Palmer in the late 1800s, Palmer believed that he had discovered the cause of all diseases suffered by mankind: the vertebral subluxation. The current Chiropractic definition of subluxation is "a

complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and/or influence organ system and general health". (Wikipedia, 2006)

- h. Thermotherapy: treatment of disease by therapeutic application of heat. (Stedman's Medical Dictionary, 2000)

