

**THE ICD-10 CODING SYSTEM IN CHIROPRACTIC PRACTICE AND
THE FACTORS INFLUENCING COMPLIANCY**

A dissertation presented to the Faculty of Health, Durban University of
Technology, for the Masters Degree in Technology: Chiropractic.

By

Riaan Pieterse

I, Riaan Pieterse, do hereby declare that the following dissertation represents
my own work, both in conception and execution.

Sign: _____ Date: _____

Supervisor: Dr. N. de Busser (MTech Chiropractic), MMedSci
(Sports Medicine)

Sign: _____ Date: _____

DEDICATION

Psalm 19:14 “May the words of my mouth and the meditation of my heart be pleasing in your sight, O Lord, my Rock and my Redeemer.”

I dedicate this research to God for giving me the strength to complete it and to my parents and Marnice for their support and love through all the frustration and difficult times.

ACKNOWLEDGEMENTS

- Firstly, a huge thank you to my supervisor, Dr N. de Busser without whose guidance, support, advice and patience I would never have finished this research.
- Thank you to Dr C. Korporaal for her assistance in sending out and receiving the questionnaires.
- Thank you to Mrs L. Whitelaw from Discovery Health (Pty) Ltd. for the chiropractic ICD-10 data.
- Thank you to all the chiropractors who participated in this study.
- Thank you to Mrs T. Esterhuizen for her statistical analysis.
- Thank you to Mrs I. Ireland for her administrative assistance.
- Thank you to Miss T. Paulus for her proof-reading.
- Thank you to Mr W. Vosloo for giving me a laptop and printer that was invaluable in the completion of this dissertation.
- Thank you to Linda and Pat for their support during my internship.
- A big thank you to all my class mates for their encouragement and friendship through all the years of this marathon course.

ABSTRACT

Background: The International Classification of Diseases (ICD) provides codes to classify diseases in such a manner, that every health condition is assigned to a unique category. Some of the most common diagnoses made by chiropractors are not included in the ICD-10 coding system, as it is mainly medically orientated and does not accommodate these diagnoses. This can potentially lead to reimbursement problems for chiropractors in future and create confusion for medical aid schemes as to what conditions chiropractors actually diagnose and treat.

Aim: To determine the level of compliancy of chiropractors, in South Africa, to the ICD-10 coding procedure and the factors that may influence the use of correct ICD-10 codes. As well as to determine whether the ICD-10 diagnoses chiropractors commonly submit to the medical aid schemes, reflect the actual diagnoses made in practice.

Method: The study was a retrospective survey of a quantitative nature. A self-administered questionnaire was e-mailed and posted to 380 chiropractors, practicing in South Africa. The electronic questionnaires were sent out four times at two week intervals for the duration of eight weeks; and the postal questionnaires sent once. A response rate of 16.5% ($n = 63$) was achieved. Raw data was received from the divisional manager of the coding unit of Discovery Health (Pty) Ltd. in the form of an excel spreadsheet containing the most common ICD-10 diagnoses made by chiropractors in South Africa, for the period June 2006 to July 2007, who had submitted claims to the Medical Scheme. The spreadsheet also contained depersonalised compliance statistics of chiropractors to the ICD-10 system from July 2006 to October 2008. SPSS version 15 was used for descriptive statistical data analysis (SPSS Inc., Chicago, Ill, USA).

Results: The age range of the 63 participants who responded to the questionnaire was 26 to 79 years, with an average of 41 years. The majority of the participants were male (74.6%, $n = 47$). KwaZulu-Natal had 25 participants (39.6%), Gauteng 17 (26.9%), Western Cape 12 (19%), Eastern Cape four (6.3%), Free State and Mpumalanga two (3.1%) each and North West one (1.5%). The mean knowledge score for ICD-10 coding was 43.5%, suggesting a relatively low level of knowledge. The total percentage of mistakes for electronic claims was higher for both the primary and unlisted claims (3.93% and 2.18%), than for manual claims

(1.57% and 1.59%). The total percentage of mistakes was low but increased marginally each year for both primary claims (1.43% in 2006; 1.99% in 2007; 2.33% in 2008) and unlisted claims (0% in 2006; 2.61% in 2007; 3.07% in 2008). CASA members were more likely to be aware of assistance offered, in terms of ICD-10 coding through the medical schemes and the association ($p = 0.131$), than non-members. There was a non-significant trend towards participants who had been on an ICD-10 coding course (47.6%; $n = 30$), having a greater knowledge of the ICD-10 coding procedures ($p = 0.147$). Their knowledge was almost 10% higher than those who had not been on a course (52.4%; $n = 33$). Most participants (38.1%; $n = 24$) did not use additional cause codes when treating cases of musculoskeletal trauma, nor did they use multiple codes (38.7%; $n = 24$) when treating more than one condition in the same patient. Nearly 70% of participants ($n = 44$) used the M99 code in order to code for vertebral subluxation and the majority (79.4%; $n = 50$) believed the definition of subluxation used in ICD-10 coding to be the same as that which chiropractors use to define subluxation. According to the medical aid data, the top five diagnoses made by chiropractors from 2006 to 2007 were: Low back pain, lumbar region, M54.56 (8996 claims); Cervicalgia, M54.22 (6390 claims); Subluxation complex, cervical region, M99.11 (2895 claims); Other dorsalgia, multiple sites in spine, M54.80 (1524 claims) and Subluxation complex, sacral region, M99.14 (1293 claims). According to the questionnaire data, the top five diagnoses (Table 4.24) were: Lumbar facet syndrome, M54.56 (25%); Lumbar facet syndrome, M99.13 (23.3%); Cervical facet syndrome, M99.11 (21.7%); Cervicogenic headache, G44.2 (20%) and Cervicalgia, M54.22 (20%).

Conclusion: The sample of South African chiropractors were fairly compliant to the ICD-10 coding system. Although the two sets of data (i.e. from the medical aid scheme and the questionnaire) regarding the diagnoses that chiropractors make on a daily basis correlate well with each other, there is no consensus in the profession as to which codes to use for chiropractic specific diagnoses. These chiropractic specific diagnoses (e.g. facet syndrome) are however, the most common diagnoses made by chiropractors in private practice. Many respondents indicated that because of this they sometimes use codes that they know will not be rejected, even if it is the incorrect code. For more complicated codes, the majority of respondents indicated that they did not know how to or were not interested in submitting the correct codes to comply with the level of specificity required by the medical aid schemes. The challenge is to make practitioners aware of the advantages of correct coding for the profession.

LIST OF TABLES

Chapter two

Table 2.1	Responsibilities of the four subcommittees of the National task team	8
Table 2.2	Example of primary and secondary codes	11
Table 2.3	Five parameters of the study conducted by Koo <i>et al.</i> (2005)	12
Table 2.4	Results of various studies regarding commonly treated chiropractic conditions worldwide	20

Chapter four

Table 4.1	Total claims processed by month and year	27
Table 4.2	Totals and percentages of claims by origin and year	29
Table 4.3	T-test to compare mean knowledge score between males and females	32
Table 4.4	T-test to compare mean knowledge score between those who handled the coding procedures and those who did not	33
Table 4.5	T-test to compare mean knowledge score between those whose staff had been on ICD-10 training courses and those who had not	33
Table 4.6	T-test to compare mean knowledge score between those who submitted claims manually and electronically	34
Table 4.7	Comparison of the mean knowledge score between responses to question 14	34
Table 4.8	Mean ages of response categories for question 15	35
Table 4.9	ANOVA test of mean differences in age between the responses to question 15	35
Table 4.10	Cross-tabulation of CASA membership status and question 24	35
Table 4.11	Cross tabulation of province vs. reasons for not taking ICD-10 course	37
Table 4.12	Cross-tabulation of question 24 by question 6	37
Table 4.13	Cross-tabulation of who handles coding procedures by whether staff have attended ICD10 training course	38
Table 4.14	Cross-tabulation of question 6 with question 15	38
Table 4.15	Cross-tabulation of question 6 with question 16 responses	39

Table 4.16	Cross-tabulation of question 6 with question 22 responses	39
Table 4.17	Response to question 17	41
Table 4.18	Cross-tabulation of claims procedure by question 14	42
Table 4.19	Cross-tabulation of question 15 by whether the practice was contracted in or out of medical aid	43
Table 4.20	Cross-tabulation of question 18 by question 19	44
Table 4.21	Cross-tabulation of question 19 by question 23	44
Table 4.22	Top 50 ICD-10 codes	45
Table 4.23	Frequency of treatment	46
Table 4.24	Top 50 ranked conditions seen in practice according to questionnaire respondents	47

LIST OF FIGURES

Chapter two

Figure 2.1	The percentage of compliancy for the ICD-10 in South Africa from January 2005 to May 2006 according to the BHF	14
------------	--	----

Chapter four

Figure 4.1	Percentage of distinct claim lines with ICD-10 code	30
Figure 4.2	Percentage of distinct claim lines with primary ICD-10 code	30
Figure 4.3	Percentage of distinct claim lines with Non-Primary ICD-10 code	30
Figure 4.4	Percentage of distinct claim lines with unlisted ICD-10 code	30
Figure 4.5	Scatter-plot of age by knowledge score	32
Figure 4.6	Clustered bar chart of percentage attending ICD10 training per province	36
Figure 4.7	Responses to question 15	40
Figure 4.8	Responses to question 20	42

TABLE OF CONTENTS

DECLARATION	i
DEDICATION	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
LIST OF TABLES	vi
LIST OF FIGURES	viii
CHAPTER ONE : Introduction	1
1.1 Introduction to the problem	1
1.2 Aim and objectives of the study	2
1.3 Hypothesis	2
1.4 Scope of the study	2
CHAPTER TWO : Review of Related Literature	4
2.1 History of the ICD	4
2.2 ICD-10 coding in South Africa	8
2.3 Implementation	9
2.3.1 Worldwide implementation	11
2.4 Compliance and factors affecting compliance	14
2.4.1 Chiropractic specific terms	17
2.5 Training in South Africa	19
2.6 Commonly treated conditions	19
2.7 Advantages and disadvantages of questionnaire based studies	21
2.8 Conclusion	22
CHAPTER THREE : Methodology	23
3.1 The Design	23

3.2 Inclusion and exclusion criteria	23
3.3 Data collection tool	24
3.4 Focus group	24
3.5 Pilot study	25
3.6 Protocol and procedure	25
3.7 The data	25
CHAPTER FOUR : Results	27
4.1 The level of compliancy of chiropractors in terms of correct coding	27
4.2 Demographics	31
4.3 The factors which influence the compliance of chiropractors	31
4.3.1 Knowledge of ICD-10 coding	31
4.3.2 Age	34
4.3.3 CASA membership	35
4.3.4 ICD-10 training course	36
4.3.5 Claims procedure	39
4.3.6 Knowledge about the term, “subluxation”	43
4.4 The diagnoses chiropractors commonly make in private practice, as well as the frequency of treatments	44
4.4.1 Using medical aid data from 2006 to 2007	44
4.4.2 Using questionnaire data	46
CHAPTER FIVE : Discussion	49
5.1 Introduction	49
5.2 Demographics and response rate	49
5.3 The level of compliancy of chiropractors in terms of correct coding	50
5.4 Knowledge of ICD-10 coding	51
5.5 Age	52

5.6 CASA membership	52
5.7 ICD-10 training course	52
5.8 Claims procedure	54
5.9 Knowledge about the term, “subluxation”	55
5.10 The most common diagnoses made by chiropractors in South Africa, as well as the frequency of treatments	55
5.11 Hypotheses	56
5.12 Limitations to the study	57
CHAPTER SIX : Conclusion and recommendations	58
6.1 Conclusion	58
6.2 Recommendations	59
REFERENCES	61
APPENDICES	

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION TO THE PROBLEM

The International Classification of Diseases (ICD) provides codes to classify diseases in such a manner, that every health condition can be assigned to a unique category and given a code (Mullin, 2007). These codes are clinical diagnostic codes that translate the written description of medical, as well as health related information, into codes in a standardised format. The ICD is published by the World Health Organization (WHO) and is used for world wide statistics on morbidity, mortality and reimbursement systems. This system was designed to promote international comparability in collection, processing, classification and presentation of these statistics (Mullin, 2007).

Some of the most common diagnoses made by chiropractors are not included in the ICD-10 coding system, as the ICD-10 system is mainly medically orientated and does not accommodate these diagnoses (Whitelaw, 2009). According to Holt and Beck (2005), the most common diagnoses made by chiropractors are facet syndrome and joint fixation. Chiropractors are hence, forced to use the “wrong” ICD-10 codes that are closest to the diagnoses which they make, in order to be reimbursed by the medical aid schemes. This can potentially lead to reimbursement problems for chiropractors in future and create confusion for the medical aid schemes as to what conditions chiropractors actually diagnose and treat because of the wide variety of ICD-10 codes used, as chiropractic specific diagnoses are not included in the ICD-10 system. The statistical analysis of this data is also used by the government to make decisions about health care expenditure (SA Department of Health, 2006). The problems that chiropractors encounter with the current ICD-10 system have not yet been documented in published studies.

According to Manga (2000) and The Future of Chiropractic Revisited: 2005 to 2015 (2005), chiropractic is a profession that is still campaigning for acceptance and inclusion into the medical fraternity; therefore, chiropractors need to make sure that it is clear what conditions they can

diagnose and treat successfully. Hence, this study aims to investigate the level of compliancy and factors affecting the compliancy of South African chiropractors using the ICD-10 coding system.

1.2 AIM AND OBJECTIVES OF THE STUDY

The aim of this study was to determine the level of compliancy to ICD-10 coding procedures by chiropractors in South Africa as well as to determine the factors that may influence the use of correct ICD-10 codes.

The specific objectives of this study included the following:

- 1.2.1 To determine the level of compliance of chiropractors in terms of accurate coding that is not rejected by the medical aid scheme.
- 1.2.2 To determine whether the ICD-10 diagnoses, which chiropractors commonly submit to the medical aid scheme reflect the actual diagnoses made in practice (based on participants' responses to the Questionnaire).
- 1.2.3 To determine the problems encountered by chiropractors with respect to the ICD-10 coding system (based on responses from the Questionnaire).

1.3 HYPOTHESIS

The following hypotheses were set to address the specific objectives identified in 1.2.1 and 1.2.2:

- The level of compliance of chiropractors to the ICD-10 coding procedures will be good.
- The ICD-10 diagnoses commonly submitted to the medical aid scheme will be similar to the actual diagnoses commonly made in practice (based on participants' responses to the Questionnaire).

1.4 SCOPE OF THE STUDY

The study design was that of a retrospective survey of a quantitative nature. A self-administered questionnaire (Appendix A) was e-mailed and posted to 380 chiropractors practicing in South Africa. The electronic questionnaires were sent out four times at two week intervals for the

duration of eight weeks; and the postal questionnaires sent once. A response rate of 16.5% ($n=63$) was achieved.

Raw data was received from the divisional manager of the coding unit of Discovery Health (Pty) Ltd. in the form of an excel spreadsheet containing the most common ICD-10 diagnoses made by chiropractors in South Africa who had submitted claims to Discovery Health (Pty) Ltd. for the period June 2006 to July 2007. The spreadsheet also contained depersonalised compliance statistics of chiropractors to the ICD-10 system from July 2006 to October 2008. SPSS version 15 was used for descriptive statistical data analysis (SPSS Inc., Chicago, Ill, USA).

This research aims to determine potential problems in the current ICD-10 coding system, with respect to chiropractors specifically; as well as to investigate the level of compliance of chiropractors to the ICD-10 coding system and the factors which may affect this in order for chiropractors to correctly code conditions in the future; receive the help they require and come to an agreement over which ICD-10 codes to use for certain chiropractic specific diagnoses.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 HISTORY OF THE ICD

According to History of the Development of the ICD (2007), the first attempt to classify diseases, also known as nosology, was made by Francois Bossier de Lacroix - better known as Sauvages in the 1750's under the title of *Nosologia methodica*. At around the same time, Linnaeus published his own version entitled, *Genera morborum*. In 1785, the most commonly used classification system for disease was published by William Cullen under the title of *Synopsis nosologiae methodicae*.

The statistical study of disease started a century earlier by John Graunt, in his work on the London Bills of Mortality, in which he attempted to estimate the proportion of live born children who died before reaching the age of six.

In 1837, William Farr, at the inception of the General Register Office of England and Wales, concluded that the classification introduced by Cullen was no longer suitable as it did not take into account the advances of medical science nor was it satisfactory for statistical purposes.

At the first International Statistical Congress in Brussels in 1853, the congress requested William Farr and Marc d' Espine to prepare an internationally applicable uniform classification of causes of death. They proposed two different classification systems and the congress adopted a compromise list of 139 rubrics. In 1864 this classification was revised in Paris on the basis of Farr's model and was further revised in 1874, 1880 and 1886.

This classification system was never accepted universally, but the model proposed by Farr that included the principle of classifying diseases by anatomical site, served as the basis of the International list of Causes of Death. The International Statistical Congress was replaced by the International Statistical Institute, and at its meeting in Vienna in 1891, ordered the committee,

chaired by Jacques Bertillon, with the preparation of a classification of causes of death. Bertillon presented the report in Chicago in 1893 and it was accepted by the International Statistical Institute. This classification was based on the model used by the City of Paris, of which Bertillon was the Chief of Statistical Services, and was based on classifications used in England, Germany and Switzerland. This system included the principle introduced by Farr, of distinguishing between general diseases and those localised to a particular organ or anatomical site.

The Bertillon Classification of Causes of Death was approved and adopted by several countries and cities. The American Public Health Association recommended that this classification system be used by registrars of Canada, Mexico and the United States of America and that the system be revised every ten years.

In August 1900, the first International Conference for the Revision of the Bertillon Classification of Causes of Death was held in Paris and was attended by delegates of 26 countries. A detailed classification, consisting of 179 groups, and an abridged classification of 35 groups, were adopted. The need for revision every ten years was recognised and the following conferences took place in 1909, 1920, 1929 and 1938. Bertillon was in charge of the 1909 and 1920 conferences but passed away in 1922.

In 1923, the International Statistical Institute decided to cooperate with other International organizations in preparation for future revisions. The Health Organization of the League of Nations had taken an active interest in the statistics of the classification of Causes of Death. An international commission, known as the Mixed Commission, was created in order to coordinate the work of both agencies and consisted of an equal number of representatives from the International Statistical Institute and the Health Organization of the League of Nations. This commission drafted the proposals for the 4th (1929) and 5th (1938) revisions of the International list of Causes of Death.

The 5th International Conference for the Revision of the International List of Causes of Death approved three lists: a detailed list of 200 titles, an intermediate list of 87 titles and an abridged list of 44 titles. These lists were brought up to date with progress of medical science, particularly

in the chapter on infectious and parasitic diseases, changes in the chapters on puerperal conditions and accidents and a list of causes of stillbirth were approved. The Conference recognised the need for a corresponding list of diseases for the classification of morbidity to meet the statistical requirements for health insurance organizations, hospitals, military medical services, health administrators, and similar bodies. The Conference could not agree on a uniform classification of diseases that could be used for statistics of illness, and most countries prepared their own lists. A Standard Morbidity Code was prepared by the Dominion Council of Health of Canada and published in 1936, and at the 5th International Conference in 1938, the Canadian delegate introduced a modification of this list for consideration as the basis for an international list of causes of illness - but no action was taken on this proposal.

The UK and USA published provisional classifications of diseases and injuries in 1944 that were more extensive than the Canadian list, but followed the general order of diseases in the International List of Causes of Death. The UK, USA and Canada formed a committee to try and combine the mortality and morbidity lists in order to utilise both and to compare the statistics. This committee prepared a draft of a Proposed Statistical Classification of Diseases, Injuries and Causes of Death.

In 1946, at the International Health Conference in New York, the interim Commission of the World Health Organization was entrusted with the next decennial revision of the International List of Causes of Death and the establishment of International Lists of Causes of Morbidity. This committee prepared a list under the title of International Classification of Diseases, Injuries and Causes of Death and circulated it to national governments for comments and suggestions. The committee altered the lists according to the feedback received and it was adopted at the International Conference for the Sixth Revision of the International Lists of Diseases and Causes of Death in 1948. At this conference a comprehensive programme of international cooperation for vital and health statistics was adopted and it was recommended that governments establish national committees to coordinate the statistics in the country, and to serve as a link between the national committees and the World Health Organization.

These lists were published in the Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death.

The 7th revision conference was held in 1955, under the auspices of the World Health Organization, and was limited to essential changes and amendments of errors and inconsistencies. However, the 8th revision conference held in 1965 recommended changes that were more comprehensive than the 7th but left the basic structure of the Classification and the general philosophy of classifying diseases according to their aetiology, rather than a particular manifestation.

In 1975, still under the auspices of the WHO, the International Conference for the Ninth Revision of the International Classification of Diseases retained the basic classification structure, but with more detail at the level of four-digit sub-categories, and some optional five-digit subdivisions. It was recognised that the three-digit level was appropriate for users not requiring such detail.

The 9th revision included optional extras for users wishing to produce statistics and indices toward medical care, and included an alternative method of classifying diagnostic statements, which included information about underlying general disease, and a manifestation in a particular organ or site. This became known as the dagger and asterisk system and has been retained in the 10th revision. ICD-10 codes marked with a dagger (†) indicate the primary code and cause of underlying disease. A code marked with an asterisk (*) indicates the current manifestation, which is coded as a secondary code although its use is optional codes e.g. M51.1†G55.1* is the correct way to code for lumbar and other intervertebral disc disorders with radiculopathy.

It became clear that the great expansion in the use of ICD needed a rethinking of its structure and to devise a stable and flexible system which would not require comprehensive revision for many years. It was also decided that the 10 year interval was too short and a decision was made to postpone the 10th revision development until 1989. At the 1989 Conference, a program of work leading to the development and publication of the ICD-10 was undertaken (History of the development of the ICD, 2007).

2.2 ICD -10 CODING IN SOUTH AFRICA

Stakeholders of the South African medical profession realised that South Africa had to keep abreast with what was happening in the rest of the world regarding healthcare statistics, and that a standardised method of capturing these statistics had to be developed.

The Committee on Standardisation of Data and Billing practices was formed in 2001 to standardise data and billing practices in the South African healthcare system. The main recommendation of this group was the need to develop an appropriate coding standard for South Africa. The Council for Medical Schemes, as well as the Department of Health and industry stakeholders, formed a National task team in 2004 to develop recommendations for an appropriate strategic plan for the successful implementation of ICD-10 coding in the private and public sector. This task team formed four subcommittees that were responsible for various aspects of the implementation process, as reflected in Table 2.1 below.

Table 2.1: Responsibilities of the four subcommittees of the National task team

Operational Subcommittee	Technical Subcommittee
<ul style="list-style-type: none">- <i>Licensing issues</i>- <i>Communication with stakeholders</i>- <i>Privacy and Confidentiality</i>- <i>Assessment of public and private sector readiness</i>- <i>Role of switching companies</i>	<ul style="list-style-type: none">- <i>Coding level</i>- <i>Adjudicate in disputes on codes</i>- <i>Evaluate scope of practice of healthcare providers</i>- <i>Investigate rules and applications</i>- <i>Primary versus secondary codes</i>
Training Subcommittee	Confidentiality Subcommittee
<ul style="list-style-type: none">- <i>Minimum training standards for ICD 10 coding</i>- <i>Recommended training material and processes</i>- <i>Recommended training institutions</i>- <i>Recommended accreditation and qualifications for training</i>	<ul style="list-style-type: none">- <i>Develop framework for informed consent from medical scheme members</i>- <i>Inter-provider referrals</i>

The rationale behind the implementation of ICD-10 coding, after investigation by the National task team, was found to be fourfold:

1. There was a need to standardise data collecting processes in the health industry,
2. Regulation 5 of the medical schemes act 131 of 1998 prescribed the manner of submission of claims by health services,
3. There was a need to facilitate an efficient reimbursement system for providers that was consistent with legislation and improved risk management practices by medical schemes,
4. The introduction of the medical schemes act in 1999 saw the emergence of a minimum set of guaranteed benefits to be covered by medical schemes (SA Department of Health, 2006).

“The purpose of the ICD-10 is to translate diagnoses of diseases and other health problems from descriptions into an alphanumeric code, which permits easy storage, retrieval and analysis of data. It also allows for the establishment of a systematic recording, analysis, interpretation and comparison of morbidity and mortality data collected within the country but also with other countries” (SA Department of Health, 2006).

2.3 IMPLEMENTATION

The implementation of the ICD-10 system occurred in four phases:

Phase 1: From 1 July to 30 September 2005

It was decided that during the first phase submission of ICD-10 codes was mandatory for all healthcare providers except pharmacists, clinical support staff and allied healthcare providers. This latter group, which included chiropractors as they are registered with the Allied Health Professionals Council of South Africa (AHPCSA), was given until 1 January 2006 before submissions became mandatory. A “no code, no pay” principle applied during this phase and a code per line item was required. The code had to have a minimum of three digits and be alphanumeric. No clinical validation or validation of primary codes was required *viz.* diagnostic and procedure codes had to match up in order to monitor the appropriateness of care given. An active monitoring system to monitor turn around times for reimbursement of healthcare providers, was also developed and implemented during this phase.

Phase 2: From 1 October to 31 December 2005

During this phase all healthcare providers, registered with the Health Professionals Council of South Africa (HPCSA), except pharmacists, were required to provide a valid primary code in the primary field. All codes were to be coded to the correct level of specificity but no clinical validation of codes was necessary.

Phase 3: From 1 January to 30 June 2006

All healthcare providers, including chiropractors, had to submit claims with complete codes during this phase; however, clinical validation was still not necessary.

Phase 4: Postponed in 2006 until further notice

Clinical validation was introduced for primary and secondary codes by medical schemes during this phase. At the time of implementation, there were two types of licences for ICD-10 in South Africa, with the first type being owned by the public sector and the second type being owned by individual companies. Each licence was under the terms of the WHO. The Board of Healthcare Funders (BHF) holds a licence from the WHO, which allows distribution of an electronic version of the ICD-10 codes which was developed by the BHF, and is called the BHF-DXS ICD-10 Master Industry Table. The National task team promotes the use of this format as the basis for all coding in South Africa. Short lists or “cheat sheets” of codes that are commonly used by healthcare providers have been developed by certain companies; however, the widespread use of these lists is not recommended by the task team. They have called these lists Quick Reference Code lists and permit their use only under a set of certain regulations (SA Department of Health, 2006)

The task team (SA Department of Health, 2006) has also defined a valid and complete code as: *“A code that appears in the ICD-10 coding manual according to the WHO rules and conventions and as specified in the BHF-DXS ICD-10 Master Industry Table. It comprises a primary code in the primary position of a claim. For multiple diagnoses, secondary codes are coded in the secondary position”* (see table 2.2 below). A complete code is defined as a code that is coded to the highest level of specificity.

Table 2.2: Example of primary and secondary codes

Primary code	M51.1†	Lumbar and other intervertebral disc disorder with radiculopathy
Secondary code	G55.1*	Nerve root and plexus compression in intervertebral disorders
Complete code	M51.1†G55.1*	

Thus in terms of the chiropractic profession full implementation of this classification system occurred on the 1st of January 2006 and full rejection of statements not reflecting an ICD-10 code on the 1st of March 2007 (SA Department of Health, 2006).

2.3.1 Worldwide implementation

The mission of the WHO is to establish the highest possible level of health for all people. The implementation of the ICD-10 coding system in the WHO member states has played a vital role in improving measurement of disease, and aiding the WHO in achieving its mandate (The WHO agenda, 2008). Koo *et al.* (2005) reviewed the worldwide implementation of ICD-10 in WHO member states. They studied the availability of ICD related resources, the contexts in which ICD resources have been used and the correlations between socioeconomic development (SED) and the quality of mortality data that has been collected. This evaluation was conducted using a number of survey methods to investigate the following; as indicated in Table 2.3 below.

Table 2.3: Five parameters of the study conducted by Koo *et al.* (2005)

ICD licensing and sales	The WHO Press is authorised to sell the latest revision of ICD-10 in printed book and digital CD-ROM format, along with selling licences to organizations and individuals. In this paper they requested data of all ICD related licensing during 1994-2004 and of all the sales of the English revision of ICD-10 second edition during 1993-2004.
Context of use	Koo <i>et al</i> (2005) wanted to determine the context of use of ICD information in member states having already completed implementation. They conducted a web based search using online search engines and used the first fifty results that were relevant to ICD related information.
Socioeconomic development (SED)	The World Bank definitions and rankings were used for member states to determine the gross domestic product (GDP) per capita: Low income = GDP < \$5 000 Middle income = GDP between \$5 000 and \$10 000 High income = GDP > \$10 000
Quality adjusted completeness (QAC)	The information on the quality and completeness of mortality data in WHO member states was used and in order to compare SED with mortality data, taking into account completeness, an adjustment of the completeness of data was made based on quality. This was done because completeness is a factor in the extent of the implementation of ICD related measurement systems. The QAC was plotted against SED in US dollars for each of the member states and the following classification was drawn up; QAC below 50 was low, QAC below 80 and above 50 was moderate and QAC over 80 was good.
Population size	This was divided into 4 categories: Small = < one million Medium = < ten million Large = < hundred million Very large = > hundred million

All this data was taken into account and was evaluated from multiple perspectives to determine a before and after view of implementation worldwide. These results can be cross referenced to understand how extensive, effective and reproducible the process was.

ICD-10 sales - The results showed that 37% of all ICD-10 sales were to agents or private parties in the United Kingdom and other high income countries such as South Africa 12%, USA 8% and Japan 2%. From low income countries the Philippines had 14%, India 7% and Egypt 5%. These seven countries represented 85% of all ICD-10 sales. No middle income countries were amongst the seven largest purchasers, which may indicate a shift in political priorities to issues other than health measurement. The results showed that purchasing does not equal implementation and that other factors such as collection methods and data quality also play an important role in the success of implementation.

Licences – From the licenses that were sold, 48% were to organizations intending to sell or distribute products internationally and most of these organizations were large, multinational companies that sell software or other medical and technical products that are required to include ICD codes. South Africa had 16%, UK 9%, France 9% and United Arab Emirates 5% of all licences sold.

Context of use - When the authors looked at the context in which ICD can be used, it was clear that software products were not the only context and that over 100 unique results were collected. Of these, 90% were grouped into one of five categories; medical practice management software, productivity software for alternative computing platforms, searchable databases in non-standard languages, information for the general public and classroom based or online education programmes.

SED - The socioeconomic status of a country can contribute to the health outcomes of a country and generally, there appeared to be a relationship between development and completeness of mortality data. This was strongest for the low and middle income countries, which were grouped in the low and moderate completeness tiers. High income countries were distributed equally over the three QAC tiers, indicating that direct SED and QAC relationships do not always hold true.

In conclusion, this study showed that the implementation of ICD in WHO member states varies greatly according to SED, ICD resources available, how these resources are distributed/used and who is guiding the implementation and data collection.

2.4 COMPLIANCE AND FACTORS AFFECTING COMPLIANCE

ICD compliance statistics from January 2005 to May 2006 were released by the BHF to document the success of the implementation of the ICD-10 coding system in South Africa. Figure 2.1 below highlights the percentage of valid claims submitted between January 2005 and May 2006 and shows the gradual improvement in compliancy over this time frame.

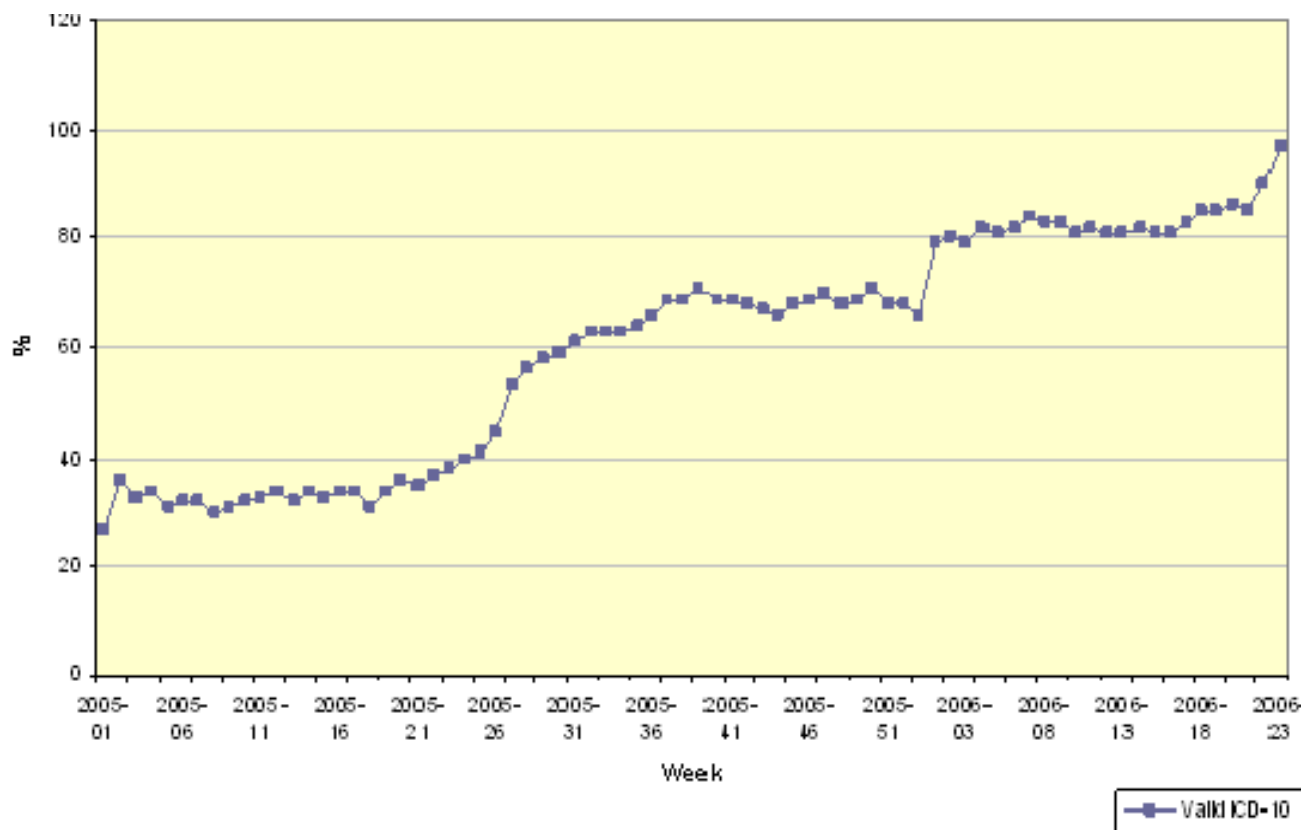


Figure 2.1: The percentage of compliancy for the ICD-10 in South Africa from January 2005 to May 2006 according to the BHF (ICD-10 compliance statistics from January 2005 to May 2006, 2007)

The BHF was able to identify two major errors that were resulting in the rejection of claims during this time period. Firstly, coding format errors that were caused because of typing errors, e.g. multiple codes that apply to the same patient must be written in the following way: M91.2/K53.8/I14.0; however, many claims submitted incorrectly included a space between the codes; i.e. M91.2/ K53.8/ I14.0. Another formatting error commonly made was omitting a number from the code; i.e. some codes require three characters, a letter followed by two numbers, e.g. M41 (scoliosis). Some require four characters, a letter followed by two numbers, a dot and one more number, M41.0 (infantile idiopathic scoliosis) and still others require five characters, a letter followed by two numbers, a dot and two more numbers, M41.02 (infantile idiopathic scoliosis, cervical region).

Secondly, practitioners were including diagnosis descriptions on the claim forms, which could be embarrassing for the patient, especially if they were diagnosed with depression or a sexually transmitted disease. These written descriptions should not have been included so as to maintain patient confidentiality and should merely have been assigned the relevant ICD-10 code.

For this reason, the South African ICD-10 Coding Standards document was prepared to assist healthcare providers with correct coding practices and is still available on the website www.medicalschemes.com. The task team have drawn up a list of guidelines to which practice management application software must comply with in order to help healthcare providers with coding and to decrease the number of claims rejected.

In 2006, the Department of Health set up a standards body to be called the National Health Standards Advisory Body, which took over the function of the implementation task team. This body is now responsible for the continued developments of adequate standards for privacy, confidentiality and security (SA Department of Health, 2006).

According to O'Malley *et al.* (2005), there has been an increased interest in coding accuracy, *viz.* the extent to which ICD codes reflect a patient's underlying disease. The reason for this is that the data is used in deciding on the distribution of funding, especially in terms of clinical and research funding allocations.

In studies that have been conducted since 1970, researchers have found a wide variety of errors in the code assignment process. In the 1970's the error rates ranged from 20-80% (Johnson and Appel, 1984), in the 1980's it decreased to an average of 20% with most below 50% (Fischer *et al.*, 1992, Jolis *et al.*, 1993) and in the 1990's the range varied from 0-70% (Benesch *et al.*, 1997, Goldstein, 1998). This wide range of error rates was due to different methodology being used in different studies such as, different data sets, different versions of ICD classification, different conditions studied, number of digits compared and codes examined (Bossuyt *et al.*, 2004).

The O'Malley *et al.* (2005) study focused on codes assigned during hospital stays in the United States of America and examined sources of error that lead to the assignment of a diagnostic code which was not a fair reflection of the patient's actual condition. They believed that users could evaluate the limitations of the classification and make better decisions if they understood the sources of error.

The first potential source of error can occur at the specific location where the coding occurs, i.e. in private practice or in hospital. Although the basic coding procedure is similar whether it occurs in or out of hospital, in private practice ICD-10 claims are submitted either manually or electronically and there is a higher risk of errors occurring with manual claims, due to unreadable handwriting or coding format errors, which should not occur with electronic claims. Doctors are known for their illegible handwriting and errors might occur in attempting to decipher their writing. The second potential source of error can occur because of the extent and depth of communication between the doctor and the patient. If the patient does not disclose all their signs and symptoms, it can cause the doctor to make the wrong diagnosis, e.g. if a patient complains of back pain alone without disclosing to the doctor that the pain is made worse on urination the doctor might incorrectly diagnose the patient with lumbago when in fact he has kidney stones. The doctor however, also has a responsibility to take a detailed case history and to ask all relevant questions. The doctor may also use a general code rather than a specific code, e.g. they may diagnose a patient with general headache (R51) when the correct diagnosis is actually a tension type headache (G44.2). This may occur because of time constraints, lack of training or lack of interest either by the doctor or his employees.

The third potential source of error can occur with diagnostic tests. The doctor's knowledge regarding such tests, availability of the tests and the doctor's ability to interpret the results can all influence the final code that is submitted. The relevant tests must be ordered as some tests have higher sensitivity and specificity and will result in higher diagnostic accuracy. For example, tests for the presence of a carcinoma are more sensitive and specific than tests for schizophrenia, as the former tests include tumour histopathology and serum markers compared to behavioural diagnostic criteria required to diagnose for schizophrenia.

The fourth potential error can occur at the medical aid where the coders have to capture all the data received from the doctor. If these are manual claims and handwritten, it might be hard to read as mentioned before. The quality and quantity of training that the coders undergo influences their ability to work through large amounts of data. Continuing education is also vital as changes occur and can influence accuracy. For example, haemorrhage has been moved from the circulatory chapter to the signs and symptoms chapter. The coders' experience, attention and persistence can also affect accuracy. When a patient with renal failure and hypertension is admitted, an inexperienced coder may code each condition separately, whereas an experienced coder will look to see if there is a connection between them and use combination codes. If coders are unsure about the primary diagnosis or about any information on the claim form they are expected to contact the doctor or to gather the necessary information from the record to capture the correct diagnosis. If they fail to do this and are not persistent, errors can occur. Up coding is another potential error where codes of higher reimbursement value are assigned over codes of lower value, for example, up coding a urinary tract infection to septicaemia will result in an increase of over \$2 000 in reimbursement. O'Malley *et al.* (2005) concluded that all of the above mentioned errors were a result of the healthcare workers' reliability in making a correct diagnosis and the factors that directly or indirectly influence this.

2.4.1 Chiropractic specific terms

One of the problems encountered by chiropractors with the ICD-10 system is that there are terms used by chiropractors that have a different meaning in the ICD-10 system, which is more medically orientated. For example, the definition of the term "subluxation", used by the ICD-10 classification system, differs from the definition that chiropractors have for the same term.

According to the Oxford concise medical dictionary (2003), subluxation is a “*partial dislocation of a joint, so that the bone ends are misaligned but still in contact*”. According to Bergmann *et al.* (1993), the chiropractic definition of subluxation is “*the alteration of the normal dynamic, anatomic or physiologic relationships of contiguous articular structures*.” When a chiropractor makes a diagnosis of a subluxation and is forced to use the ICD-10 code and definition, it is then wrongly reflected in the data that chiropractors treat dislocated joints by manipulative therapy, which would be the wrong treatment protocol for a dislocated joint.

A common term that chiropractors use on a daily basis, which is not included in the ICD-10 system, is facet syndrome, which according to Vizniak (2005) is “*facet joint irritation or damage that may cause pain*”. It has been estimated that 15% to 40% of low back pain actually originates from the facet joints (Vizniak, 2005) and according to Holt and Beck (2005) and Bryant (2003), facet syndrome is the most common diagnosis made by chiropractors. This creates a problem for chiropractors as this diagnosis cannot be reflected in the ICD-10 data and so chiropractors have to choose the closest code to a facet syndrome that they can find. This leads to a wide variety of codes being submitted for the same condition, which can lead to confusion when the medical schemes review these statistics. Another diagnosis that chiropractors use on a regular basis, for which there is no ICD-10 code, is cervicogenic headache, which according to Vizniak (2005) is “*head pain originating from the cervical spine localised to the neck and occiput*.” The closest code to cervicogenic headache that chiropractors can use is Tension type headaches, which is defined as “*intermittent headache associated with muscular origin, trigger points and other myofascial pain syndromes*” by Vizniak (2005).

Another potential source of error to consider according to O'Malley *et al.* (2005) is that there exist many medical synonyms for the same condition, e.g. lumbago, low back pain, lumbar facet syndrome or lumbar sprain or strain injury.

2.5 TRAINING IN SOUTH AFRICA

Various companies in South Africa offer ICD-10 training courses. Three different courses are available - basic, intermediate and advanced. The content of the course depends on whether the person is medically trained or not. The courses for people that do not have a medical background include basic anatomy and physiology.

The basic course duration is 88 hours, of which eight hours is facilitator based and 80 hours of assignments. The intermediate course duration is also 88 hours, which consists of 32 hours of facilitator based learning and 56 hours of assignments. The advanced course duration is 360 hours, which consists of nine modules of eight hours each and 32 hours of assignments. Short, one day courses are also available to cover the basics of coding to medically trained people.

In South Africa, various companies/associations offer internal training to their employees such as: Netcare, Mediclinic, Life and the South African Dental Association. There are five companies that offer external training: The Foundation for Professional Development, which is based in Pretoria; Africode which is based in Johannesburg; Discovery Institute, which is also based in Johannesburg; Medcode Training and Consulting cc, as well as The Institute of Health Risk Managers (IHRM), who offer courses countrywide (SA Department of Health, 2006).

In America however, there are two specialised training courses of two and four year's duration respectively. It is for this reason that South Africa is lacking in specialist coders who are working at medical schemes (O'Malley *et al*, 2005).

2.6 COMMONLY TREATED CONDITIONS

According to Guez *et al*. (2006), Horvath *et al*. (2006) and Cote *et al*. (2004), low back and neck pain are two of the most commonly diagnosed musculoskeletal disorders and exert a significant influence on the lives of the general population. Two major studies in the United States of America (USA), by Coulter *et al*. (2002) and Hurwitz *et al*. (2006), found that 70% of patients ($n = 1275$ and $n = 5183$ respectively) who visited a chiropractor, presented with major

complaints of low back and neck pain and that 20% of the US adult population had visited a chiropractor.

In terms of pain in the lumbar region, 34% of male and 26% of female patients ($n = 692$), receiving chiropractic treatment, were treated for low back pain in a Canadian study by Waalen and Mior (2005). Similar studies in New Zealand ($n = 1004$), by Holt and Beck (2005), and Australia ($n = 1018$), by Bryant *et al.* (2003), found that 38% and 40% of patients respectively were treated for low back pain and that the most common diagnosis given by these chiropractors was facet syndrome. In the Canadian study, 17% of male and 23% of female patients received chiropractic treatment for cervical pain, with a further 9% receiving treatment for thoracic pain and the average number of treatments per patient per year was 8.6 treatments (Waalen and Mior, 2005).

In an unpublished study completed at the Durban University of Technology, Mahomed (2007) investigated the profile of patients ($n = 227$) who were treated by chiropractors in private practice in South Africa. The most common diagnoses made by these chiropractors were Cervical facet syndrome (7.5%), followed by Sacroiliac syndrome (5.73%), Whiplash (4.85%) and Lumbar facet syndrome (3.96%). Furthermore, she found that 40.7% of patients required less than six treatments, 17.1% required more than 18 treatments and 17.1% of patients required between six and 11 treatments.

Table 2.4: Results of various studies regarding commonly treated chiropractic conditions worldwide

	USA(1)	Canada (2)	New Zealand (3)	Australia (4)	South Africa (5)
Low back pain	70 %	34% male 26% female	38%	40%	
Cervical pain		17% male 23% female			
Thoracic pain		9%			
Number of treatments		8.6			40.7% <6 17% 6-11 17% >18
Most common diagnosis			Lumbar facet syndrome	Lumbar facet syndrome	Cervical facet syndrome (7.5%) SI syndrome(5%) Whiplash (4%) Lumbar facet syndrome (3.9%)

1. Coulter (2002) and Hurwitz (2003); 2. Waalen and Mior (2005); 3.Holt and Beck (2005); 4. Bryant et al. (2003)
5. Mahomed (2007)

Various studies also investigated the demographics of chiropractors. Pedersen (1994) found that the average age of European chiropractors who responded to his research was 37.2 years while Mahomed (2007) recorded an average age of 34.2 years. Coulter and Shekelle (2005) found that 83% of the respondents were male, while Mootz *et al.* (2005) recorded that 81% were male in the Arizona study and 70% were male in the Massachusetts study. Mahomed (2007) found that only 45% of the respondents were male in the South African study.

Russel *et al.* (2004) found that the average response rate of chiropractors to survey type research was 53%. Mootz *et al.* (2005) recorded a 61% response rate in the Arizona study and an 86% response rate in the Massachusetts study. Hartvigsen *et al.* (2002) recorded a 94% response rate while Mahomed (2007) recorded a 22.4% response rate.

2.7 ADVANTAGES AND DISADVANTAGES OF QUESTIONNAIRE BASED STUDIES

This study made use of a questionnaire to gather data from the sample population. According to Survey Design (2009), there are certain advantages and disadvantages of using a questionnaire or survey as a data capturing tool for research.

The advantages are that:

- Questionnaires are relatively inexpensive when compared to travelling costs for personal interviews and telephone costs for telephonic interviews and can be administered from remote locations via mail, e-mail and telephone.
- Surveys are useful in describing characteristics of large populations and the large sample will ensure statistically significant results.
- Mail questionnaires allow the respondent to complete it at their own time and place.
- E-mailing questionnaires is fast and the response time is normally quicker. With the internet, it is also possible to attach photos or sound files to make it more interesting.
- Standardized questionnaires make measurement more precise and similar data can be collected and interpreted comparatively.
- High reliability can be obtained by presenting all subjects with standard stimuli and thus, eliminating observer subjectivity.

The disadvantages as listed below are:

- Standardization can force the researcher to develop questions that are general enough to be minimally appropriate for all respondents and thereby, possibly missing what is most appropriate to many respondents.
- Questionnaires are inflexible in that the initial study design must remain unchanged throughout the data collection.
- It can be difficult to obtain a high response rate.
- Respondents might read the instructions incorrectly, whereas in a personal interview the researcher can correct them immediately.
- With a questionnaire the researcher only has a limited number of questions that he can ask before the respondent loses interest in contrast to a personal interview where the researcher can motivate the respondent to answer more questions.
- People will often delete bulk e-mail thinking that it is spam mail if the researcher does not inform them of his e-mail before he sends it out.
- Normal postal mail takes much longer than e-mail to send and receive.
- E-mail is not always available to everybody and the sample might be biased if the questionnaire is only sent out via e-mail.
- In a personal interview the researcher can ask more in depth questions and lead the respondent on to more questions, whereas in a questionnaire the researcher can extract less information from the respondent.

2.8 CONCLUSION

When reviewing the literature there exist few published studies conducted on the use of ICD-10 by chiropractors in South Africa, and any possible problems that might be associated with this system. When focusing on chiropractors specifically, there is a need to code compliantly, as well as correctly, as the chiropractic profession is still trying to gain recognition from the medical fraternity (Manga, 2000; The Future of Chiropractic revisited: 2005 to 2015, 2005).

CHAPTER 3

METHODOLOGY

3.1 THE DESIGN

The design of the study was that of a retrospective quantitative cross-sectional survey of South African chiropractors, using data gathered from a self-structured questionnaire and compliancy data provided by a medical aid scheme.

3.1.1 Ethical Clearance and Subjects

The ethics committee of the health faculty of Durban University of Technology (DUT) granted permission to do this research on 15 September 2008 (Clearance number FHSEC 034/08) (Appendix B)

The sample consisted of 63 questionnaires that were returned out of 380 that were sent out and represented 16.5% of the registered chiropractic population in South Africa.

Due to the confidential nature of the data, no names or indication of race group was given.

3.2 INCLUSION AND EXCLUSION CRITERIA

For the questionnaire the following inclusion and exclusion criteria were used.

3.2.1 Inclusion Criteria

1. Participants had to be qualified, registered chiropractors who were practicing in South Africa.
2. Participants had to be English literate, as this is the medium used for ICD -10 coding in South Africa.

3.2.2 Exclusion Criteria

1. Persons who were involved in either the focus group or the pilot study.

3.3 DATA COLLECTION TOOL

A questionnaire was developed by the researcher. The questionnaire consisted of 24 questions that included information regarding demographics, the person responsible for handling the ICD-10 coding in the practice and whether they attended an ICD-10 coding course, whether the practice submitted directly to medical schemes, the five most common diagnoses made in the practice and their perception of the ICD-10 coding system in South Africa.

Additional data was received from the divisional manager of the coding unit of Discovery Health (Pty) Ltd. in the form of an excel spreadsheet, containing the most common ICD-10 diagnoses made by chiropractors in South Africa for the period June 2006 to July 2007, that submit claims to Discovery Health (Pty) Ltd.; as well as an excel spreadsheet containing the depersonalised compliance statistics of chiropractors to the ICD-10 system from July 2006 to October 2008. Ethical clearance for the use of this data was obtained from Discovery Health (Pty) Ltd. (Appendix C)

3.4 FOCUS GROUP

Adaptation of the pre-focus group questionnaire was accomplished through the use of a focus group, which consisted of four chiropractors, the researcher and his supervisor who read and discussed the questionnaire to rule out any ambiguity and syntax difficulties and who helped add additional questions where deemed necessary. It was also assessed for relevance and ease of understanding. All participants were briefed on the aims of the study and were asked not to communicate any information about the questionnaire to their colleagues. All participants signed an Informed Consent form (Appendix D), Letter of Information (Appendix E), Code of Conduct (Appendix F) and Confidentiality statement (Appendix G) form at the focus group. The recommendations made by the focus group were taken into account to produce a refined version of the questionnaire.

3.5 PILOT STUDY

The refined questionnaire was then reviewed by the use of a pilot study, which consisted of five practicing chiropractors, who were not part of the focus group, in order to determine if the questionnaire was understandable and easy to complete, as well as to identify remaining ambiguity and errors of grammar/language, by using an evaluation form (Appendix H). The members of the pilot study and the focus group were excluded from the study, as previously mentioned.

3.6 PROTOCOL AND PROCEDURE

A self-structured questionnaire was used to collect data for the research. These questionnaires were sent out via e-mail or post to 380 registered chiropractors who were practicing in South Africa. The participants were asked to complete the questionnaire and return it via e-mail, fax or in the envelope that was included with the questionnaire. The participants received a Letter of Information along with the questionnaire explaining the nature of the study (appendix I). The electronic questionnaires were sent out four times in two week intervals and the postal questionnaires were sent out once. The data from the validated questionnaires were captured using the Microsoft Excel package. Any incomplete questionnaires were included and missing data were reflected as such in the statistical analysis.

3.7 THE DATA

3.7.1 The Primary Data

The primary data consisted of the raw data provided from the completed questionnaires, in the form of an excel spread sheet, as well as the data received from Discovery Health (Pty) Ltd. mentioned earlier.

3.7.2 Statistical Analysis

Medical aid data were imported into SPSS version 15.0 (SPSS Inc., Chicago, Illinois, USA) for analysis. Frequency tables and summary statistics were generated to summarise the data by year

and type of claim. Responses to the questionnaire were examined descriptively using frequency tables and bar charts.

Questionnaire responses to seven questions were used to determine knowledge of ICD-10 coding. Scores out of seven were expressed as a percentage. These were summarized using mean, standard deviation and range, in order to assess the level of knowledge in the sample. Knowledge was a normally distributed quantitative variable; thus, it was compared between two independent groups using t-tests and between more than two groups using ANOVA tests. Pearson's correlation analysis was used to assess relationships between quantitative variables and knowledge. Pearson's chi square tests were used to assess associations between categorical variables. A p value <0.05 was considered as statistically significant.

To provide indications of the diagnosis chiropractors commonly make in private practice, frequency tables of the total number of cases for each diagnosis were generated. Diagnoses were ranked in order of frequency to indicate the highest ranking diagnoses. Each specific disease code was examined individually with regard to the frequency of each treatment.

CHAPTER FOUR

RESULTS

4.1 THE LEVEL OF COMPLIANCY OF CHIROPRACTORS IN TERMS OF CORRECT CODING

4.1.1 Using Medical aid data from 2006 to 2008

Table 4.1 and Figures 4.1 – 4.4 shows the number and percentage of distinct claims and claim lines processed by month and year. There were a total of 103351 claims representing 869330 distinct claim lines in the three years.

Table 4.1: Total claims processed by month and year

Year	Month	Claims	Total distinct claim lines
2006	1	3399	36978
	2	2822	33245
	3	3411	33896
	4	2896	27037
	5	3335	32296
	6	2945	27610
	7	3157	29764
	8	3253	30271
	9	3195	28892
	10	3333	30573
	11	3375	31024
	12	2695	23321
	Total for 2006	37816	364907
2007	2	3299	35915
	3	3491	31733
	4	3194	28558
	5	3574	32597
	6	3426	29211
	7	3259	26883
	8	3393	28499
	Total for 2007	23636	213396
2008	1	1105	5860
	2	5184	40549
	3	5035	36032
	4	9203	62903
	5	10588	68057
	6	6989	49126
	7	3795	28500
	Total for 2008	41899	291027
Total for all 3 years		103351	869330

The percentage of claims with non-primary ICD or unlisted ICD codes (i.e. codes that were incorrect in the primary field or not listed in ICD-10 coding system) was small in all three years. Table 4.2 and Figure 4.3 show that electronic claims were responsible for more non-primary ICD claims than manual claims. Unlisted ICD claims increased over the years in both electronic and manual claims but the percentages were low.

Table 4.2: Totals and percentages of claims by origin and year

Year	CLAIM ORIGIN	Total distinct claim lines	Distinct claim lines with ICD	Percentage	Distinct claim lines with primary ICD	Percentage	Distinct claim lines with non-primary ICD	Percentage	Distinct claim lines with unlisted ICD	Percentage
2006	Electronic	18896.00	17776.00	94.07	17727.00	93.81	1293.00	6.84	0.00	0.00
	Manual	346011.00	114816.00	33.18	114404.00	33.06	3925.00	1.13	0.00	0.00
	Total	364907.00	132592.00	36.34	132131.00	36.21	5218.00	1.43	0.00	0.00
2007	Electronic	15257.00	13530.00	88.68	13497.00	88.46	705.00	4.62	92.00	0.60
	Manual	198139.00	144627.00	72.99	141813.00	71.57	3546.00	1.79	5474.00	2.76
	Total	213396.00	158157.00	74.11	155310.00	72.78	4251.00	1.99	5566.00	2.61
2008	Electronic	74631.00	71283.00	95.51	71281.00	95.51	2276.00	3.05	2275.00	3.05
	Manual	216396.00	216377.00	99.99	216377.00	99.99	4496.00	2.08	6647.00	3.07
	Total	291027.00	287660.00	98.84	287658.00	98.84	6772.00	2.33	8922.00	3.07
Total	Electronic	108784.00	102589.00	94.31	102505.00	94.23	4274.00	3.93	2367.00	2.18
	Manual	760546.00	475820.00	62.56	472594.00	62.14	11967.00	1.57	12121.00	1.59
	Total	869330.00	578409.00	66.54	575099.00	66.15	16241.00	1.87	14488.00	1.67

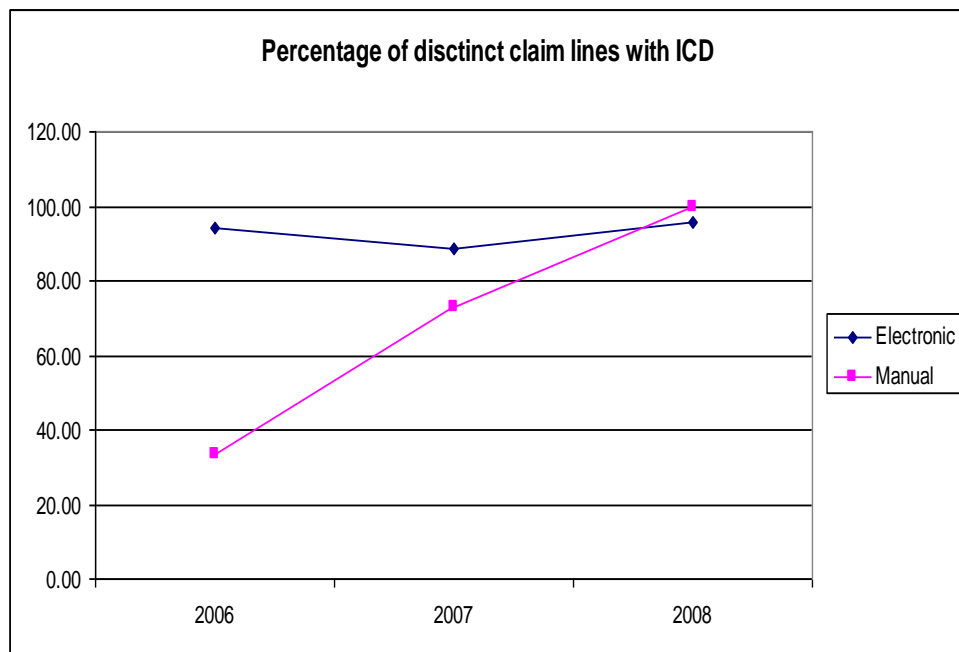


Figure 4.1: Percentage of distinct claim lines with ICD-10 code

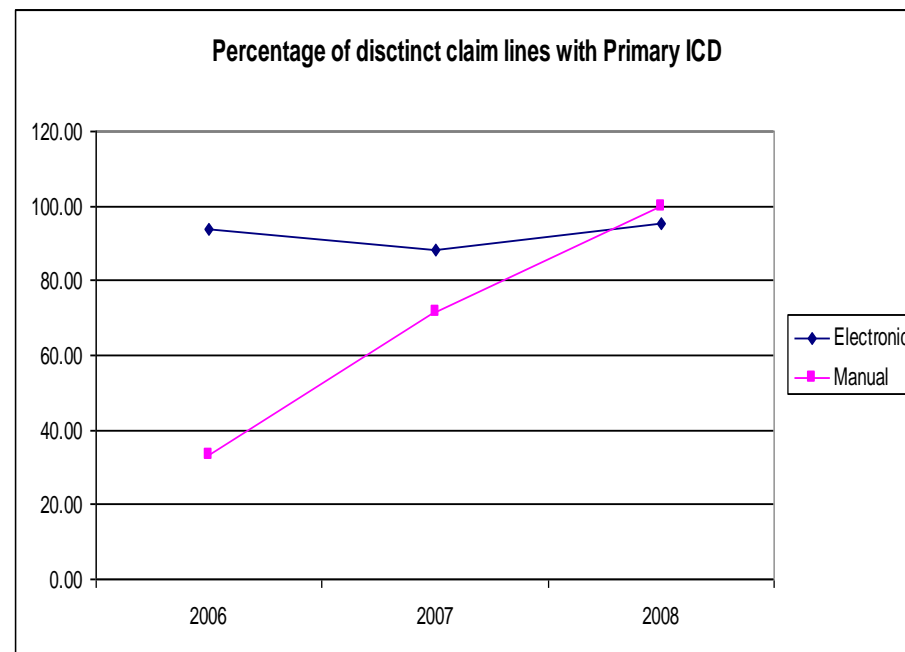


Figure 4.2: Percentage of distinct claim lines with primary ICD-10 code

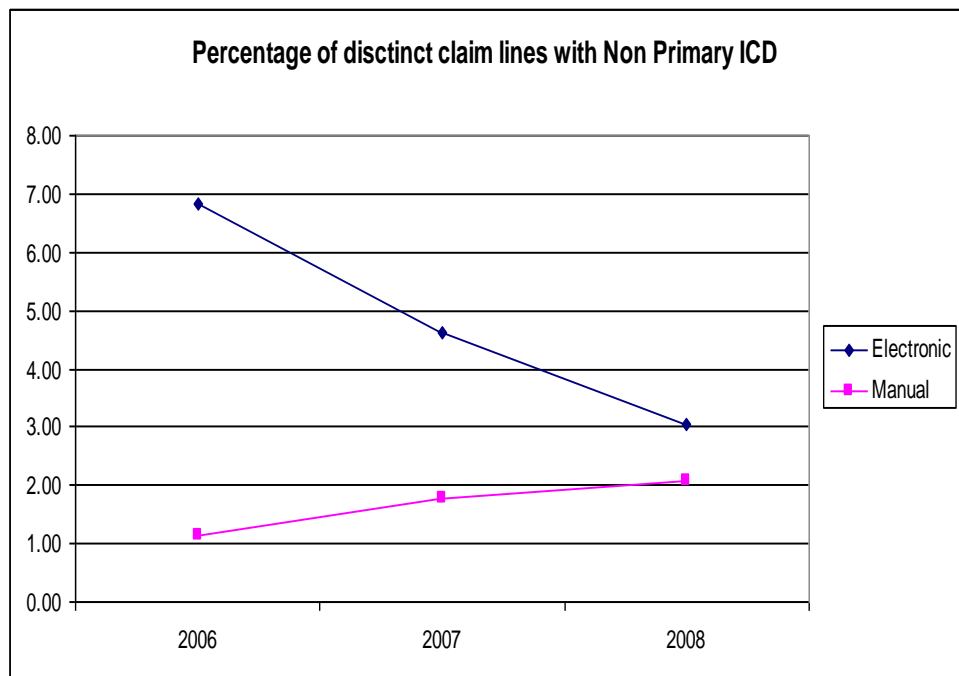


Figure 4.3: Percentage of distinct claim lines with Non-Primary ICD-10 code

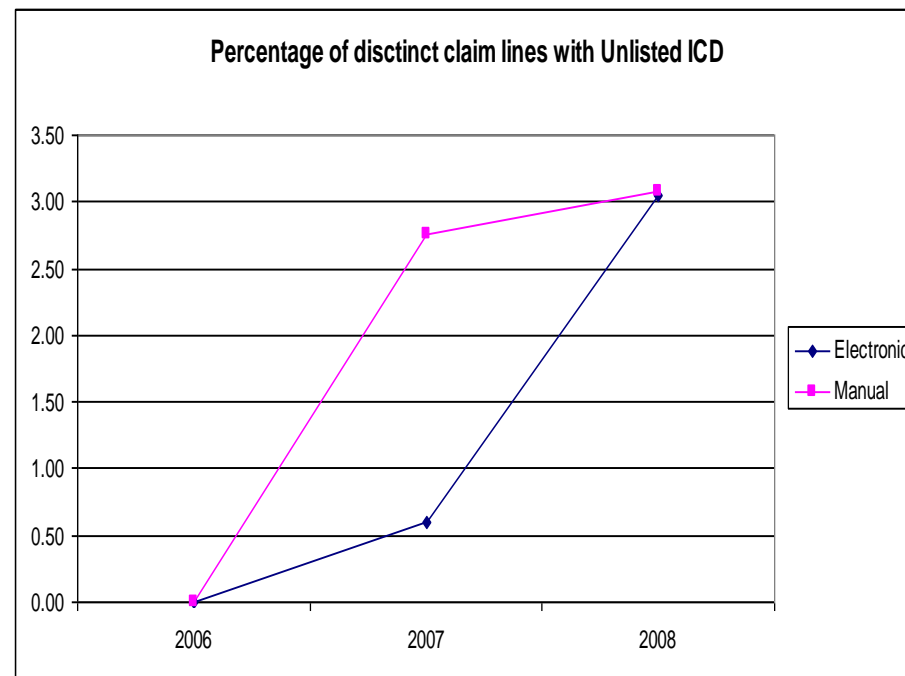


Figure 4.4: Percentage of distinct claim lines with unlisted ICD-10 code

4.2 DEMOGRAPHICS

With respect to the Questionnaire that was sent out to Chiropractors in South Africa, data from 63 participants were used with ages ranging from 26 to 79 years - with an average of 41 years. The majority of the participants were male (74.6%, $n = 47$) and 25.4% ($n = 16$) were female. KwaZulu-Natal had 25 participants (39.6%), Gauteng 17 (26.9%), Western Cape 12 (19%), Eastern Cape four (6.3%), Free State and Mpumalanga two (3.1%) each and North West one (1.5%).

4.3 THE FACTORS WHICH INFLUENCE THE COMPLIANCE OF CHIROPRACTORS

4.3.1 Knowledge of ICD-10 coding

In terms of responses to the questionnaire, the mean knowledge score for ICD-10 coding in the sample was 43.5%. This suggests a relatively low level of knowledge. The range was from 0% to 85.7%.

Being a CASA member did not influence knowledge of ICD-10 coding ($p = 0.727$), nor was there a relationship between age and knowledge of coding (correlation coefficient $r = 0.063$, $p = 0.622$) as shown in Figure 4.5.

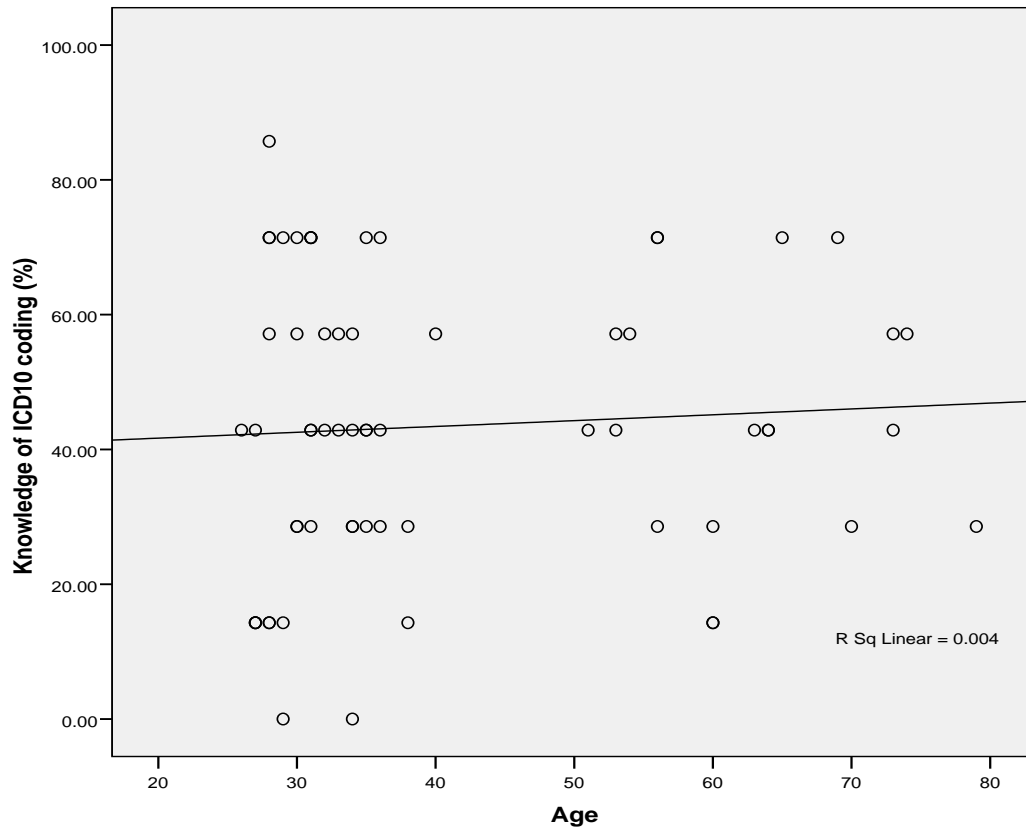


Figure 4.5: Scatter-plot of age by knowledge score

Gender was not significantly associated with knowledge of ICD-10 coding as, shown in Table 4.3 ($p = 0.265$). Males however, tended to have higher scores than females.

Table 4.3: T-test to compare mean knowledge score between males and females

	Sex	<i>n</i>	Mean	Std. Deviation	Std. Error Mean	<i>p</i> value
Knowledge of ICD-10 coding (%)	Male	47	45.29	20.919	3.051	0.265
	Female	16	38.39	21.957	5.489	

Table 4.4 shows that the individual responsible for handling the coding procedures in the practice (i.e. whether it be the chiropractor or a receptionist) did not influence the knowledge of coding ($p = 0.381$). However, those participants who did not handle the coding procedures tended to know slightly more than those who actually handled the coding procedure themselves.

Table 4.4: T-test to compare mean knowledge score between those who handled the coding procedures and those who did not

	Chiropractor handles coding	<i>n</i>	Mean	Std. Deviation	Std. Error Mean	<i>p</i> value
Knowledge of ICD-10 coding (%)	Yes	49	42.27	21.618	3.088	0.381
	No	14	47.95	19.895	5.317	

There was a non-significant trend towards participants who had been on an ICD-10 course (47.6%; $n = 30$) to have a greater knowledge of the ICD-10 coding procedures ($p = 0.147$). Their knowledge was almost 10% higher than those who had not been on a course (52.4%; $n = 33$).

Table 4.5 shows that only eight (12%) of the 63 participants had sent their staff on ICD-10 training courses. These participants tended to have higher knowledge scores than those who had not sent their staff on a course, however, the difference was not statistically significant ($p = 0.243$).

Table 4.5: T-test to compare mean knowledge score between those whose staff had been on ICD-10 training courses and those who had not

	Staff ICD course	<i>n</i>	Mean	Std. Deviation	Std. Error Mean	<i>p</i> value
Knowledge of ICD-10 coding (%)	Yes	8	51.78	20.112	7.111	0.243
	No	55	42.33	21.289	2.871	

There was no significant difference between those contracted in (48.9%; $n = 19$) or out (41.2%; $n = 44$) of medical aid in terms of knowledge of coding ($p = 0.192$). Table 4.6, however, shows that there was a trend towards statistical significance in the knowledge of coding between those who submitted claims manually ($n = 7$) and electronically ($n = 12$, $p = 0.078$). Those who used manual methods had less knowledge than those who submitted claims electronically.

Table 4.6: T-test to compare mean knowledge score between those who submitted claims manually and electronically

	Claims	<i>n</i>	Mean	Std. Deviation	Std. Error Mean	<i>p</i> value
Knowledge of ICD-10 coding (%)	Manual	7	36.73	19.961	7.544	0.078
	Electronic	12	55.95	22.346	6.451	

ANOVA testing showed no significant difference ($p = 0.452$) between knowledge score of the three groups of responses (medical aid, myself, no rejections) to question 14, “If you have rejections with manual claims, are the majority of the errors made by the medical aid or by yourself?” as shown in Table 4.7. However, the group with no rejections ($n = 6$) had a higher knowledge score than the other two groups.

Table 4.7: Comparison of the mean knowledge score between responses to question 14

Q14	Mean	<i>n</i>	Std. Deviation
Medical aid	40.81	7	26.635
Myself	42.85	4	26.082
No rejections	57.14	6	18.071
Total	47.05	17	23.563

4.3.2 Age

There was no significant difference in age between chiropractors who handle coding themselves and those whose receptionists do it for them ($p = 0.749$). Similarly, there was no difference in age between those who attended an ICD-10 course and those who had not ($p = 0.722$). Again, there was no significant difference in age between responses to question 15, “In the case of musculoskeletal trauma, do you give the code required as well as the additional cause codes, i.e. S with W code?” ($p = 0.505$). Table 4.8 shows however, that there was a trend towards older chiropractors answering, “Sometimes” and younger chiropractors answering, “Always” or “Never”. Table 4.9 shows the ANOVA test results for the responses to question 15.

Table 4.8: Mean ages of response categories for question 15

Q15	Mean age	<i>n</i>	Std. Deviation
Always	38.89	19	13.609
Often	40.00	3	17.321
Sometimes	50.43	7	20.911
Seldom	44.10	10	14.806
Never	39.96	24	15.588
Total	41.46	63	15.522

Table 4.9: ANOVA test of mean differences in age between the responses to question 15

Age	Sum of Squares	df	Mean Square	F	<i>p</i> value
Between Groups	818.289	4	204.572	0.840	0.505
Within Groups	14119.362	58	243.437		
Total	14937.651	62			

4.3.3 CASA membership

In terms of membership to the Chiropractic Association of South Africa, there was a non-significant relationship between being a CASA member and being aware of the assistance offered through the association as asked in question 24, “Are you aware of any assistance offered with ICD-10 coding through the association or medical schemes?” ($p = 0.131$). CASA members were more likely to be aware of this, as shown in Table 4.10.

Table 4.10: Cross-tabulation of CASA membership status and question 24

			Q24		Total
			Yes	No	
CASA member	Yes	<i>n</i>	34	18	52
		% within CASA member	65.4%	34.6%	100.0%
	No	<i>n</i>	4	6	10
		% within CASA member	40.0%	60.0%	100.0%
Total		<i>n</i>	38	24	62
		% within CASA member	61.3%	38.7%	100.0%

Pearson's chi square = 2.278, $p = 0.131$

4.3.4 ICD-10 training course

The trend regarding attending ICD-10 training courses by province is shown in Figure 4.6: In Gauteng, KZN and Western Cape there was a higher percentage of respondents who had not attended training than had attended training. In the other provinces there were few or none who had not attended training. The relationship was however, not statistically significant ($p = 0.189$).

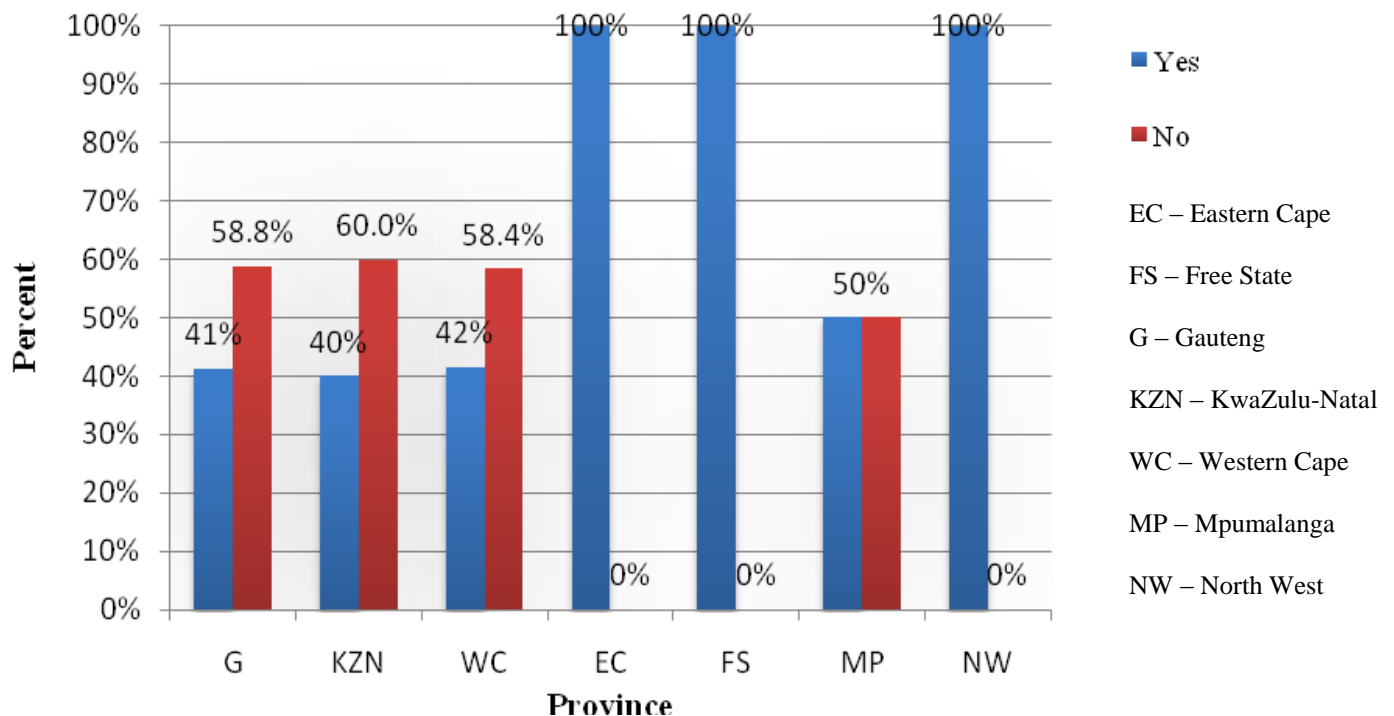


Figure 4.6: Clustered bar chart of percentage attending ICD-10 training per province

With respect to the reason why participants had not attended a course, there was only a significant association between province and “not available” ($p = 0.008$). KZN practitioners were much less inclined than those from other provinces to say that a course was not available locally. 100% of practitioners from Mpumalanga who had not been on the course, said the course was not available locally (but this was however, only one person), as shown in Table 4.11.

	Province	<i>p</i>
--	----------	----------

Table
tabulation of
reasons for
ICD-10

	Gauteng		KZN		WC		MP		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Not Available	1	10.0%	0	0%	1	14.3%	1	100.0%	0.008
Time	5	50.0%	7	46.7%	2	28.6%	0	0%	0.652
Interest	2	20.0%	6	40.0%	3	42.9%	0	0%	0.596
Finance	1	10.0%	1	6.7%	0	0%	0	0%	0.850

4.11: Cross-
province vs.
not taking
course

Those who had attended a training course (question 6, “Have you been on an ICD-10 coding course?”) were no more aware than those who had not attended such a course, that assistance is available through the association and medical schemes with respect to coding. This is reflected in Table 4.12 ($p = 0.840$).

Table 4.12: Cross-tabulation of question 24 by question 6

			ICD-10course		Total
			Yes	No	
Q24	Yes	<i>n</i>	18	20	38
		% within q24	47.4%	52.6%	100.0%
	No	<i>n</i>	12	12	24
		% within q24	50.0%	50.0%	100.0%
Total		<i>n</i>	30	32	62
		% within q24	48.4%	51.6%	100.0%

Pearson's chi square = 0.041, $p = 0.840$

Table 4.13 shows that there was a statistically significant association between those whose receptionists handled the coding procedures (Question 5, “Who handles the coding procedures in your practice?”) and whether the staff (Question 9, “Have your staff been on an ICD-10 coding course?”) had attended training ($p = 0.002$). Those whose receptionists handled coding were more likely to have sent their staff on training.

Table 4.13: Cross-tabulation of who handles coding procedures by whether staff have attended ICD-10 training course

			Staff ICD course		Total
			Yes	No	
Receptionist handles coding procedures	No	<i>n</i>	2	43	45
		Row%	4.4%	95.6%	100.0%
	Yes	<i>n</i>	6	12	18
		Row%	33.3%	66.7%	100.0%
Total		<i>n</i>	8	55	63
		Row%	12.7%	87.3%	100.0%

Pearson's chi square = 9.679, $p = 0.002$

No association existed however, between questions 6 (“Have you been on an ICD-10 coding course?”) and 15 (“In the case of musculoskeletal trauma, do you give the code required as well as the external cause codes, i.e. S with W code?”), as shown in Table 4.14 ($p = 0.260$).

Table 4.14: Cross-tabulation of question 6 with question 15

			Q15					Total
			Always	Often	Sometimes	Seldom	Never	
ICD-10 course	Yes	<i>n</i>	9	3	2	6	10	30
		% within ICD-10course	30.0%	10.0%	6.7%	20.0%	33.3%	100.0%
	No	<i>n</i>	10	0	5	4	14	33
		% within ICD-10course	30.3%	0%	15.2%	12.1%	42.4%	100.0%
Total		<i>n</i>	19	3	7	10	24	63
		% within ICD-10course	30.2%	4.8%	11.1%	15.9%	38.1%	100.0%

Pearson's chi square = 5.274, $p = 0.260$

Table 4.15 shows that of those who did not always give external cause codes in the case of musculoskeletal trauma, there was no association between whether they had attended an ICD-10 course and their responses to why they did not give the additional codes. Question 6 (“Have you been on an ICD-10 coding course?”) and 16 (“If you have answered often, sometimes, seldom or never to question 15, why?”)

Table 4.15: Cross-tabulation of question 6 with question 16 responses

	ICD-10course				<i>p</i> value
	Yes		No		
	<i>n</i>	%	<i>n</i>	%	
Lack of knowledge	7	33.3%	8	34.8%	0.919
Lack of interest	2	9.5%	5	21.7%	0.416
Time constraints	9	42.9%	6	26.1%	0.241
Reception staff not trained	0	0%	2	8.7%	0.489

Similarly, there was no association between those who had been on a training course and question 20, “How often do you use multiple codes if you are treating more than one condition in the same patient?” responses ($p = 0.238$; $\chi^2 = 5.517$). A significant association did however exist between attending an ICD-10 training course and the response to question 22, “What do you think is the purpose of the ICD-10 coding system?” ($p = 0.009$). Table 4.16 shows that more participants who had been on a training course indicated that the purpose of the ICD-10 coding system was for statistical analysis.

Table 4.16: Cross-tabulation of question 6 with question 22 responses

	ICD-10course				<i>p</i> value
	Yes		No		
	<i>n</i>	%	<i>n</i>	%	
Claims	5	16.7%	10	30.3%	0.204
Statistical analysis	22	73.3%	20	60.6%	0.009
Reimbursement	3	10.0%	6	18.2%	0.479
Government decisions	11	36.7%	3	9.1%	0.285

4.3.5 Claims procedure

Figure 4.7 shows that the most frequent response to Question 15, “In the case of musculoskeletal trauma, do you give the code required as well as the external cause codes, i.e. S with W code?” was “Never”, although the correct answer was “Always”.

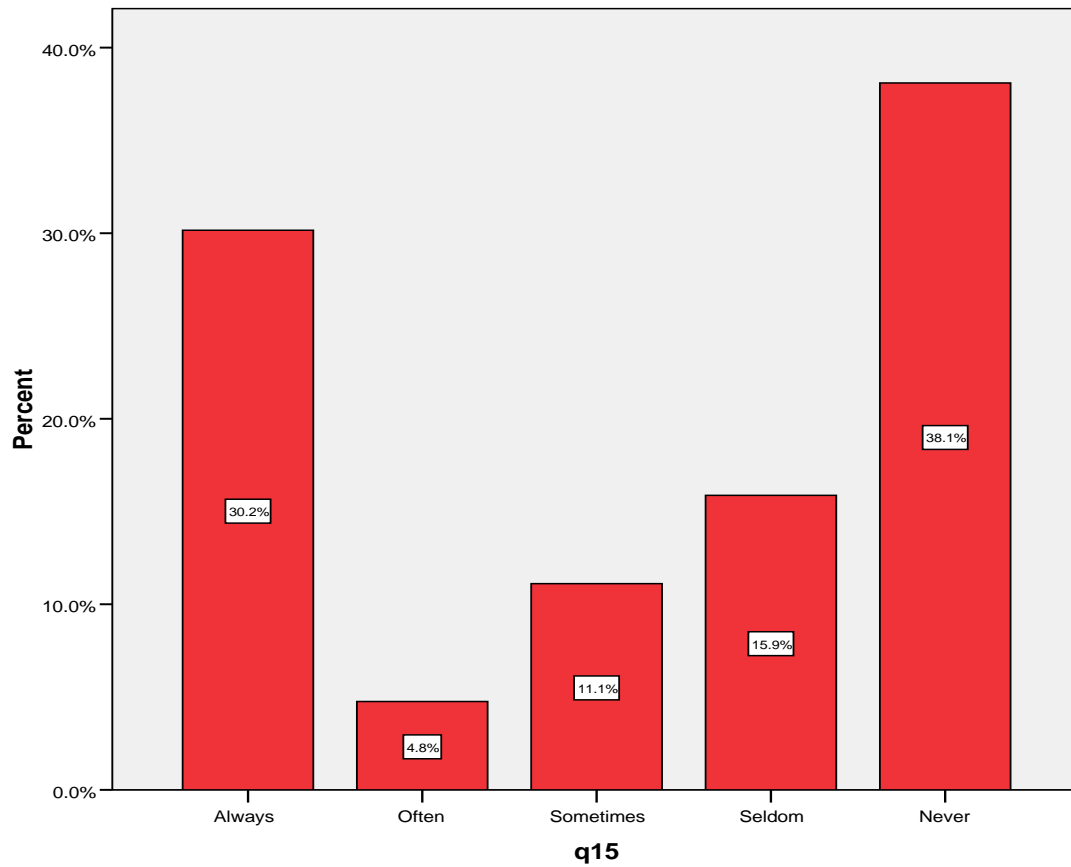


Figure 4.7: Responses to question 15

Table 4.17 shows the responses to question 17, “What code would you use for the following conditions?” Just over half the respondents ($n = 32$) coded correctly for Lumbar facet syndrome, 43.5% ($n = 27$) coded correctly for Cervicogenic headache and only 20% ($n = 10$) coded correctly for Trapezius myofasciitis.

Table 4.17: Response to question 17

		<i>n</i>	Column <i>n</i> %
Lumbar facet	M54.56	32	50.8%
	M54.57	8	12.7%
	M54.59	0	0%
	M99.13	18	28.6%
	other	5	7.9%
Cervicogenic headache	G43.0	3	4.8%
	G44.2	27	43.5%
	G44.8	15	24.2%
	M99.11	6	9.7%
	Other	11	17.7%
Trapezius myofasciitis	M54.63	15	29.4%
	M60.98	10	19.6%
	M60.99	4	7.8%
	M62.69	5	9.8%
	Other	17	33.3%

Whilst the majority of participants ($n = 24$) answered “Never” to question 20, “How often do you use multiple codes if you are treating more than one condition in the same patient?” however, the correct answer was “Always”. This is shown in Figure 4.8.

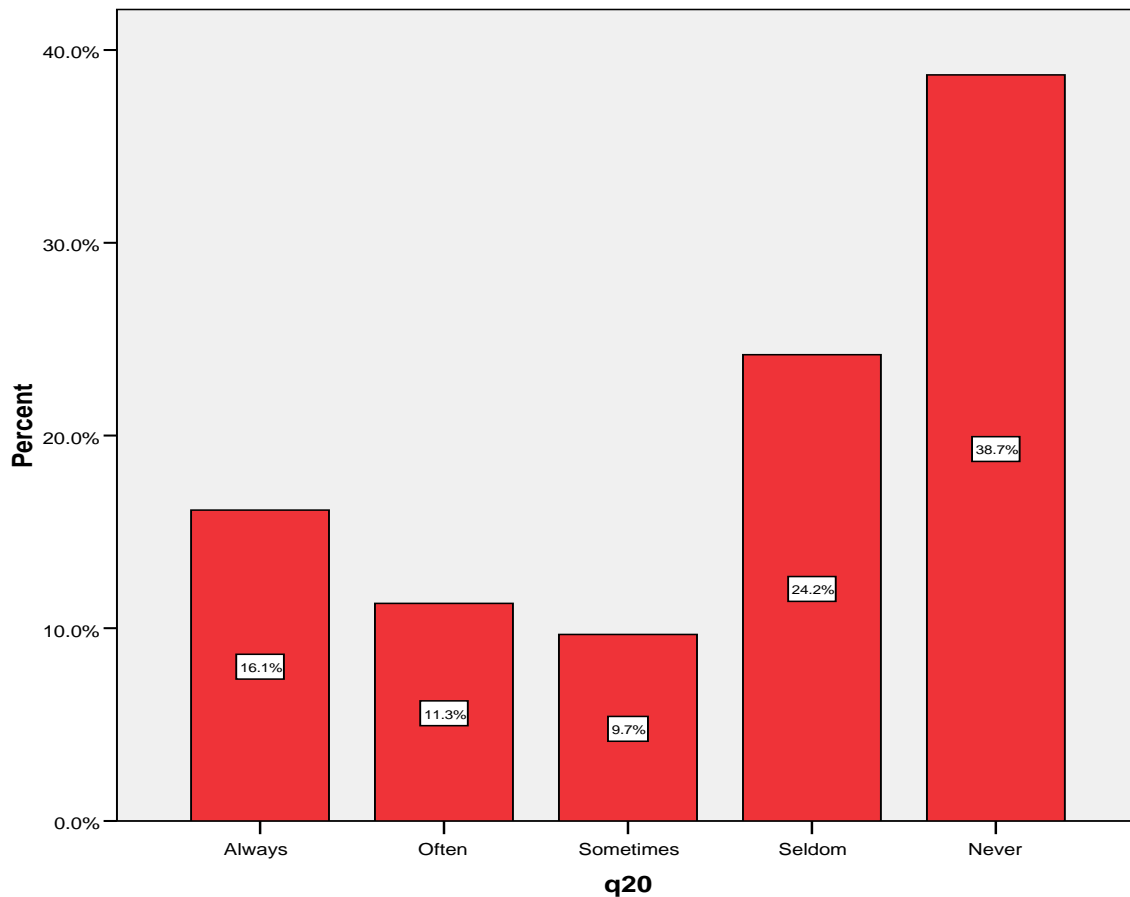


Figure 4.8: Responses to question 20

There was a significant association between claims procedure and question 14, “If you have rejections with manual claims, are the majority of the errors made by the medical aid or by yourself?” ($p = 0.031$). Those who did manual claims reported that the medical aid made most errors, while those who did electronic claims mainly reported no errors as shown by Table 4.18.

Table 4.18: Cross-tabulation of claims procedure by question 14

			Q14			Total
			Medical aid	Myself	No rejections	
Claims	Manual	<i>n</i>	5	2	0	7
		% within claims	71.4%	28.6%	0%	100.0%
	Electronic	<i>n</i>	2	2	6	10
		% within claims	20.0%	20.0%	60.0%	100.0%
Total		<i>n</i>	7	4	6	17
		% within claims	41.2%	23.5%	35.3%	100.0%

Pearson's chi square = 6.973, $p = 0.031$

There was a significant association between question 15 (“In the case of musculoskeletal trauma, do you give the code required as well as the external cause codes, i.e. S with W code?”) and 12 (“Are you contracted in or out of medical aid?”) ($p = 0.033$). Chiropractors were more likely to respond “Sometimes”, “Seldom” and “Never” if they were contracted out of medical aid, as shown in Table 4.19

Table 4.19: Cross-tabulation of question 15 by whether the practice was contracted in or out of medical aid

			Contracted		Total
			In	Out	
Q15	Always	<i>n</i>	10	9	19
		% within Q15	52.6%	47.4%	100.0%
	Often	<i>n</i>	2	1	3
		% within Q15	66.7%	33.3%	100.0%
	Sometimes	<i>n</i>	2	5	7
		% within Q15	28.6%	71.4%	100.0%
	Seldom	<i>n</i>	2	8	10
		% within Q15	20.0%	80.0%	100.0%
	Never	<i>n</i>	3	21	24
		% within Q15	12.5%	87.5%	100.0%
Total		<i>n</i>	19	44	63
		% within Q15	30.2%	69.8%	100.0%

Pearson’s chi square = 10.505, $p = 0.033$

4.3.6 Knowledge about the term, “subluxation”

Most respondents answered correctly to questions 18 (“Do you use the M99 code to code for a subluxation?”) (69.8%; $n = 44$) and 19 (“Is this definition of subluxation the same as what chiropractors define a subluxation as?”) (79.4%; $n = 50$).

As expected, there was a highly significant association between questions 18 (“Do you use the M99 code to code for a subluxation?”) and 19 (“Is this definition of subluxation the same as what chiropractors define a subluxation as?”) ($p < 0.001$). Table 4.20 shows that those who said yes to Question 18 were much more likely to say yes to Question 19 and vice versa.

Table 4.20: Cross-tabulation of question 18 by question 19

			Q19		Total
			Yes	No	
Q18	Yes	<i>n</i>	10	9	19
		% within Q18	52.6%	47.4%	100.0%
	No	<i>n</i>	3	41	44
		% within Q18	6.8%	93.2%	100.0%
Total		<i>n</i>	13	50	63
		% within Q18	20.6%	79.4%	100.0%

Pearson's chi square = 17.007, $p < 0.001$

No association was found however between questions 19 and 23, “Do you think the ICD-10 coding system is specific enough in terms of chiropractic diagnoses?” ($p=0.585$). Table 4.21 shows that those who said no to question 19 were almost equally divided in their opinions to question 23.

Table 4.21: Cross-tabulation of question 19 by question 23

			Q23		Total
			Yes	No	
Q19	Yes	<i>n</i>	5	8	13
		% within q19	38.5%	61.5%	100.0%
	No	<i>n</i>	23	26	49
		% within q19	46.9%	53.1%	100.0%
Total		<i>n</i>	28	34	62
		% within Q19	45.2%	54.8%	100.0%

Pearson's chi square = 0.298, $p = 0.585$

4.4 THE DIAGNOSES CHIROPRACTORS COMMONLY MAKE IN PRIVATE PRACTICE AS WELL AS THE FREQUENCY OF TREATMENTS.

4.4.1 Using medical aid data from 2006 to 2007

Using data on ICD-10 codes and treatments claimed from July 2006 to July 2007, the top 50 most common ICD-10 codes were ranked in Table 4.22. The most common condition claimed was for low back pain (M54.56) followed by cervicgia (M54.22).

Table 4.22: Top 50 ICD-10 codes

Rank	ICD-10-Code	Claims
1	M54.56 – Low back pain, lumbar region	8996
2	M54.22 – Cervicalgia, cervical region	6390
3	M99.11 – Subluxation complex (vertebral), cervical region	2895
4	M54.80 – Other dorsalgia, multiple sites in spine	1524
5	M99.14 – Subluxation complex (vertebral), sacral region	1293
6	M79.10 – Myalgia, multiple sites	1179
7	M47.94 – Spondylosis, unspecified, thoracic region	1116
8	M54.64 – Pain in thoracic spine, thoracic region	1115
9	M54.5 – Low back pain	1097
10	M99.13 – Subluxation complex (vertebral), lumbar region	1032
11	M47.92 – Spondylosis, unspecified, cervical region	874
12	S13.4 – Sprain and strain of cervical spine	846
13	M54.13 – Radiculopathy, cervicothoracic region	838
14	M99.12 – Subluxation complex (vertebral) thoracic region	809
15	M54.12 – Radiculopathy, cervical region	746
16	S33.6 – Sprain and strain of sacroiliac joint	708
17	G44.2 – Tension type headache	658
18	S33.5 – Sprain and strain of lumbar spine	620
19	G54.2 – Cervical root disorders, not elsewhere classified	600
20	M54.17 – Radiculopathy, lumbosacral region	599
21	M47.96 – Spondylosis, unspecified, lumbar region	587
22	M54.2 – Cervicalgia	587
23	M54.57 – Low back pain, lumbosacral region	561
24	M99.1 – Subluxation complex (vertebral)	557
25	M54.47 – Lumbago with sciatica, lumbosacral region	512
26	M54.85 – Other dorsalgia, thoracolumbar region	496
27	M54.87 – Other dorsalgia, lumbosacral region	478
28	S23.3 – Sprain and strain of thoracic spine	449
29	X50.01 – Overexertion and strenuous or repetitive movements, home, while engaged in leisure activity	440
30	M54.86 – Other dorsalgia, lumbar region	438
31	G24.3 – Spasmodic torticollis	419
32	M47.22 – Other spondylosis with radiculopathy, cervical region	419
33	M51.1 – Lumbar and other intervertebral disc disorders with radiculopathy	392
34	M54.16 – Radiculopathy, lumbar region	350
35	R51 – Headache	331
36	M54.97 – Dorsalgia, unspecified, lumbosacral region	317
37	M54.83 – Other dorsalgia, cervicothoracic region	296
38	M47.26 – Other spondylosis with radiculopathy, lumbar region	287
39	M79.61 – Pain in limb, shoulder region	279
40	G44.8 – Other specified headache syndrome	273
41	M79.11 – Myalgia, shoulder region	262
42	M54.03 – Panniculitis affecting regions of neck and back, cervicothoracic region	260
43	S13.1 – Dislocation of cervical vertebra	256
44	M47.99 – Spondylosis, unspecified, site unspecified	244
45	M79.6 – Pain in limb	232

46	M54.50 – Low back pain, multiple sites in spine	226
47	M54.58 – Low back pain, sacral and sacrococcygeal region	222
48	R10.4 – Other and unspecified abdominal pain	220
49	M54.37 – Sciatica, lumbosacral region	219
50	G54.9 – Nerve root and plexus disorder, unspecified	215

Frequency of treatment from the tariff codes, provided by Discovery Health, was determined from the same data source. The most frequent procedure was a consultation (22.6% of claims), followed by diagnostic procedure (14.2%), and three treatment procedures (14.2%). This is shown in Table 4.23.

Table 4.23: Frequency of treatment

	Frequency	Percentage
Consultation	746	22.6
Diagnostic Procedure	468	14.2
Three treatment procedures	467	14.2
Diagnostic Procedures	351	10.7
Two treatment procedures	303	9.2
Single treatment procedure	193	5.9
Six treatment procedures	175	5.3
Three diagnostic procedures	133	4.0
Four treatment procedures	115	3.5
Immobilization or therapeutic exercises	114	3.5
Consumables at cost plus 10%.	88	2.7
Not Available	51	1.5
Five treatment procedures	48	1.5
Medicine dispensed - Practitioner	20	.6
Reports	12	.4
Injection	10	.3
Total	3294	100.0

4.4.2 Using questionnaire data:

The top 50 ranked conditions seen by chiropractors in practice, according to the questionnaire are shown in Table 4.24. With the most common condition treated being Lumbar facet syndrome (M54.56, M99.13) followed by cervical facet syndrome (M99.11).

Table 4.24: Top 50 ranked conditions seen in practice, according to questionnaire respondents

		<i>n</i>	Column %
1	M54.56 – Lumbar facet syndrome	15	25.00%
2	M99.13 – Lumbar facet syndrome	14	23.30%
3	M99.11 – Cervical facet syndrome	13	21.70%
4	G44.2 – Cervicogenic headache	12	20.00%
5	M54.22 – Cervicalgia	12	20.00%
6	M54.56 – Low back pain	10	16.70%
7	M54.22 – Cervical facet syndrome	9	15.00%
8	M99.14 – Sacroiliac syndrome	8	13.30%
9	M54.57 – Sacroiliac syndrome	6	10.00%
10	G44.8 – Cervicogenic headache	6	10.00%
11	M54.64 – Thoracic facet syndrome	6	10.00%
12	M54.22 – Cervical spine pain	5	8.30%
13	M99.12 – Thoracic facet syndrome	5	8.30%
14	R10.4 – Colic	5	8.30%
15	M51.1 – Lumbar disc disorder	3	5.00%
16	M54.47 – Low back pain with sciatica	3	5.00%
17	M54.87 – Sacroiliac syndrome	3	5.00%
18	M54.37 – Sciatica	3	5.00%
19	G44.2 – Tension headache	3	5.00%
20	M53.13 – Cervicobrachialgia	3	5.00%
21	M60.98 – Trapezius myofascitis	3	5.00%
22	M75.1 – Rotator cuff syndrome	3	5.00%
23	Lumbar facet syndrome – No code included	2	3.30%
24	M54.64 – Low back pain	2	3.30%
25	Lumbar discopathy – No code included	2	3.30%
26	M54.36 – Sciatica neuralgia	2	3.30%
27	M54.37 – Sciatica	2	3.30%
28	M54 – Sciatica	2	3.30%
29	S33.6 – Sacroiliac syndrome	2	3.30%
30	M54.58 – Sacroiliac syndrome	2	3.30%
31	R51 – Headaches	2	3.30%
32	Cervicogenic headache – No code included	2	3.30%
33	G44.2 – Migraine	2	3.30%
34	Cervical facet syndrome – No code included	2	3.30%
35	M54.83 – Cervico thoracic dorsalgia	2	3.30%
36	M54.84 – Thoracic dorsalgia	2	3.30%
37	M54.57 – Lumbar facet lesion	1	1.70%
38	M54.87 – Lumbar facet syndrome	1	1.70%
39	M53.82 – Chronic low back facet syndrome	1	1.70%
40	M99.14 – Low back pain	1	1.70%
41	M54.57 – Mechanical Low back pain	1	1.70%
42	M54 – Low back pain	1	1.70%

43	M54.56 – Lumbar dorsalgia	1	1.70%
44	M54.87 – Lumbosacral dorsalgia	1	1.70%
45	M54.17 – Lumbar disc bulge	1	1.70%
46	M54.17 – Lumbar nerve root entrapment	1	1.70%
47	M54.17 – Lumosacral radiculopathy	1	1.70%
48	M51.8 – Disc disorder	1	1.70%
49	M51.1 – Lumbar disc with radiculopathy	1	1.70%
50	M51.1 – Degenerative disc disease with Radiculopathy	1	1.70%

CHAPTER FIVE

DISCUSSION

5.1 INTRODUCTION

This chapter is based on the aim and objectives that were set out in Chapter One. It will include a discussion of the (i) demographics and response rate, (ii) level of compliancy of chiropractors in terms of correct coding, (iii) knowledge of ICD-10 coding, (iv) age of the participants, (v) CASA membership, (vi) ICD-10 training course, (vii) claims procedure, (viii) knowledge about the term, “subluxation”, (ix) most common diagnoses made by chiropractors in South Africa, as well as frequency of treatments. The hypotheses will be answered and the limitations of this study will be discussed.

5.2 DEMOGRAPHICS AND RESPONSE RATE

With respect to the questionnaire, the age of the participants ranged from 26 to 79 with the average being 41 years, which is marginally higher than Mahomed (2007) who reported an average of 34.2 and Pedersen (1994) who reported an average of 37.2 years of age.

In this study 74.6% of the participants were male while 25.4% were female, which correlated with Coulter and Shekelle (2005) who recorded 83% males and Mootz *et al* (2005) who recorded 81% males in the Arizona study and 70% males in the Massachusetts study, while Mahomed (2007) found that only 45% of the participants in her study were male.

Kwazulu-Natal was the best represented ($n = 25$; 39.6%), followed by Gauteng ($n = 17$; 26.9%), the Western Cape ($n = 12$; 19%) and the Eastern Cape ($n = 4$; 6.3%), whilst Free State and Mpumalanga only had two respondents each (3.1%) and the North West one (1.5%). In contrast, Mahomed (2007) had the best response rate from the North West province ($n = 1$; 100%) followed by the Western Cape ($n = 6$; 33.3%), Kwazulu-Natal ($n = 7$; 28%), Gauteng ($n = 5$;

14.7%), Eastern Cape ($n = 1$; 12.5%) and a 0% response from the Free State, Limpopo and Mpumalanga.

The overall response rate from the practitioners in this study was 16.5%, which is lower than Mahomed (2007) who recorded a 22.47% response rate and significantly lower than Mootz *et al* (2005) with 61% in the Arizona study and 86% in the Massachusetts study, as well as Rubenstein *et al* (2000) with 78% and Hartvigsen *et al* (2002) with a 94% response rate. This was largely due to time restriction in terms of the return of questionnaires and the fact that the questionnaire only formed a part of the data that was used in the current study.

5.3 THE LEVEL OF COMPLIANCY OF CHIROPRACTORS IN TERMS OF CORRECT CODING

Data from the medical aid was used to determine the level of compliancy of chiropractors submitting claims to Discovery Health (Pty) Ltd. from 2006 to 2008. Table 4.2 shows the percentage of claims that either had a mistake in the primary claim line or an unlisted ICD-10 code for each year from 2006 to 2008 and an overall total.

The total percentage of mistakes for electronic claims was higher for both the primary and unlisted claims (3.93% and 2.18%) than for manual claims (1.57% and 1.59%). This however did not correlate with the data gathered from the questionnaire where 60% of the practitioners who submitted claims electronically stated that they “did not have any rejections” while 100% of practitioners who submitted claims manually had experienced rejections, as shown in Table 4.18. It was expected that electronic claims would incur fewer errors than manual claims, as electronic claims are processed online and mistakes can be picked up by the software before submitting the claim (Matkovich, 2008). While with manual claims, other factors such as illegible handwriting can be the cause of a claim being rejected (O’Malley *et al*, 2005).

The total percentage of mistakes also increased each year from 1.43% for primary and 0% for unlisted claims in 2006 to 1.99% for primary and 2.61% for unlisted claims in 2007 to 2.33% for primary and 3.07% for unlisted claims in 2008. This suggests that either the compliance of

chiropractors is decreasing or that the medical aid companies are becoming stricter with regards to incorrect coding (Whitelaw, 2009). It seems more likely that the latter is true, since the implementation process of the ICD-10 coding system in South Africa occurred in four phases from 1 July 2005 to January 2007. During this time a grace period was included in which slightly incorrect codes were still accepted and processed (SA Department of Health, 2006).

5.4 KNOWLEDGE OF ICD-10 CODING

The overall percentage of knowledge about ICD-10 coding was 43.5% which is relatively low considering that chiropractors have to use the ICD-10 system on a daily basis to be able to claim successfully from medical aid schemes.

There was no significant correlation between either age ($p = 0.622$), gender ($p = 0.265$) or being a CASA member ($p = 0.727$) and knowledge about ICD-10 coding, possibly due to the assistance that CASA offers its members (Engelbrechth, 2009). Again, Table 4.4 shows that no significant correlation existed between the individual responsible for the coding (either the chiropractor or the receptionist) and knowledge of the coding procedure ($p = 0.381$). It was expected that the person responsible for handling the coding would have greater knowledge because they deal with the ICD-10 system on a daily basis. There was however, a non-significant trend ($p = 0.147$) towards participants who had been on an ICD-10 training course, having greater knowledge scores ($n = 30$; 47.6%). Their knowledge was almost 10% higher than those who did not attend a training course ($n = 33$; 52.4%). This was expected, as people who have attended a coding course should have greater knowledge about the ICD-10 system compared to those who have not received any training (O'Malley *et al.* 2005).

There was no significant difference between those contracted in to (48.9%; $n = 19$) or out (41.2%; $n = 44$) of medical aid schemes in terms of knowledge of coding ($p = 0.192$). It was expected that chiropractors who were contracted into a medical aid scheme would have greater knowledge because they deal directly with the medical aid schemes, compared to those who are contracted out of medical aid schemes where the patient pays the chiropractor in cash and submits their claim to the medical aid schemes themselves (Whitelaw, 2009). However, Table 4.6 shows that

there was an almost statistically significant difference in knowledge of coding between those who submitted claims manually ($n = 7$) and electronically ($n = 12$; $p = 0.078$). Those who used manual methods had less knowledge than those who submitted claims electronically. It is possible that people who submit claims electronically will have access to more information on ICD-10 coding as they submit these claims via the internet where additional information is available through the websites of the BHF, CASA and the medical aid schemes.

5.5 AGE

There was no association between age and most respondents answers to the questionnaire which suggests that the same mistakes are made by young and old chiropractors alike. Currently training regarding ICD-10 coding is not included in the curriculum of chiropractic students in South Africa (Korporaal, 2009). For question 15, “In the case of musculoskeletal trauma, do you give the code required, as well as the external cause codes, i.e. S with W code?” ($p = 0.505$), there was a trend towards older chiropractors answering “sometimes” and younger chiropractors answering “Always” or “Never” as shown in Table 4.8. The researcher could not find any published studies to explain this occurrence.

5.6 CASA MEMBERSHIP

Table 4.10 shows that CASA members were more likely to be aware of assistance offered in terms of ICD-10 coding through the medical aids or the association ($p = 0.131$), which suggests that CASA does give information to its members regarding ICD-10 coding but it may not currently be enough.

5.7 ICD-10 TRAINING COURSE

In South Africa there are three ICD-10 courses available; basic, intermediate and advanced. The content of the course depends on whether the person is medically trained or not. Five companies offer these courses, three offer the courses in the Johannesburg and Pretoria region, while the other two companies offer the ICD-10 training courses country wide, provided that they have

enough people present to run the course (SA Department of Health, 2006). The trend regarding attending ICD-10 training courses by province shows that in Gauteng ($n = 7$; 41.2% attended and $n = 10$; 58.8% did not attend), KZN ($n = 10$; 40% attended and $n = 15$; 60% did not attend) and the Western Cape ($n = 5$; 41.6% attended and $n = 7$; 58.4% did not attend) there was a higher percentage of respondents who had not attended training ($n = 32$; 59.2%) than had attended training ($n = 22$; 40.8%). In the other provinces there were few or none who had not attended training, as shown in Figure 4.6. The relationship was however, not statistically significant ($p = 0.189$).

When looking at the reasons why the practitioners did not attend an ICD-10 course the most common reason was lack of time (Gauteng, $n = 5$, 50%; KZN, $n = 7$, 46.7% and Western Cape, $n = 2$, 28.6%) followed by a lack of interest (KZN, $n = 6$, 40% and Western Cape, $n = 3$, 42.9%). Only one practitioner in Mpumalanga did not attend a course because it was not available locally as there were insufficient numbers to hold a course (SA Department of Health, 2006) as shown in Table 4.11.

As expected, there was a statistically significant association between those practitioners whose receptionist handled the coding procedures (Question 5, “Who handles the coding procedures in your practice?”) and whether the staff (Question 9, “Have your staff been on an ICD-10 coding course?”) had attended training ($p = 0.002$), as shown in Table 4.13. Those whose receptionists handled coding were more likely to have sent their staff on training.

According to the SA Department of Health (2006), there are various reasons for the implementation of the ICD-10 system in South Africa. Some of the reasons are: for standardised recording of diagnoses and analysis of this information, research, efficient reimbursement and healthcare planning. According to the results from the questionnaire, most respondents thought that the reason for ICD-10 coding was for statistical analysis ($n = 42$; 52.5%) followed by purely for claiming purposes ($n = 15$; 18.8%), some thought it was to aid government decisions ($n = 14$; 17.5%) and some believed it was for reimbursement by medical aid schemes ($n = 9$; 11.2%).

A significant association did exist between attending an ICD-10 training course and the response to question 22 “What do you think is the purpose of the ICD-10 coding system?” ($p = 0.009$). Most of the participants who had been on a training course indicated that one of the purposes of the ICD-10 coding system, was for statistical analysis, as shown in Table 4.16.

According to O’Malley *et al.* (2005), there has been an increased interest in coding accuracy *viz.* the extent to which ICD-10 codes reflect a patient’s underlying disease. The reason for this is that the data is used in deciding on the distribution of funding, especially in terms of clinical and research funding allocations.

5.8 CLAIMS PROCEDURE

The most frequent response to Question 15 (“In the case of musculoskeletal trauma, do you give the code required as well as the external cause codes, i.e. S with W code?”) was “Never” (38.1%), although the correct answer was “Always” (30.2%) as shown in Figure 4.7. Figure 4.8 also shows that the majority of participants answered “Never” (38.7%) to question 20 (“How often do you use multiple codes if you are treating more than one condition in the same patient?”); however, the correct answer was “Always” (16.1%). Although no published studies have examined this problem, it may suggest that chiropractors either lack the time or the interest to look these codes up or that they do not know how to use these codes. If the latter is the reason, this further suggests that either the courses do not adequately teach this or people are unaware of assistance offered via CASA and medical aid schemes, although in Table 4.10, 61.3% of the participants said that they were aware of assistance offered by CASA and medical aid schemes. There was a significant association between question 15, “In the case of musculoskeletal trauma, do you give the code required as well as the external cause codes, i.e. S with W code?” and 12, “Are you contracted in or out of medical aid?” ($p = 0.033$). Table 4.19 shows that chiropractors were more likely to respond positively if they were contracted in to a medical aid scheme.

5.9 KNOWLEDGE ABOUT THE TERM, “SUBLUXATION”

According to the Oxford medical dictionary (2003), subluxation is a “*partial dislocation of a joint, so that the bone ends are misaligned but still in contact*”. According to Bergmann *et al.* (1993), the chiropractic definition of subluxation is “*the alteration of the normal dynamic, anatomic or physiologic relationships of contiguous articular structures.*”

Most respondents answered correctly (the correct answer was “No”) to questions 18, “Do you use the M99 code to code for a subluxation?” (69.8%; $n = 44$) and 19, “Is this definition of subluxation the same as what chiropractors define a subluxation as?” (79.4%; $n = 50$). This suggests that chiropractors realise that the meaning of the term, “subluxation” differs for chiropractors compared to medical aid schemes. 28.6% however, still used the M99.13 code for lumbar facet syndrome in question 17 (Table 4.17) and for question 21 in the list of the top 50 diagnoses (Table 4.24). Second on the list was M99.13 (23.3%) and third on the list was M99.11, cervical facet syndrome (21.7%). From the medical aid data in the list of top 50 diagnoses (Table 4.22) from 2006 to 2007, third on the list was M99.11, cervical facet syndrome (2895 claims); fifth on the list was M99.14, sacral subluxation (1293 claims) and tenth on the list was M99.13, lumbar facet syndrome (1032 claims). The M99.11/13/14 code, however codes for the medical definition of subluxation (Oxford medical dictionary, 2003).

As expected, there was a highly significant association between questions 18, “Do you use the M99 code to code for a subluxation?” and 19, “Is this definition of subluxation the same as what chiropractors define a subluxation as?” ($p < 0.001$). Those who said yes to Question 18 were much more likely to say yes to Question 19 and vice versa, as shown by Table 4.20.

5.10 THE MOST COMMON DIAGNOSES MADE BY CHIROPRACTORS IN SOUTH AFRICA, AS WELL AS THE FREQUENCY OF TREATMENTS

According to the medical aid data, the top five diagnoses made by chiropractors from 2006 to 2007 (Table 4.22) were, number one: Low back pain, lumbar region, M54.56 (8996 claims); number two: Cervicalgia, M54.22 (6390 claims); number three: Subluxation complex, cervical

region, M99.11 (2895 claims); number four: Other dorsalgia, multiple sites in spine, M54.80 (1524 claims) and number five: Subluxation complex, sacral region, M99.14 (1293 claims).

According to the questionnaire data, the top five diagnoses (Table 4.24) were, number one: Lumbar facet syndrome, M54.56 (25%); number two: Lumbar facet syndrome, M99.13 (23.3%); number three: Cervical facet syndrome, M99.11 (21.7%); number four: Cervicogenic headache, G44.2 (20%) and number five: Cervicalgia, M54.22 (20%). These two different lists correlate well with each other, as well as with Waalen and Mior (2005), Holt and Beck (2005) and Bryant *et al* (2003), while Coulter (2002) found a much greater percentage of patients ($n = 900$; 70%) had low back pain. In South Africa Mahomed (2007) found that the most common diagnoses made by chiropractors were Cervical facet syndrome (7.5%), Sacroiliac syndrome (5%), Whiplash (4%) and Lumbar facet syndrome (3.9%).

Although the two different sets of data regarding diagnoses correlate well, there is no consensus in the chiropractic community about which codes to use for chiropractic specific diagnoses and to illustrate this problem, there were five different codes used for the diagnosis of Lumbar facet syndrome. The following codes were used with the correct BHF ICD-10 code in brackets: M54.56 (Low back pain, lumbar region) 25%, M99.13 (Subluxation complex, vertebral, lumbar region) 23.3%, M54.57 (Low back pain, lumbosacral region) 1.7%, M54.87 (Other dorsalgia, lumbosacral region) 1.7%, M53.82 (Other specified dorsopathies, cervical region) 1.7%.

The most common treatment procedure for a single treatment (Table 4.23) was a consultation (22.6%) followed by one diagnostic procedure (14.2%), three treatment procedures (14.2%), more than one diagnostic procedure (10.7%) and two treatment procedures (9.2%). The researcher could not find any published studies that compared the most common treatment procedures for a single treatment.

5.11 HYPOTHESES

In terms of the hypotheses that were set in chapter one, the hypothesis regarding the level of compliancy of chiropractors in South Africa is accepted, although the levels marginally dropped

between 2006 and 2008. The hypothesis regarding the common diagnoses made by chiropractors is also accepted, as there is considerable overlap between the Top 50 most common diagnoses received from the medical aid scheme and the Top 50 most common diagnoses made by participants who responded to the Questionnaire.

5.12 LIMITATIONS TO THE STUDY

It must be acknowledged that certain limitations arise when using a questionnaire as a data capturing tool for research. With a questionnaire the researcher only has a limited amount of questions that he can ask before the respondent loses interest; in contrast to a personal interview where the researcher can motivate the respondent to answer more questions. In a personal interview the researcher can ask more in-depth questions and lead the respondent on to further questions, whereas in a questionnaire the researcher may extract less information from the respondent (Survey Design; Advantages and Disadvantages of the Survey Method, 2009).

The response rates from the chiropractors in the current study was low (16.5%) and thus, the results may not be representative of the views of all chiropractors in South Africa. According to Russell *et al.* (2004), the average response rate of chiropractors to surveys is 53%; they also state that with every additional contact made with a participant, the response rate can increase by 10%. In this study the sample population was contacted four times via e-mail and once via post. More time could have been spent on phoning the sample population in trying to increase the sample size, as well as allowing more time for the participants to return the questionnaires.

Data from only one medical aid was used and the results may have been more representative if more than one medical aid was willing to share this information. A further limitation to the study is that the medical aid scheme could also only supply data about coding mistakes made and not data about chiropractic specific diagnoses. Further the fact that chiropractors do not have consensus about the ICD-10 codes they commonly use confuses the results because it is not possible to distinguish whether different codes are used to reflect the same condition nor to accurately count actual diagnoses treated.

CHAPTER SIX

CONCLUSION & RECOMMENDATIONS

6.1 CONCLUSION

According to the data, chiropractors are fairly compliant to the ICD-10 coding system, although the level of compliancy has decreased marginally from 2006 to 2008. This might be due to the fact that the medical aid schemes are becoming stricter with incorrect coding (Whitelaw, 2009). A large proportion of the participants had been on a training course, or were aware of the assistance available to them.

Although the two different sets of coding data (i.e. from the medical aid scheme and questionnaire), regarding the diagnoses that chiropractors make on a daily basis, correlate well with each other, there is no consensus in the profession as to which codes to use for chiropractic specific diagnoses. These diagnoses (e.g. facet syndrome) however, are the most common diagnoses made by chiropractors in private practice in South Africa (Mahomed, 2007).

Respondents further indicated that they sometimes use codes that they know will not be rejected, even if it is the incorrect code for that particular condition. For more complicated cases the majority of respondents indicated that they do not know how to or are not interested in submitting the correct codes to comply with the level of specificity required by the medical aid schemes.

This can potentially lead to rejections of claims by the medical aids in future when chiropractors do not make an attempt to code correctly. It might also influence the decisions made by government about healthcare expenditure. According to Manga (2000) and The Future of Chiropractic Revisited: 2005 to 2015 (2005), chiropractors are campaigning for inclusion and acceptance into the medical fraternity, which might be negatively affected if chiropractors do not reach consensus about which codes to use.

The South African Department of Health (2006) stated that ICD-10 coding has resulted in streamlining our healthcare system through *“appropriate and standardised recording of diagnoses, analysis of information of patient care, research, performance improvement, healthcare planning and facility management.”* Further to this, they state that it has also enabled *“fair reimbursement for healthcare services provided and communicates health data in a predictable, consistent and reproducible manner.”*

It is essential that chiropractors develop a universal set of codes to ensure that the correct data about the daily activities of chiropractors in South Africa can be obtained and analysed to prove their ability as primary health care physicians.

The challenge is to make everyone aware of the advantages of correct coding for the profession. CASA have an important roll to play in this and have to ensure that this need is communicated to its members.

6.2 RECOMMENDATIONS

It may be beneficial for CASA to draw up a list of common chiropractic diagnoses, similar to but more comprehensive than the current ‘cheat sheet’ available, along with the accepted ICD-10 codes that are agreed upon by most medical aids and circulate this list to its members to ensure uniformity in the coding practices of chiropractors in South Africa.

In future studies it would be beneficial to determine if practicing chiropractors understand and code for comorbid conditions. It would also be beneficial to find out whether they code directly from a “cheat sheet” or use the full ICD browser or book in order to determine their true level of knowledge of the coding system.

The two chiropractic training institutions in South Africa (Durban University of Technology and University of Johannesburg) might look into bringing in a course on ICD-10 coding as part of the curriculum to prepare student chiropractors for the process of coding. The outcomes of this course would be to ensure that chiropractors are aware of the importance of accurate and correct

coding, as well as making sure that they will be able to code correctly for traumatic injuries by using the cause codes. The training institutions might also consider the list of most common diagnoses and ensure that adequate training time is spent with students, as well as practitioners on these conditions.

REFERENCES

- Advantages and Disadvantages of the Survey Method [online]. 2009. Available from: <http://writing.colostate.edu/index.cfm> [Accessed 27 January 2009].
- Benesch, C., Witter, D.M. Jr., Wilder, A.L., Duncan, P.W., Samsa, G.P. and Matchar, D.B. 1997. Inaccuracy of the International Classification of Diseases (ICD-9-CM) in Identifying the Diagnosis of Ischemic Cerebrovascular Disease. *Neurology*, 49:660–4.
- Bergmann, T., Peterson, D. and Lawrence D. 1993. *Chiropractic technique*. Churchill Livingstone.
- Bossuyt, P.M., Reitsma, J.B., Bruns, D.E., Gatsonis, C.A., Glasziou, P.P., Irwig, L.M., Lijmer, J.G., Moher, D., Rennie, D. and de Vet, H.C., STARD Group. 2004. Towards Complete and Accurate Reporting of Studies of Diagnostic Accuracy: The STARD Initiative. *Family Practice*, 21:4–10.
- Bryant, S., Atkins, B.W. and Bull, P.W. 2003. Demographics and Diagnostic Profile of Patients Presenting to a University Chiropractic Outpatient Clinic. *Chiropractic Journal of Australia*, 33(3): 89-92.
- Cote, P., Cassidy, D.J., Carroll, L.J. and Kristman, V. 2004. The annual incidence and course of neck pain in the general population: a population based cohort study. *Pain*, 12(3): 267-273.
- Coulter, I.D. and Shekelle, P.G. 2005. Chiropractic in North America: A Descriptive Analysis. *Journal of Manipulative and Physiological Therapeutics*, 28: 83-89.
- Coulter, I.D., Hurwitz, E.L., Adams, A.H., Genovese, B.J., Hays, R. and Shekelle, P.G. 2002. Patients using chiropractors in North America: Who are they and why are they in chiropractic care? *Spine Journal*, 27(3): 291-298.

Engelbrecht, R. 2009. Interviewd via email by R. Pieterse. 23 January 2009.

Fischer, E.D., Whaley, F.S., Krushat, W.M., Malenka, D.J., Fleming, C., Baron, J.A. and Hsia, D.C. 1992. The Accuracy of Medicare's Hospital Claims Data: Progress Has Been Made, but Problems Remain. *American Journal of Public Health*, 82:243–8.

Goldstein, L.B. 1998. Accuracy of ICD-9-CM Coding for the Identification of Patients with Acute Ischemic Stroke: Effect of Modifier Codes. *Stroke*, 29(8):1602–4.

Guez, M., Hildingsson, C., Nasic, S. and Toolanen, G. 2006. Chronic low back pain in individuals with chronic neck pain of traumatic and non-traumatic origin: a population based study. *Acta Orthopaedica*, 77(1): 132-137.

Hartvigsen, J., Sorensen, L.P., Graesborg, K. and Grunnet-Nilsson, N. 2002. Chiropractic patients in Denmark: A short description of basic characteristics. *Journal of Manipulative and Physiological Therapeutics*, 25(3): 162-167.

History of the development of the ICD [online]. 2007. Available from: <http://www.who.int>. [Accessed 27 March 2008].

Holt, K.R. and Beck, R.W. 2005. Chiropractic patients presenting to the New Zealand College of Chiropractic teaching clinic: A short description of patients and patient complaints. *Chiropractic Journal of Australia*, 35: 122-124.

Horvath, G., Than, P., Bellyei, A., Kranics, J. and Illes, T. 2006. Prevalence of musculoskeletal symptoms in adulthood and adolescence. *Orvosi Hetilap*, 147(8): 351-356.

Hurwitz, E. And Chiang, L. 2006 *A comparative analysis of chiropractic and general practitioner patients in North America: findings from joint Canada/United states survey of health, 2002-03*. [online] Available from:

<http://www.pubmedcentral.nih.gov/redirect3.cgi?&&auth=OTA5pK4t58KqZiJChkm0WGalq>

7nZNR6wq2tKJf5TM&reftype=extlink&artid=1458338&iid=126574&jid=34&FROM=Article%7CFront%20Matter&TO=External%7CLink%7CURI&article-id=1458 338&journal-id=34&renderingtype=normal&&http://creativecommons.org/licenses/by/2.0 [Accessed 23 October 2008].

ICD-10 compliance statistics from January 2005 to May 2006 [online]. 2007. Available from: <http://www.bhf.co.za> [Accessed 27 March 2008].

Johnson, A.N. and Appel, G.L. 1984. DRGs and Hospital Case Records: Implications for Medicare Casemix Accuracy. *Inquiry*, 21:128–34.

Jolis, J.G., Ancukiewics, M., DeLong, E.R., Pryor, D.B., Muhlbaier, L.H. and Mark, D.B. 1993. Discordance of Databases Designed for Claims Payment versus Clinical Information Systems. *Annals of Internal Medicine*, 119:844–50.

Koo, K., Jakob, R. and Bedirhan Ustun, T. 2005. A resource- and context-based evaluation of ICD implementation worldwide. Paper delivered at the WHO-FIC Network Meeting held in Tokyo, Japan, 16-22 October 2005.

Korporaal, C. 2009. Interviewed via email by R. Pieterse. 20 January 2009.

Mahomed, F. 2007. *Chiropractic patients in South Africa: A Demographic and Descriptive Profile*. M.Tech: Chiropractic thesis, DurbanUniversity of Technology.

Manga, P. 2000. Economic Case for the Integration of Chiropractic Services into the Health Care System. *Journal of Manipulative and Physiological Therapeutics*, 23: 118-122.

Matkovich, G. 2009. Interviewed as part of focus group by R. Pieterse. Durban University of Technology board room, 23 April 18:00.

Mootz, R.D., Cherkin, D.C., Odegard, C.E., Eisenberg, D.M., Barassi, J.P. and Deyo, R.A. 2005. Characteristics of chiropractic practitioners, patients and encounters in Massachusetts and Arizona. *Journal of Manipulative and Physiological Therapeutics*, 28: 645-653.

Mullin, R. 2007. *A brief history of ICD-10-PCS*. [online] Available from: http://library.ahima.org/xpedio/groups/public/documents/ahima/bok3_004938.hcsp?dDocName=bok3_004938 [Accessed 27 March 2008].

O'Malley, K.J., Cook, K.F., Price, M.D., Wildes, K.R., Hurdle, J.F. and Ashton, C.M. 2005. *Measuring diagnoses: ICD code accuracy*. [online] Available from: http://www.findarticles.com/p/articles/mi_m4149/is_5_40/ai_n15874906/pg_1?tag=artBody:col1 [Accessed 23 June 2008].

Oxford concise medical dictionary. 2003. Oxford University Press.

Pedersen, P. 1994. A survey of chiropractic practice in Europe. *European Journal of Chiropractic*, 42: 3-28.

Rubinstein, S., Pfeifle, E., Tulder, M.W. and Assendelft, W.J.J. 2000. Chiropractic Patients in the Netherlands: A descriptive study. *Journal of Manipulative and Physiological Therapeutics*, 23(8): 557-563.

Russell, M.L., Verhoefm M.J., Injeyan, H.S. and McMorland, D.G. 2004. Response Rates for Surveys of Chiropractors. *Journal of Manipulative and Physiological Therapeutics*, 27: 43-48.

South Africa Department of Health. 2006. ICD 10 Implementation review, January 2004-October 2006. Pretoria: Government printer.

Survey Design [online]. 2009. Available from <http://www.surveysystem.com/sdesign.htm> [Accessed 27 January 2009].

The Future of Chiropractic Revisited: 2005 to 2015 [online]. 2005. Available from <http://www.altfutures.com> [Accessed 15 January 2009].

The WHO agenda [online]. 2008. Available from <http://www.who.int> [Accessed 27 March 2008].

Vizniak, N. 2005. *Quick reference clinical chiropractic: Physical Assessment*. Professional Health System Inc.

Waalén, J. and Mior, S. 2005. Practice patterns of 692 Ontario chiropractors (2000-2001). *Journal of Canadian Chiropractic Association*, 49(1): 21-31.

Whitelaw, L. 2009. Interviewed via email by R. Pieterse. 20 January 2009.

CHIROPRACTIC ICD-10 QUESTIONNAIRE**1. Gender**

Female

☐

Male

☐**2. Age:** years**3. Are you a CASA member?**

Yes

☐

No

☐**4. In which province are you practicing?**

Eastern Cape

☐

Limpopo

☐

Free State

☐

Mpumalanga

☐

Gauteng

☐

Northern Cape

☐

KwaZulu Natal

☐

North West

☐

Western Cape

☐**5. Who handles the coding procedures in your practice?**

Myself

☐

Receptionist

☐**6. Have you been on an ICD-10 coding course?**

Yes

☐

No

☐**7. If yes to question 6, when?**

2005

☐

2006

☐

2007

☐

2008

☐**8. If no, why not?**

Course not available locally

☐

Lack of interest

☐

Time constraints

☐

Financial constraints

☐

Other
specify) _____

(Please

9. Has your reception staff been on an ICD-10 coding course?

Yes ☐ No ☐

10. If yes to question 9, when?

2005 ☐ 2006 ☐ 2007 ☐ 2008 ☐

11. If no, why not?

Course not available locally	<input type="checkbox"/>	Lack of interest	<input type="checkbox"/>
Time constraints	<input type="checkbox"/>	Financial constraints	<input type="checkbox"/>

Other
specify) _____

(Please

12. Are you contracted in or out of a medical aid society?

In ☐ Out ☐

13. If your answer to question 12 was "In" please answer question 13 and 14, if your answer was "Out" please go to question 15.

Do you handle your claims manually or electronically?

Manual ☐ Electronic ☐

14. If you have rejections with manual claims, are the majority of the errors made by the medical aid or by yourself?

Medical aid ☐ Myself ☐ No rejections ☐

15. In the case of musculoskeletal trauma, do you give the code required as well as the additional cause codes, i.e. S with W code?

Always ☐ Sometimes ☐ Seldom ☐
Never ☐ O ☐

16. If you have answered often, sometimes, seldom or never to question 15, why?

Lack of knowledge	<input type="checkbox"/>	Time constraint	<input type="checkbox"/>	
Lack of interest	<input type="checkbox"/>	Reception staff not trained	<input type="checkbox"/>	
Other	<input type="checkbox"/>	(Please specify)	<input type="checkbox"/>	

17. What code would you use for the following conditions? Please only choose one code per condition.

If you don't use any of these codes, please write down the code that you use on the line provided.

Lumbar facet syndrome L3	M54.56	<input type="checkbox"/>	M54.57	<input type="checkbox"/>	M54.59	<input type="checkbox"/>	M99.12	<input type="checkbox"/>

Cervicogenic headache	G43.0	<input type="checkbox"/>	G44.2	<input type="checkbox"/>	G44.	<input type="checkbox"/>	M99.	<input type="checkbox"/>

Trapezius myofascitis	M54.63	<input type="checkbox"/>	M60.98	<input type="checkbox"/>	M60.9	<input type="checkbox"/>	M62.	<input type="checkbox"/>

18. Do you use the M99 code to code for a subluxation?

Yes ☐ No ☐

19. Is this definition of subluxation the same as what chiropractors define a subluxation as?

Yes ☐ No ☐

20. How often do you use multiple codes if you are treating more than one condition in the same patient?

Always ☐ Often ☐ Sometimes ☐ Seldom ☐ Never ☐

21. What are the 5 most common conditions that you see in your practice? Please add the codes that you normally assign to these conditions.

Condition	Code
1.	
2.	

3.	
4.	
5.	

22. What do you think is the purpose of the ICD-10 coding system?

Purely for claims ☐

Used for statistical analysis ☐

Purely for reimbursement ☐

For government to make decisions on health care expenditure ☐

Other (please specify) _____

23. Do you think the ICD-10 coding system is specific enough in terms of chiropractic diagnoses?

Yes ☐

No ☐

If no, please specify _____

24. Are you aware of any assistance offered with ICD-10 coding through the association or medical aid schemes?

Yes ☐

No ☐

25. Please add any brief comments or problems regarding ICD-10 coding.



ETHICS CLEARANCE CERTIFICATE

Student Name	Riaan Pieterse	Student No.	20300555
Ethics Reference Number	FHSEC 034/08	Date of FRC Approval	15/09/2008
Research Title	The ICD 10 coding system in chiropractic practice and the factors influencing compliance		

In terms of the ethical considerations for the conduct of research in the Faculty of Health Sciences, Durban University of Technology, this proposal meets with Institutional requirements and confirms the following ethical obligations:

1. The researcher has read and understood the research ethics policy and procedures as endorsed by the Durban University of Technology, has sufficiently answered all questions pertaining to ethics in the DUT 186 and agrees to comply with them.
2. The researcher will report any serious adverse events pertaining to the research to the Faculty of Health Sciences Research Ethics Committee.
3. The researcher will submit any major additions or changes to the research proposal after approval has been granted to the Faculty of Health Sciences Research Committee for consideration.
4. The researcher, with the supervisor and co-researchers will take full responsibility in ensuring that the protocol is adhered to.
5. **The following section must be completed if the research involves human participants:**

	YES	NO	N/A
❖ Provision has been made to obtain informed consent of the participants	X		
❖ Potential psychological and physical risks have been considered and minimised	X		
❖ Provision has been made to avoid undue intrusion with regard to participants and community	X		
❖ Rights of participants will be safe-guarded in relation to:			
- Measures for the protection of anonymity and the maintenance of confidentiality.	X		
- Access to research information and findings.	X		
- Termination of involvement without compromise	X		
- Misleading promises regarding benefits of the research	X		

SIGNATURE OF STUDENT

DATE

16/09/08

SIGNATURE OF SUPERVISORS

DATE

16.09.08

SIGNATURE OF HEAD OF DEPARTMENT

DATE

19/9/08

SIGNATURE: CHAIRPERSON OF RESEARCH ETHICS COMMITTEE

DATE

19/09/08

Appendix C



Attention: Riaan Pieterse
riaanpieterse@yahoo.com

09 June 2008

ICD-10 compliance data for Chiropractors

Dear Riaan,

With reference to the ICD-10 compliance data supplied to you by Discovery Health for the purposes of your Master's research, this letter confirms that the data sent to you (claims service dates May 2005 – October 2006) was aggregated and de-identified. We are thus comfortable that you cannot trace this data back to any individual provider or member and that no inferences can be made to any individual in this regard; hence the information should be ethically sound.

Kind Regards,

Luisa Whitelaw
Divisional Manager
Coding Unit

16 Fredman Drive, Sandton; PO Box 786722, Sandton 2146; Tel 0860 99 88 77 or 083 123 8877 (Client Services);
(011) 529 2888 (Switchboard); Fax (011) 539 2958; www.discovery.co.za

Directors: M I Hilkowitz (Chairperson), A Gore* (Group CEO), N S Koopowitz* (CEO), Dr B A Brink, P Cooper, Dr N J Dlamini,
S B Epstein (USA), Dr T V Maphah, H P Mayers*, A L Owen (UK), A Pollard*, J M Robertson* (CIO),
S E Sebetsa, T Slabbert, B Swartzberg*, S V Zilwa (*Executive). Secretary: M J Botha.

Discovery Health (Pty) Ltd. registration number: 1987/013480/07
An authorised financial services provider

2008-01

Appendix D

INFORMED CONSENT FORM

(TO BE COMPLETED BY THE PARTICIPANTS OF THE FOCUS GROUP)

DATE: _____

TITLE OF RESEARCH PROJECT:

The ICD-10 coding system in chiropractic practice and the factors influencing compliancy.

NAME OF SUPERVISOR : Dr N.L.B de Busser

NAME OF RESEARCH STUDENT : Riaan Pieterse

Please circle the appropriate answer

	YES/NO	
1. Have you read the research information sheet?	Yes	No
2. Have you had an opportunity to ask questions regarding this study?	Yes	No
3. Have you received satisfactory answers to your questions?	Yes	No
4. Have you had an opportunity to discuss this study?	Yes	No
5. Have you received enough information about this study?	Yes	No
6. Do you understand the implications of your involvement in this study?	Yes	No
7. Do you understand that you are free to		
a) withdraw from this study at any time?	Yes	No
b) withdraw from the study at any time, without reasons given?	Yes	No
c) withdraw from the study at any time without affecting your future health care or relationship with the Chiropractic day clinic at the Durban Institute of Technology?	Yes	No
8. Do you agree to voluntarily participate in this study	Yes	No
9. Who have you spoken to regarding this study?		

If you have answered NO to any of the above, please obtain the necessary information from the researcher and / or supervisor before signing. Thank You.

Please Print in block letters:

Pilot study Member: _____ Signature: _____

Witness' Name: _____ Signature: _____

Researcher's Name: _____ Signature: _____

Supervisor's / Co-supervisor's Name: _____ Signature: _____

Appendix E LETTER OF INFORMATION – FOCUS GROUP

Dear Participant,

I would like to thank you for taking part in my focus group. The title of my research project is:

The ICD-10 coding system in chiropractic practice and the factors influencing compliancy.

Background to the study:

The **aim** of this study is to determine the factors that influence compliancy of ICD-10 coding procedures by chiropractors in South Africa.

The International Classification of Diseases (ICD) provides codes to classify diseases in such a manner, that every health condition can be assigned to a unique category and given a code. The ICD is published by the World Health Organisation (WHO) and is used for world wide statistics on morbidity, mortality and reimbursement systems. This system was designed to promote international comparability in collection, processing, classification and presentation of these statistics.

Full implementation of this classification system in South Africa occurred on 1/1/2006 and full rejection of statements not reflecting an ICD-10 code on 1/3/2007.

Compliance statistics of ICD-10 claim forms for chiropractors in South Africa have been received from Discovery Health. From this questionnaire, we will try and determine the reasons for any mistakes that have been made by chiropractors on the claim forms.

Objectives of the study:

The **objectives** of this research study are:

1. To determine the level of compliancy of chiropractors in terms of accurate coding that is not rejected by the medical aid scheme.
2. To determine whether the ICD-10 diagnoses chiropractors commonly submit to the medical aid scheme reflect the actual diagnoses made in practice (based on participants responses to the Questionnaire).
3. To determine the problems encountered by chiropractors with respect to the ICD-10 coding system (based on responses from the Questionnaire).

Your participation in this study is much appreciated and you are assured that your comments and contributions to the discussion will be kept confidential. The results of the discussion will only be used for research purposes. If you have any further questions please feel free to contact either my supervisor or myself.

Riaan Pieterse

Appendix F

CODE OF CONDUCT

This form needs to be completed by every member of the Focus Group prior to the commencement of the focus group meeting.

As a member of this committee I agree to abide by the following conditions:

1. All information contained in the research documents and any information discussed during the focus group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
3. The information from this focus group will be made public in terms of a journal publication, which will in no way identify any participants of this research.

Member represents	Member's Name	Signature	Contact Details

Appendix G

IMPORTANT NOTICE: THIS FORM IS TO BE READ AND FILLED IN BY EVERY MEMBER PARTICIPATING IN THE FOCUS GROUP, BEFORE THE FOCUS GROUP MEETING CONVENES.

CONFIDENTIALITY STATEMENT – FOCUS GROUP DECLARATION

1. All information contained in the research documents and any information discussed during the focus group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. The returned questionnaires will be coded and kept anonymous in the research process.
3. None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
4. The information from this focus group will be made public in terms of a journal publication, which will in no way identify any participants of this research.

Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Please Print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature: _____

Researcher's Name: _____ Signature: _____

Supervisor's /
Co-supervisor's Name: _____ Signature: _____

Appendix H

Pilot study evaluation

1. What is your opinion of the subject presented in this questionnaire?

(Please circle the most appropriate answer)

- 1.1 Extremely interesting
- 1.2 Interesting
- 1.3 Average
- 1.4 Boring
- 1.5 Very boring

2. Do you think the topics raised in this questionnaire were adequately covered?

- 2.1 Yes
- 2.2 No

3. What is your opinion about the covering letter?

- 3.1 Very clear
- 3.2 Clear
- 3.3 Adequate
- 3.4 Unclear
- 3.5 Needs revising

4. How would you describe the instructions accompanying each of the questions?

(Please circle one answer only)

- 4.1 Very clear
- 4.2 Clear
- 4.3 Adequate
- 4.4 Unclear
- 4.5 Needs revising

5. Do you think the questionnaire is too long?

- 5.1 Yes
- 5.2 No

6. What is your opinion of the wording of the questionnaire?

(Please circle the appropriate answer/s)

- 6.1 The meaning of **all** questions is absolutely clear
- 6.2 The meaning of **most** questions is clear
- 6.3 There is too much chiropractic/ medical jargon
- 6.4 The questions will not be understood by lay persons
- 6.5 The questionnaire needs to be revised because it is unclear

LETTER OF INFORMATION

Dear Participant, welcome to my research study.

Title : The ICD-10 coding system in chiropractic practice and the factors influencing compliancy.

Name of student : Riaan Pieterse, Contact number: (031) 373 2512

Name of Supervisor : Dr. N. De Busser (MTech Chiropractic), MMedSci (Sports Medicine)

Background to the Study

The **aim** of this study is to determine the factors that influence compliancy of ICD-10 coding procedures by chiropractors in South Africa. Compliance statistics of ICD -10 claim forms for chiropractors in South Africa have been received from a leading medical aid scheme. From this questionnaire, we will try and determine the reasons for any mistakes that have been made by chiropractors on the claim forms as well as trying to establish any problems with the ICD 10 coding system.

Outline of Procedures

Participants will receive the questionnaire by post and will be asked to complete the questionnaire and return it in the envelope provided. Only chiropractors registered in South Africa will be included in this study.

Risk or Discomforts to subjects

There is no risk or discomfort involved in this study.

Benefits

The researcher will obtain an M.Tech (Chiropractic) degree upon completion of this research project. The benefits to the participants might be to identify any problems that exist with the ICD-10 coding procedures for chiropractors in South Africa.

Reasons for withdrawal

Incomplete questionnaires will be withdrawn from the study.

Remuneration and costs:

There will be no remuneration or cost associated with this study.

Confidentiality and ethics:

Your participation is voluntary and you are free to withdraw from this study at any time. The information given is also confidential, so please do not write your name anywhere on the questionnaire. All information will be treated with the strictest of confidence and the results of the study will be made available to all participants on request.

Research-related Injury

There is no risk of injury.

Persons to contact

Please do not hesitate to ask for clarification on any aspect of this study. Should you have any queries or complaints, kindly contact my supervisor, Dr De Busser or the HOD, Dr Korporaal on (031) 373 2512.

Thank you for your participation.

Riaan Pieterse