Associated conditions and complications among people with diagnosed cholesterol

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Research Report submitted in partial fulfilment of the requirements for the Diploma in Therapeutic Reflexology and Meridian Therapy

International Academy of Reflexology and Meridian Therapy (IARAMT)

2017

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List of Acronyms

ADHD:	Attention Deficit Hyperactivity Disorder
AECT:	The Association for Educational Communications and Technology
AHA:	American Heart Association
APS:	American Physiological Society
CAM:	Complementary and Alternative Medicine
HDL:	High-Density Lipoproteins
IARAMT:	International Academy of Reflexology and Meridian Therapy
IBS:	Irritable Bowel Syndrome
IDL:	Intermediate-Density lipoprotein
LDL:	Low-Density Lipoproteins
mmol/L:	Millimoles per Litre
NHLBI:	National Heart, Lung and Blood Institute
StatsSA:	Statistics South Africa
TB:	Tuberculosis
TCM:	Traditional Chinese Medicine
UVB:	Ultraviolet B
VLDL:	Very-Low-Density Lipoproteins
WHO:	World Health Organization
7-DHC:	7-Dehydrocholesterol

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1. INTRODUCTION

Cardiovascular disease is a group of disorders related to the heart and blood vessels which is caused by various reasons such as disease, damage or malformation of heart muscle, heart valve or blood vessels, but primarily related to atherosclerosis, or in other words, plaque build-up in arteries (AHA, 2017b; WHO, 2017a).

Cardiovascular disease is one of the leading causes of death in South Africa and the number one cause of death globally making it a very relevant condition to further investigate (StatsSA, 2015:94; WHO, 2017a).

High Cholesterol (Hypercholesterolemia or Hyperlipidaemia) is one such cardiovascular disease and the reason for this study, which will look at the associated conditions and complications related to this disease (NHLBI, 2016).

2. BACKGROUND TO THE PROBLEM

Cholesterol is a fatty substance (lipid) and an important steroid hormone in the body, found in cell membranes, that is produced by the body itself in the liver, but also ingested through a diet rich in animal protein and saturated fats; cholesterol is necessary to generate hormones (like oestrogen and progesterone), steroid hormones, vitamin D, cortisol and bile salts in the body (Beers, 2003:836; Marieb, 2012:48-49, 496; NHLBI, 2016; Van Elfen, 1993:107).

As cholesterol is a lipid, it is insoluble in water and in order for it to be transported in the bloodstream, lipoproteins are needed to bind to, which are fat substances internally covered by proteins externally, making it soluble in water (Beers, 2003:836; Marieb, 2012:497; NHLBI, 2016).

The presence of cholesterol in the human body is not only normal, but critical for optimal functioning.

The problem is therefore not with the substance, but with the excess of cholesterol in the body as it may lead to atherosclerosis (plaque build-up in artery walls causing narrowing) which is a leading cause of increased risk for cardiovascular disease (Sharma, 2002:577; NHLBI, 2016; Van Elfen, 1993:107; Youngson, 2005:65).

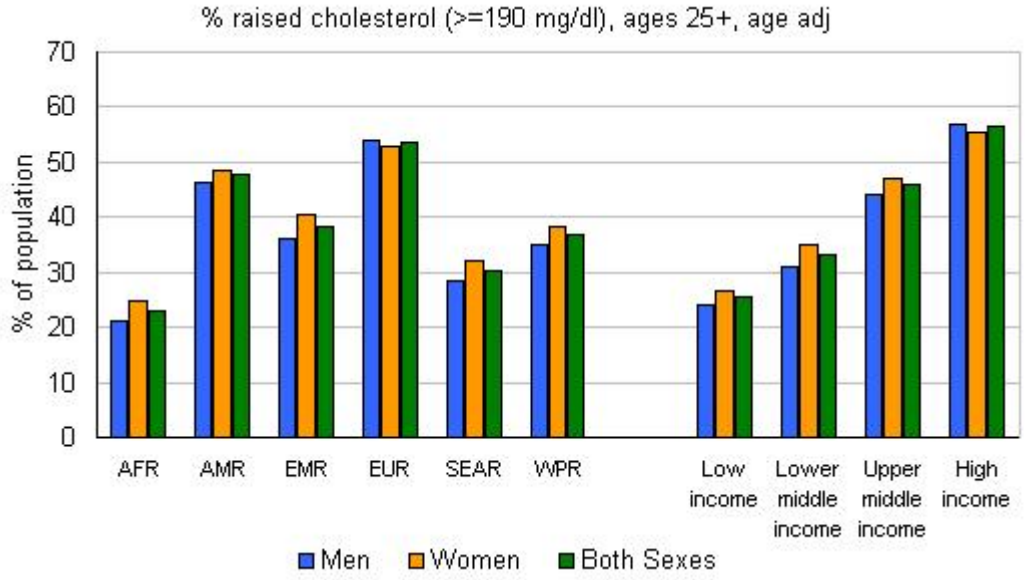
The prevalence of high cholesterol is evident in statistics when it is seen that a third of American adults have high cholesterol (AHA, 2017a; Jackson, 2017).

The World Health Organization (WHO, 2017b) alleges that total raised cholesterol is the highest in Europe, second highest in America and the lowest percentages where seen in Africa and South East Asia as illustrated in Figure 1.

It is interesting that high cholesterol has been linked to a country's income level where low income countries have the lowest raised cholesterol and the highest income countries have the highest occurrence of high cholesterol, but even in the low income countries, high cholesterol has been observed in a quarter of adults (WHO, 2017b).

This indicates that high cholesterol is a problem globally regardless of income level which leads to the identified research problem for this study.

Figure 1: Raised Cholesterol



(WHO, 2017b)

3. PROBLEM STATEMENT

Cholesterol can affect many parts of the human body and is associated with a number of serious conditions and complications, such as depressive, metabolic, digestive and fertility disorders.

4. AIM OF THE STUDY

The aim of the study is to list associated conditions and complications among people with diagnosed cholesterol.

5. RESEARCH OBJECTIVES (GOAL)

The research objectives are:

- To provide evidence of the link between typical conditions and complications associated with cholesterol and those along the Liver Meridian; and
- To provide evidence of the link between typical behavioural patterns associated with patients suffering from cholesterol and those associated with the Wood Element.

6. RESEARCH QUESTIONS

The research questions are:

- What evidence can be provided of the link between typical conditions and complications associated with cholesterol and those along the Liver Meridian?
- What evidence can be provided of the link between typical behavioural patterns associated with patients suffering from cholesterol and those associated with the Wood Element?

7. HYPOTHESIS

The Ancient Chinese Meridian system is divided into twelve major meridians and each meridian is linked and named accordingly to a major organ in the human body. People with cholesterol will typically suffer from conditions and complications along the **Liver Meridian**.

The Liver Meridian starts in the lateral section of the big toes, runs up the front of the legs and penetrates the groin, the sexual organs, and the medial sections of the digestive organs including

the liver. The Meridian also has internal sections running through the lungs, oesophagus and frontal lobe. Internal conditions and complications along the meridians will possibly confirm a weakness with the associated organ, namely the liver. Furthermore, external visual assessments of the toes, fingers and face associated with the Liver will also possibly confirm a weakness with the Liver.

Each Meridian can be linked to one of the Ancient Chinese Five Elements and any imbalances can be used as an assessment of human psychology. **The Liver Meridian is linked to the Wood Element** and therefore any patients with cholesterol would express behavioural patterns associated with an imbalance of this element.

8. LITERATURE REVIEW

8.1 Introduction

High cholesterol is a contemporary condition due to its high occurrence globally and since cardiovascular disease is seen as the leading cause of death globally (AHA, 2017a; Jackson, 2017; StatsSA, 2015:94; WHO, 2017a; WHO, 2017b). Available literature on high cholesterol will be reviewed in this section.

8.2 Definitions

8.2.1 Lipids

Lipids are large organic compounds or fats found in the human body and in food (Marieb, 2012:45; Youngson, 2005:231). Various types of lipids found in the human body are illustrated in Table 1.

Table 1: Lipids in the human body

Lipid Type	Description
Triglycerides (Natural Fats)	Found in Fat Deposits (subcutaneous tissue and around organs) and Consists of Fatty Acids and Glycerol.
Phospholipids	Found in cell membranes and help with lipid transportation in plasma.
Steroids: • Cholesterol • Bile Salts • Vitamin D • Sex Hormones • Corticosteroids (adrenal cortical hormones)	• Basis of all body steroids • It is a breakdown product of cholesterol • A fat-soluble vitamin • Produced from cholesterol • Cortisol (glucocorticoid) reduces stress and aldosterone helps to regulate water and salt balance in body fluids
Other Lipoid Substances: • Vitamin A • Vitamin E • Vitamin K	• Found in orange vegetables like carrots and fruits like tomatoes • Ingested from plant products like wheat germ and green leafy vegetables • Intestinal bacteria makes it available and ingested from various foods
Prostaglandins	Derivatives of fatty acids in cell membranes
Lipoproteins	Substances transporting fatty acids and cholesterol in the bloodstream

(Marieb, 2012:45-46)

8.2.2 Cholesterol

Cholesterol is a lipid found in the blood and a component of the cell membranes, synthesized in the liver and seen as the most important steroid molecule crucial in the production of steroid hormones, bile and vitamin D as well as in the transport of fatty acids, but it is not used as source of energy in the body; it is insoluble in water and is transported in the bloodstream as lipoproteins (Beers, 2003:836; Dougans, 2017b:17; Marieb, 2012:46-49, 496-497; NHLBI, 2016; Trattler & Jones, 2004:494; Youngson, 2005:132).

8.2.3 High Cholesterol

High Cholesterol (Hypercholesterolemia or Hyperlipidaemia) is a condition of elevated blood cholesterol levels that leads to atherosclerosis and is a major risk factor for cardiovascular disease (Beers, 2003:836-837; Longmore *et al.*, 2010:704; NHLBI, 2016; Van Elfen, 1993:107; Youngson, 2005:307).

A more specific division in terminology can be made with regards to high cholesterol and high lipids based on the type of blood lipid that is affected although high cholesterol or hypercholesterolemia or hyperlipidaemia are often used interchangeably; terms to consider are hypercholesterolemia, hyperlipidaemia, dyslipidaemia and hypertriglyceridemia.

8.2.3.1 Hypercholesterolemia

Hypercholesterolemia is a condition when only cholesterol levels are high in the blood (Moll, 2017).

8.2.3.2 Hyperlipidaemia

Hyperlipidaemia is the most common type of dyslipidaemia and indicates high lipid levels (cholesterol and triglycerides) in the blood (Goldberg, 2015; Moll, 2017; Youngson, 2005:197).

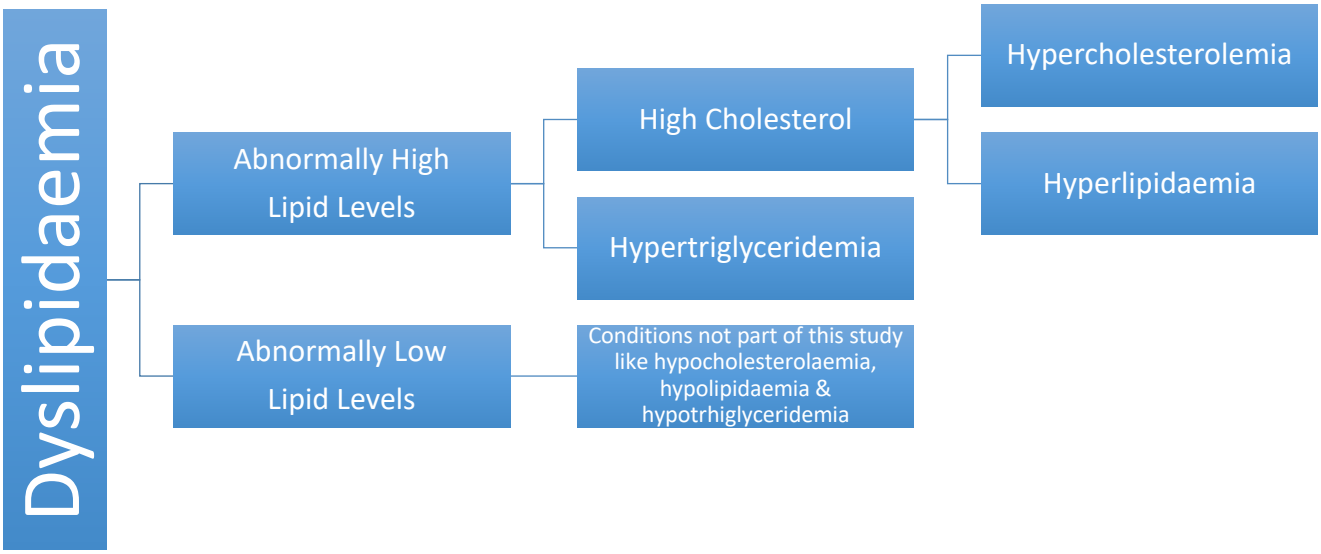
8.2.3.3 Dyslipidaemia

Dyslipidaemia is a lipid metabolism condition of abnormal levels (high or low) of lipids (cholesterol and triglycerides) in the blood (Goldberg, 2015; Moll, 2017; Youngson, 2005:197).

8.2.3.4 Hypertriglyceridemia

Hypertriglyceridemia is a condition when only triglyceride levels are high in the blood (Moll, 2017).

Figure 2: Divisions of Abnormal Lipid Levels



(Goldberg, 2015; Moll, 2017; Youngson, 2005:197)

8.2.4 Lipoproteins

Lipoproteins are lipids comprised of internal fatty substances covered externally by protein making it soluble in water in order to transport fatty acids and cholesterol in the bloodstream (Beers, 2003:836; Marieb, 2012:46; NHLBI, 2016).

There are four types of lipoproteins, namely:

- High-Density Lipoproteins (HDL);
- Low-Density Lipoproteins (LDL);
- Very-Low-Density Lipoproteins (VLDL) and its conversion into Intermediate-Density Lipoproteins (IDL); and
- Chylomicrons (Beers, 2003:836; Hirano *et al.*, 2004:199).

8.3 Description of High Cholesterol

8.3.1 Classification

The classification of High Cholesterol is done through one of three different methods, namely the Fredrickson Classification, the Alternative Classification, the Clinical Classification and the Lipoprotein Classification.

8.3.1.1 Fredrickson Classification

Traditionally the Fredrickson Classification was used as can be seen in Table 2.

Table 2: Fredrickson Classification

Hyperlipidaemia Classification	Familiar Name	Raised Lipoproteins	Raised Serum Lipids
Type I	Familial Hyperchylomicronemia	Chylomicrons	Triglycerides
Type IIA	Familial Hypercholesterolemia	LDL	Cholesterol
Type IIB	Familial Combined Hyperlipoproteinemia	LDL & VLDL	Cholesterol & Triglycerides
Type III	Dysbetalipoproteinemia	IDL	Cholesterol & Triglycerides
Type IV	Primary Hypertriglyceridemia	VLDL	Triglycerides
Type V	Mixed (Endogenous) Hypertriglyceridemia	VLDL & Chylomicrons	Cholesterol & Triglycerides

(BMJ, 2017; De Groot *et al.*, 2000; Fox, 2017; Guha, 2014)

8.3.1.2 Alternative Classification

The Alternative Classification is based on the serum lipid pattern (whether cholesterol and/or triglycerides increase) and divides Hyperlipidaemia into Primary and Secondary Hyperlipidaemia where Primary Hyperlipidaemia is caused by gene mutations while Secondary Hyperlipidaemia is acquired due to complications of another disease combined with patient factors; Figure 3 gives examples of Primary Hyperlipidaemias and Figure 4 gives examples of Secondary Hyperlipidaemias (Goldberg, 2015; Guha, 2014; Longmore *et al.*, 2010:704).

Figure 3: Primary Hyperlipidaemias

Condition	Genetic defect/mechanism	Serum lipid pattern
Familial hypercholesterolaemia	LDL receptor mutation, Apo B mutation, PCSK9 mutation	Increased total chol and LDL (Fredrickson type IIa)
Polygenic hypercholesterolaemia	Increased LDL particle number ± increased VLDL particle number	Increased total chol and LDL (type IIa)
Familial combined hyperlipidaemia	Increased VLDL particle number + increased small, dense LDL particle number	Increased total chol and LDL (type IIa) or increased triglycerides (type IV) or increased total chol, LDL and triglycerides (type IIb)
Familial hypertriglyceridaemia	Increased VLDL particle number	Increased triglycerides (type IV)
Familial lipoprotein lipase deficiency	Lipoprotein lipase mutation, Apo C-II deficiency	Increased triglycerides, decreased HDL (type I)
Familial dysbetalipoproteinaemia	Apo E2 homozygosity	Increased total chol and triglycerides (type III)

(Guha, 2014)

Figure 4: Secondary Hyperlipidaemias

Condition	Serum lipid pattern
Diabetes mellitus	Increased triglycerides, decreased HDL
Obesity	Increased triglycerides, decreased HDL
Hypothyroidism	Increased LDL, increased total chol, increased triglycerides (in some cases)
Chronic kidney disease	Increased LDL, decreased HDL, increased triglycerides
Alcohol excess	Increased triglycerides, increased HDL
Cholestasis	Increased LDL, increased total chol

(Guha, 2014)

8.3.1.3 Clinical Classification

The Clinical Classification is a more practical way of classification of the condition that can be seen in Table 3 (BMJ, 2017).

Table 3: Clinical Classification

Name	Raised
Isolated Hypercholesterolemia	LDL-Cholesterol
Mixed or Combined Dyslipidaemia	Total Cholesterol or LDL-Cholesterol and Triglycerides
Isolated Hypertriglyceridemia	Triglycerides
Low HDL-Cholesterol	Low HDL-Cholesterol

(BMJ, 2017)

8.3.1.4 Lipoprotein Classification

This classification is based on the transportation method in the bloodstream and which lipoproteins are involved in transporting the lipids as seen in Table 4.

Table 4: Cholesterol Types

Type of Cholesterol	Lipoprotein	Transportation
HDL	HDL	Excess cholesterol from cells to liver for disposal through bile
LDL	LDL	Cholesterol from liver to cells

(Dougans, 2017b; Marieb, 2012:496-498)

This Lipoprotein Classification is a very practical and simple way of classifying cholesterol and will be the default way of classifying cholesterol in this study and therefore referral will be made to the following different types of cholesterol:

- HDL – The so-called “Good Cholesterol” in the blood;
- LDL – The so-called “Bad Cholesterol” in the blood; and
- Total Cholesterol – The total of HDL and LDL in the blood (Dougans, 2017b; Marieb, 2012:496-498).

8.3.2 Aetiology
The causes of high cholesterol can be divided into primary and secondary causes (Goldberg, 2015).

8.3.2.1 Primary Causes
Primary causes are usually hereditary (genetic) factors of gene mutations resulting in the overproduction of LDL-Cholesterol or triglycerides or the underproduction of HDL-Cholesterol (Goldberg, 2015; Youngson, 2005:307).

Increased liver function due to excess toxins and stress leads to the production of more cholesterol by the liver which also increases cholesterol levels in the blood (Sharma, 2002:578).

When considering aetiology of high cholesterol, the causes for increased LDL-Cholesterol is usually focused on, but the causes of low HDL-Cholesterol may include the following:

- Abdominal obesity;
- Genetic diseases like “apoA-I, ABCA1 (ATP-binding cassette transporter)”
- Hypertriglyceridemia;
- Insulin resistance;
- Lecithin-Cholesterol Acyltransferase deficiency; and
- Smoking (BMJ, 2017).

8.3.2.2 Secondary Causes
Secondary causes are usually lifestyle related (Goldberg, 2015) and includes the following:

- Diet consisting of excessive saturated fats, trans fats, cholesterol, red meat, dairy products, prawns, shrimps and pork;
- High triglyceride levels – it is linked to high LDL levels;
- Infection – it seems LDL increases to fight infection;
- Inflammation – cholesterol increases to heal the inflammation;
- Lack of exercise;
- Sedentary lifestyle;
- Alcohol excess;
- Certain medication;
- Chronic kidney disease;
- Diabetes Mellitus – excess glucose is converted into fat (triglycerides);
- Hypothyroidism;
- Metabolic syndrome;
- Primary biliary cirrhosis (Douglas & Allan, 2016:77-80; Goldberg, 2015; Sharma, 2002:577; Trattler & Jones, 2004:268; Youngson, 2005:307).

8.3.3 Pathology
High Cholesterol is a condition that in itself is not a devastating illness, because it depends on the type of cholesterol that is causing the cholesterol reading to be raised, but when combined with deficiencies in minerals, vitamins and amino acids, it can be a dangerous condition (Sharma, 2002:577).

It is readily accepted that continued high cholesterol levels will progress to atherosclerosis which in turn increases the risk for heart attacks and strokes (Beers, 2003:836-837; Van Elfen, 1993:107).

8.3.4 Pathophysiology
There are two types of cholesterol, namely HDL and LDL where it is readily accepted that HDL refers to the so-called good cholesterol and LDL to so-called bad cholesterol, because increased

HDL removes LDL-cholesterol from the blood stream (Dougans, 2017b:17; Marieb, 2012:496-498; Patel, 2013:20).

Cholesterol is not good or bad as it is crucial in the proper functioning of the body as the liver manufactures 85 percent of all cholesterol and only 15 percent is due to dietary intake (Marieb, 2012:497). Douglas and Allan (2016:75) supports this statement that there is no good or bad cholesterol and that all cholesterol plays a role in the body while also supporting the fact that the majority of cholesterol is not diet related, but the ratio is slightly different when mentioned that 75 percent of cholesterol is manufactured by the liver and 25 percent is dietary related. Regardless of the specific percentage, it is agreed that the majority of cholesterol is not dietary related, but manufactured by the liver.

HDL-Cholesterol and LDL-Cholesterol work together in the body and both are needed for optimal functioning of the human body (Douglas & Allan, 2016:75).

When HDL levels are high it may decrease the risk of atherosclerosis due to assisting in eliminating cholesterol from the blood by disposing of it through bile, but when LDL levels are high it may increase the risk of atherosclerosis as there are more LDL in the blood and thus increasing the risk of deposits on arterial walls (Beers, 2003:837; Dougans, 2017b:17; Marieb, 2012:497).

As LDL levels increase to excessively high levels, the body is unable to produce enough HDL to remove the excess cholesterol from the blood which may result in atherosclerosis (Beers, 2003:837).

8.3.5 Signs and Symptoms

There are usually no signs and symptoms of high cholesterol levels in the blood (Beers, 2003:837).

8.3.6 Complications

High Cholesterol, especially when it is due to increased LDL levels in the blood, may lead to various complications, namely:

- Atherosclerosis;
- Heart attack; and
- Stroke (Beers, 2003:837; Dougans, 2017b:17; Marieb, 2012:497).

8.3.7 Diagnosis

8.3.7.1 Conventional Diagnosis

High Cholesterol is diagnosed through blood tests. A finger-prick cholesterol test can give an indication of the total cholesterol level in the blood (both LDL and HDL) and high cholesterol is diagnosed if this total cholesterol level is higher than 5 millimoles per litre (mmol/L) (Beers, 2003:838; Health24, 2014).

Laboratory blood tests (done while fasting) can provide a ratio of LDL to HDL and high cholesterol is diagnosed when LDL is higher than 3 mmol/L and HDL is lower than 1 mmol/L (Beers, 2003:838; Health24, 2014).

Van Schoor (2010:47) agrees that High Cholesterol is diagnosed when Total Cholesterol is above 5 mmol/L and LDL-Cholesterol is above 3 mmol/L.

Sharma (2002:577) explains that the risk ratio of cholesterol is calculated by dividing the total cholesterol by the HDL level and if the figure is above 5 for males and above 4.4 for females, their

cholesterol levels are too high. Health24 (2014) agrees, but indicates a moderate risk when it is above 4 and a high risk when it it above 5.

Goldberg (2015) furthermore provides the following guidelines for diagnosing High Cholesterol in children:

- LDL-Cholesterol higher than 2.8 mmol/L requires dietary treatment;
- LDL-Cholesterol higher than 4.9 mmol/L requires drug therapy if there is no family history of early cardiovascular disease and if the child is not responding to dietary treatment;
- LDL-Cholesterol higher than 4.13 mmol/L requires drug therapy if there is a family history of early cardiovascular disease; and
- HDL-Cholesterol lower than 1.04 mmol/L.

8.3.7.2 Complementary and Alternative Medicine (CAM) Diagnosis

CAM follows a holistic approach and is known for addresses the cause and not only the symptoms (Richardson, 2011:1051). When it comes to dealing with cholesterol, it is no different.

Douglas and Allan (2016:77-80) indicates that High Cholesterol is usually caused due to a genetic defect on chromosome 19 or it is a symptom of an underlying problem in the body which is usually inflammation and cholesterol is send to heal it, but when the problem is unresolved, the body forms more cholesterol or it may be due to any of the various secondary causes mentioned in section 8.3.2.2.

It is made very clear that the best approach of dealing with unhealthy cholesterol levels, is to find the cause and then to deal with it appropriately; this means the normal finger-prick cholesterol test serves no purpose in this regard (Douglas & Allan, 2016:80).

8.3.7.3 Traditional Chinese Medicine (TCM) Diagnostics

Therapeutic Reflexology and Meridian Therapy as educated at the International Academy of Reflexology and Meridian Therapy (IARAMT) draws from TCM when referring to meridians and the five elements theory for assessment purposes of High Cholesterol as seen in Table 5.

Table 5: TCM Diagnostics of High Cholesterol

HIGH CHOLESTEROL Imbalance in:	
Meridian Theory	**Five Elements Theory**
• ***Main Meridian:*** Liver Meridian • ***Supporting Meridian:*** Gallbladder Meridian	Wood Element

(Dougans, 2005:155; Fusionhealth, 2017; Tierra, 2017)

Table 5 indicates that High Cholesterol usually causes conditions and complications along the liver meridian and the supporting gallbladder meridian as well as imbalances in the Wood (Quality of Food) Element (Dougans, 2005:66-71; Fusionhealth, 2017; Tierra, 2017).

8.3.8 Treatment

Treatment for high cholesterol is usually related to an adjustment in diet and thus limiting the intake of saturated fats and cholesterol from food, increased exercise and one of two sets of medication, namely:

- Natural (herbal) products like Solal's Choltrol; or
- Allopathic statin medication like Simvastatin.

8.3.9 Prevention

Only 15 percent of blood cholesterol levels are attributed to diet (Marieb, 2012:497), but it is still an important consideration in prevention as the medical fraternity bought into diet as a major factor in reducing cholesterol levels according to Trattler and Jones (2004:271). Prevention relating to diet is thus to follow a balanced diet, but to limit and decrease the intake of fat, especially saturated fat, and cholesterol in foods like meats, dairy products and egg yolks (Beers, 2003:838-839). Limiting the intake of such foods is only one part, the other part is to increase the intake of healthy foods like fruits, vegetables, grains and foods rich in soluble fibre like oatmeal, bran, beans, peas and rice (Beers, 2003:840).

Apart from diet, prevention should also involve the following:

- Lose weight when overweight;
- Regular exercise as this increases HDL-Cholesterol and decreases triglycerides;
- Stop smoking;
- Reduce stress;
- Reduce caffeine intake;
- Avoid oral contraceptives; and
- Avoid food additives and pollutants (Beers, 2003:838-840; Douglas & Allan, 2016:161; Sharma, 2002:578).

8.3.10 Recommendations

8.3.10.1 Lifestyle

A lifestyle optimal for lowering cholesterol levels is characterised by:

- Getting enough sleep;
- Exercising regularly;
- Limiting stress and coping effectively with it;
- Avoiding toxic substances like food additives and smoking (Beers, 2003:838-840; Sharma, 2002:578).

8.3.10.2 Food

Diet plays a role in lowering cholesterol levels and the following should be taken into consideration:

- Avoid the intake of saturated fats and cholesterol through meats, dairy products and so forth;
- Increase the intake of healthy food like fruits, vegetables, bran, oatmeal and olive oil; and
- Before consuming products, read the dietary advice on the labels in order to understand exactly what it is that is being taken into the body (Beers, 2003:838-840).

8.3.10.3 Supplements

Table 6 indicates various supplements that are recommended to assist in dealing with High Cholesterol.

Table 6: Supplements dealing with High Cholesterol

To Lower LDL-Cholesterol	To lower Total Cholesterol	To increase HDL-Cholesterol
• Coenzyme Q10 (prevent LDL from oxidising) • Garlic (reduce oxidation of LDL) • Magnesium	• Lecithin • Vitamin E • Copper • Chromium • L-Carnitine • N-Acetylcysteine	• Garlic • Omega 3 fatty acids • Vitamin B3 (Niasin) • Vitamin C

(Beers, 2003:189-193; Dougans, 2017b:24-25; Goldberg, 2015; Sharma, 2002, 400, 578; Sinatra, 2013, Van Elfen, 1993:231-233; Volek, 2017; Youngson, 2005:287, 422)

8.3.10.4 Tissue Salts

The following tissue salts are recommended to assist with High Cholesterol:

- Tissue Salt 8 (Mag Phos) to help lower cholesterol by acting as antispasmodic to reduce stress and dealing with heart and muscle conditions;
- Tissue Salt 10 (Nat Phos) to help reduce cholesterol by balancing acid-alkalinity; and
- Tissue Salt 11 (Nat Sulph) – to create normal cholesterol levels by supporting the liver (Bomar, 2009; Roberts, 2008:x-xi)

8.3.10.5 Herbs

The following herbs are recommended to assist in lowering High Cholesterol:

- Blessed Thistle to stimulate the liver for production of normal cholesterol levels;
- Dandelion to cleanse the liver; and
- Milk Thistle to protect the liver (Bomar, 2009).

8.3.10.6 Spices

Everyday spices can be used to lower blood lipid levels and spices equivalent in function to statins can be listed as follows according to Scott (2006:88):

- Cinnamon;
- Citrus;
- Coriander;
- Fenugreek;
- Garlic;
- Ginger;
- Grapes;
- Oregano;
- Rosemary;
- Soy;
- Star Anise; and
- Thyme.

According to Scott (2006:58) there are sets of everyday spices that perform a valuable function in lowering blood lipid levels as seen in Table 7.

Table 7: Groups of spices to lower lipids

Group of Spices	Function
Coriander, Cinnamon and Fenugreek	Reduce levels of proteins carrying cholesterol to be deposited in arteries (LDL)
Ginger and Oregano	Protects against oxidation of cholesterol
Bay leaf, Garlic and Turmeric	Anti-inflammatory to prevent inflammation linked to formation and enlargement of plaque formation in arteries
Black Pepper	Antioxidant to decrease oxidative stress (which results in high cholesterol and triglyceride levels) and minimising damage caused by an incorrect diet rich in saturated fats (which is a main cause of oxidative stress).

(Scott, 2006:58-59; Scott, 2006:136)

8.3.11 Therapies

8.3.11.1 Medical Therapies

Medical therapies for high cholesterol is centred around the use of Statins (reductase inhibitors) as this is seen as the ultimate treatment for High Cholesterol (Graveline, 2015; Patel, 2013:22; Pichandi *et al.*, 2011:53-54; Stancu & Sima, 2001:385-386), but these products have terrible side-effects and not all people are able to use these products.

Patel (2013:22) acknowledges some severe side-effects of statins, but indicates that only a few severe side-effects are present and mostly people tolerate statins very well. Klug (2012:181) agrees that statins are very effective in lowering LDL-Cholesterol, but acknowledges the fact that some severe side-effects are experienced in some patients and this is supported by Taylor *et al.* (2017:2). The American Physiological Society (APS) (2015) supports the fact that statins are effective in lowering cholesterol levels, but have severe side-effects.

Armitage (2007:1787) brings this to a conclusion by mentioning that statins are effective in lowering high cholesterol and by being aware of people at risk for interactions with statins, can reduce the side-effects by adjusting dosages and medications accordingly. O'Sullivan (2007:55) agrees with the preceding points of view and declares that the the long-term benefits of statins overshadows the risks.

8.3.11.2 Complementary Therapies

Complimentary therapies to deal with high cholesterol involve the use of natural products, either herbal or homeopathic. Overall these products are effective, but not necessarily in the long term.

Physical therapies like therapeutic reflexology which assists the body to heal itself can be used, although it has not been conclusively proven that it actually lowers cholesterol levels, but it does reduce stress considerably which is part of the treatment for lowering cholesterol levels.

8.4 Previous Studies

8.4.1 Controversial Studies

Sharma (2002:577-578) as confirmed by Trattler and Jones (2004:270-273) mention that the medical industry is readily accepting an unproven theory that high cholesterol levels result in heart disease like heart attacks and stroke, but that lowering cholesterol levels with allopathic medication like statins is reducing the risk of heart attack with only two percent and the side-effects of these drugs may in many instances be worse than the actual condition. Graveline (2015:11) also alleges that it is unproven that high cholesterol causes damage to arteries as supported by Noakes cited by Brown (2014).

Douglas and Allan (2016:8) declare that this whole theory that eating saturated fats increases cholesterol levels in the blood which in turn results in clogging up arteries and causing cardiovascular disease is based on a study done by the father of the lipid hypothesis, Ancel Keys, in 1958, but the study was flawed as he decided to exclude collected data that did not support his hypothesis.

It is interesting to note that Scott (2006:136) mentions oxidative stress are associated with high cholesterol and triglyceride levels while Noakes cited by Sboros (2017) takes this a step further by mentioning that cholesterol as such is not a problem, but oxidised cholesterol is the problem and that is not even tested when advising patients on diet.

Trattler and Jones (2004:271) state that even though cholesterol levels have been lowered for the past 40 years, cardiovascular disease in the same period has increased, thus claiming that the medical profession's approach to lower cholesterol to reduce the risk of cardiovascular disease is an incorrect and even unproven approach.

This is put in perspective when Sultan and Hynes (2013:180-183) declares that the statin industry is a 20 billion dollar per annum industry and as a result major side-effects of statin use have been underreported and even concealed from the public and includes an increased risk in:

- Cancer;

- Cataract Formation;
- Diabetes Mellitus;
- Erectile Dysfunction;
- Infectious Diseases; and
- Neurodegenerative Disorders.

Lemerond (2017) supports this view, but indicates that two statin drugs have an annual revenue of 34 billion dollars; it is mentioned that statins have a place to assist people who had a heart attack before and known cardiovascular disease, but apart from those, the use of statins is a scam and not effective in preventing cardiovascular disease. This is confirmed by Mercola (2016) and Sboros (2017).

Okuyama *et al.* (2015) takes this perception a step further by declaring that statins are capable of increasing the risk of coronary heart disease as well as heart failure, supported by Mercola (2016) which makes it clear that statins deplete the body of Coenzyme Q10 which increases the risk of acute heart failure.

It seems that there is controversy over whether the lowering of cholesterol by means of statins is actually in the best interest of patients as it appears that it does not lower risk of heart disease.

8.4.2 Vitamin D Studies

Grimes *et al.* (1996) conducted a study that found sunlight deficiency being responsible for increased blood cholesterol levels. Trimarchi (2017) states that in sunlight a form of cholesterol that is naturally found in the skin, named 7-dehydrocholesterol (7-DHC), absorbs the ultraviolet B (UVB) radiation and converts it to cholecalciferol which is a previtamin form of vitamin D, specifically vitamin D3, and about 30 minutes exposure to sunlight two to three times per week between the times of 10:00 and 15:00 is sufficient for the body to produce all vitamin D necessary.

This study showed that sufficient sunlight leads to vitamin D production, but insufficient sunlight leads to increase cholesterol production (Grimes *et al.*, 1996; Scott, 2012). Scott (2006:40) confirms this view when mentioning that vitamin D is used in high doses to lower cholesterol.

Opposed to this are the studies referred to by Schaefer and Watson (2016) that was conducted in 2012 indicating vitamin D supplements does not lower cholesterol, but may even increase LDL-Cholesterol, but a 2014 study found the intake of vitamin D along with calcium improves cholesterol levels.

It seems like there is insufficient evidence that vitamin D lowers cholesterol (Schaefer & Watson, 2016), but it may be beneficial to recommend to patients with High Cholesterol that they should get enough sunlight exposure to maintain optimum vitamin D levels in the body as there are some studies indicating that it may be beneficial in lowering cholesterol levels (Grimes *et al.*, 1996).

8.4.3 Reflexology and High Cholesterol Studies

8.4.3.1 Hypertension Studies

Cha (2002) conducted a quasi-experimental study with 34 participants doing 55 minute sessions per day for three days per week over a period of eight weeks; the study showed a significant reduction in blood pressure, but furthermore also showed a decrease in Total Cholesterol and LDL-Cholesterol, but also in HDL-Cholesterol, but the results were not statistically significant.

Park and Cho (2004) conducted a study with 34 participants divided into an experimental group and a control group and foot reflexology was administered twice a week for six weeks and self foot reflexology twice a week for four weeks; the study; the study showed that foot reflexology is effective in lowering systolic blood pressure as well as triglycerides, but it did not significantly affect blood cholesterol levels.

Lee (2006) conducted a non-equivalent pretest-posttest experimental study with 40 participants divided into an experimental group and a control group; the study indicated a statistically significant difference in Total Cholesterol, but no statistical significant differences in HDL, LDL or triglycerides.

8.4.3.2 High Cholesterol Studies

Lee and Kim (2012) conducted a non-equivalent control group pretest-posttest quasi-experimental study with 71 participants divided into two experimental groups and a control group; the study showed significant decrease in systolic blood pressure, diastolic blood pressure and pulse rate, but no significant difference was identified for blood lipid levels.

8.5 Conclusion

In this section various literature sources were consulted to provide a clear description of what High Cholesterol is after various definitions were clarified. Previous studies were reviewed and it became clear that there are some controversial studies claiming that high cholesterol is not the cause of atherosclerosis and that this idea is an unproven claim, but opposed to that view the medical profession accepts that it is in actual fact the case.

Studies were seen where it is claimed that sunlight which helps the body produce vitamin D is a way of lowering cholesterol levels, while others claimed that there is insufficient evidence for such claims.

Lastly, an attempt was made to source previous studies on how reflexology affects blood cholesterol levels, but only one such study could be sources (Lee & Kim, 2012), but unfortunately the study could not prove that reflexology affects blood cholesterol levels. However, three other studies were sourced (Cha, 2002; Park & Cho, 2004; Lee, 2006) that investigated reflexology's effect on hypertension, but in the process a look at cholesterol levels were also included, but none of these studies could prove with statistical significance that reflexology made any difference in blood cholesterol levels.

The need for further research in this regard is evident and this study is an initial attempt towards that, but not with the purpose of providing that cholesterol levels are affected by reflexology treatment; instead, this study was intended to list associated conditions and complications among people with diagnosed cholesterol.

9. RESEARCH METHODOLOGY

9.1 Introduction

Research is a scientific step-by-step process of gathering information and interpreting it with a definite purpose in mind (Saunders *et al.*, 2009:600; Welman *et al.*, 2005:2). The definite purpose and rationale for this study was to list associated conditions and complications among people with diagnosed cholesterol.

In this section the specific research design and methodology used in this study is discussed, explained and motivated in order to ensure transparency in the methods used to collect and interpret the data.

9.2 Research design

The research design is the structure of the research and can be listed as descriptive studies, explanatory studies and exploratory studies (Saunders *et al.*, 2009:138-141; Scheepers, 2013:33).

Descriptive studies describe occurrences systematically, explanatory studies explain variable relationships and exploratory studies explore unknown situations (Kumar, 2011:10; Scheepers, 2013:34).

This study used a descriptive approach due to it being the ideal type of study to use for determining "what is" and since it may be used either in a quantitative or qualitative approach according to The Association for Educational Communications and Technology (AECT) (2001), this was deemed the most appropriate type of study to systematically list associated conditions and complications among people with diagnosed cholesterol (Kumar, 2011:10).

9.3 Research approach

There are three approaches to research available namely quantitative, qualitative and mixed-method approaches (Saunders *et al.*, 2009:151).

The quantitative approach uses numerical data while the qualitative approach uses non-numerical data and mixed-method approaches uses a combination of numerical and non-numerical data (Dawson, 2010:14-15; Saunders *et al.*, 2009:151; Scheepers, 2013:34).

This study used a qualitative research approach as it intended to list non-numerical conditions and complications in people with diagnosed cholesterol.

9.4 Research strategies

9.4.1 Research strategy theory

A research strategy is the plan of action researchers use to collect the necessary information in the field (Saunders *et al.*, 2009:600).

There are various research strategies available that can be used, namely:

- Action research;
- Archival research;
- Case study;
- Ethnography;
- Experiment;
- Grounded theory; and
- Survey (Saunders *et al.*, 2009:141).

This study used a case study strategy as it is an appropriate qualitative research approach strategy that involved empirical investigation of real life patients in real life situations (Robson, 2002:178).

9.4.2 Research strategy implementation

Saunders *et al.* (2009:146) indicate that case study strategies usually involve triangulation data collection methods which refer to different sources of data collection techniques implemented to collect data within one study. The data collection methods used in this study will be discussed in section 9.8.

9.5 Target Population

The target population refers to all the potential people from which data can be collected in a study (Kumar, 2011:194).

The target market for users of CAM is indicated as females aged 26 to 35, although males also make use thereof (Du Plessis, 2012:57; Smith, 2016:12).

The target population for this study was consequently identified as anyone (male or female) in South Africa with diagnosed High Cholesterol interested to make use of CAM, specifically therapeutic reflexology. Due to time and financial constraints it is not possible to use the entire target population and therefore the need for sampling was evident (Dawson, 2010:48).

9.6 Sampling

9.6.1 Sampling method

A sample is a smaller group taken from the target population that can be used to collect data from and which represents the entire target population (Dawson, 2010:48).

There are mainly two sampling methods available, namely probability sampling and non-probability sampling, where probability sampling refers to random selection of participants into the sample where each person has an equal chance to be selected, while non-probability sampling refers to a method where the researcher has a direct influence in whom is selected to make up the sample (Dawson, 2010:49-50; Kumar, 2011:198).

This study used a non-probability sampling method which is in line with a qualitative research approach and because random sampling served no specific purpose in this study as the researcher did not have access to all South Africans with diagnosed High Cholesterol (Kumar, 2011:199).

There are various non-probability sampling methods available, for example:

- Convenience sampling – where participants are selected due to convenience for the researcher;
- Purposive sampling – where the researcher's judgement and expertise is the crucial factor in determining whom are the ideal participants to provide relevant and applicable data;
- Quota sampling – where the number of participants are divided into specific groups (like male and female) and then the quota if filled for each group based on a different non-probability sampling method; and
- Snowball sampling – where one participant refers the researcher to the following participant (Dawson, 2010:50-51; Kumar, 2011:206-208).

In this study a purposive sampling method was used as the researcher was a final-year therapeutic reflexology student at IARAMT with the expertise to select the appropriate participants for the study.

9.6.2 Sampling selection

Sampling selection occurred as part of the compulsory 100 hours of community service hours that had to be completed as part of the qualifying criteria for therapeutic reflexology studies.

The researcher made use of a personal network and invited appropriate participants, but also designed a therapeutic reflexology Facebook page (www.facebook.com/christoscheepers.co.za) and website (www.christoscheepers.co.za) from where interested parties contacted the researcher for therapeutic reflexology sessions and from that pool of patients, appropriate participants were also selected. The interest was overwhelming and the study exceeded the minimum 100 community service hours.

9.6.3 Sample Size

The sample size for this study was 16 participants with diagnosed High Cholesterol and with a family history of High Cholesterol. However, four participants were excluded from the study (see section 14), leaving a total sample size of 12 participants.

9.7 Pilot Study

A pilot study is a mini-study during which data is collected with a smaller number of participants in a similar manner than during the actual data collection period in order to test the effectiveness of the data collection approach (Dawson, 2010:98).

A pilot study was conducted with one participant for one session which made the researcher comfortable with the process and procedures to follow, but no significant problems were identified and no changes were made to the data collection procedures.

9.8 Data Collection

9.8.1 Data Collection Method

There are various qualitative data collection methods that can be used like interviews, focus groups, observations and case studies (Adams & Brace, 2008:39-43).

As this study uses a case study strategy, a triangulation data collection method approach was used by making use of different methods of data collection (Robson, 2002:178), namely:

- Clinical Action Research;
- Interviews; and
- Observations.

9.8.1.1 Clinical Action Research

Action research is research facilitating change while there is close cooperation between the researcher and the participants (Saunders *et al.*, 2009:587).

In this study clinical action research was used in that the researcher, as final-year therapeutic reflexology student at IARAMT, performed therapeutic reflexology sessions on the participants and was therefore directly involved with the ongoing research process.

The intention was to perform 100 sessions of one hour in duration each, divided into 10 sessions for 10 patients, and to record all sessions on standard case study templates (see section 9.8.2) that formed part of the community service hours completed during the final year of IARAMT studies. Depending on availability of patients, the criteria for this clinic action research was therefore adjusted as per IARAMT requirements stating that in order to be included in this study, each patient had to commit for a minimum of four sessions up to a maximum of 10 sessions.

9.8.1.2 Interviews

There are various types of interviews that can be used, but the most common for use in social research, are:

- Structured interviews where a set of questions are prepared and only those questions are asked to the participants;
- Semi-structured interviews where a set of questions are prepared, but the researcher has the flexibility to ask any additional questions to a participant that may not necessarily be asked to the other participants; and
- Unstructured interviews where there are no prepared questions to ask the participants and it is a very informal type of interview (Dawson, 2010:27; Saunders *et al.*, 2009:320-321).

This study was a clinical study, and not a social research study, based on performing therapeutic reflexology sessions to patients and unstructured interviews were deemed appropriate for the purpose of therapeutic consultations where patients could be asked unprepared questions in order to obtain a thorough medical history and to clarify any uncertainty in the information provided.

9.8.1.3 Observations

Observation is the systematic inspection of a phenomenon and the consequent recording, description, analysis and interpretation (Saunders *et al.*, 2009:596). This was applied on the therapeutic reflexology consultations as observing any physical signs on the patient's feet, hands and face along with any associated emotions, conditions and complications along the meridians.

9.8.1.4 Summary

Data collection for this study occurred through clinical action research by performing therapeutic reflexology sessions on patients and during the therapeutic consultation preceding the therapy, additional information was added through unstructured interview questions to complete a thorough medical history and followed during the therapy by observing the feet, hands, face, meridians and any associated conditions and complications.

9.8.2 The Research Instrument Forms

Standard case study templates, known as the TCM forms, were used to document all relevant information in order to ensure uniformity; these TCM forms consisted of:

- TCM 1 - Complaints related to the MERIDIANS;
- TCM 2 - Visual assessments of the TOES AND FINGERS related to the MERIDIANS;
- TCM 3 - Observations related to the FIVE ELEMENTS (psychological behavioural patterns);
- TCM 4 - Visual assessments of the FACE related to the organ(s) in stress; and
- TCM 5 – Visual assessments of the FEET related tot he organ(s) in stress.

9.8.3 Data Collection Administration

Data collection occurred in one of three settings, namely:

- The researcher's premises in Bellville, Western Cape, where therapy sessions where performed on a professional massage bed;
- One client's premises in Vredekloof, Western Cape, where therapy sessions where performed on a professional and portable massage bed;
- One client's premises in Durbanville, Western Cape, where therapy sessions where performed Japanese style on a couch; and
- One client's premises in Alexandria, Eastern Cape, where therapy sessions where performed on a reclining chair with attached foot rest.

The procedure was to make an appointment with a patient a week in advance. On arrival of the first session, patients completed the necessary indemnity forms and a therapy consultation session followed in order to obtain a thorough medical history and profile. That was followed by observation of the patient's feet, hands and face and photo's where taken thereof for record purposes. Thereafter a therapeutic reflexology session was performed using a full IARAMT sequence of both therapeutic reflexology as well as meridian therapy and any sensitivity or physical signs on the reflexes on the feet were observed. Follow-up sessions followed a similar pattern, excluding a full therapy consultation, but during those times the patient's feedback on the previous session was obtained along with any feedback on what was experienced physically, emotionally and even spiritually and whether any present conditions where affected in any way.

The total number of patients and therapy sessions performed is demonstrated in Table 8.

Table 8: Number of therapy sessions

Patient Number	Patient Gender	Patient Age	Number of Sessions
1	Female	**40**	10
2	Female	**37**	10
3	Female	**44**	10
4	Female	**32**	10
5	Female	**41**	10
6	Female	**72**	10
7	Female	**37**	10
8	Female	**12**	10
9	Female	**9**	10
10	Female	**32**	10
11	Female	**45**	4
12	Female	**63**	4
13	Female	53	1 (excluded from study)
14	Female	53	1 (excluded from study)
15	Female	53	1 (excluded from study)
16	Female	52	1 (excluded from study)
17	Female	35	1 (Pilot Study)
Average Age		**39**	**112 – 4 (exclusions) =**
Total Sessions			**108 + 1 Pilot Study**

9.9 Data Analysis
The collected data had to be interpreted and since Saunders *et al.* (2009:490) declare that there is no standard procedure in qualitative data analysis, the approach was used to manually analyse the collected data using Excel software in order to view the quantitative aspects of what was observed during the data collection process.

10. TRUSTWORTHINESS
In qualitative research the concepts of validity and reliability are replaced by the concept of trustworthiness (DeVault, 2017; Olivia, 2017; Shenton, 2004:63).

Trustworthiness consists of:
- Confirmability;
- Credibility;
- Dependability; and
- Transferability (DeVault, 2017; Olivia, 2017; Shenton, 2004:64).

10.1 Confirmability
Confirmability gives an indication of neutrality or objectivity of the research findings (Olivia, 2017; Shenton, 2004:74).

In qualitative research there is a certain degree of subjectivity involved due to the researcher forming an integral part of the actual research process, but to ensure Confirmability as far as possible in this study, standard case study templates (compare section 9.8.2) were used to record all findings on.

10.2 Credibility
Credibility gives an indication of how accurate and true the research findings are (Olivia, 2017) and contributes to trustworthiness of a study (DeVault, 2017; Olivia, 2017).

This study ensured credibility due to the following steps that were in place:
- Constant contact with the participants (patients) for consecutive four to 10 sessions;
- Continuous observations during each session; and
- Triangulation by using a combination of three different data collection methods.

10.3 Dependability
Dependability gives an indication of the repeatability of the research by other researchers resulting in similar findings (Olivia, 2017).

In this study dependability was ensured by writing up the research design and methodology in detail in order to make it repeatable by other researchers in the future.

10.4 Transferability
Transferability gives an indication of the Generalisability of the study and how findings can be applied to different settings which is usually a challenge in qualitative research due to qualitative data collection being affected by the setting in which the data is collected as it affects the interpretation (DeVault, 2017).

In this study transferability has been ensured by using a purposive sampling method where participants were selected based on individual criteria that ensured they had diagnosed High Cholesterol and also had a relating family history.

10.5 Summary
The trustworthiness of this study has consequently been ensured.

11. LIMITATIONS OF THE STUDY

Two limitations were identified in this study, namely:

- One limitation to this study can be identified in the fact that two children were included in this study and their cholesterol levels are not as high as those of the adult participants, but according to the diagnostic standards for children according to Goldberg (2015), they are classified as having High Cholesterol. These children were specifically selected as part of the sample in order to obtain a balanced view of High Cholesterol in different age groups, spanning from childhood to old age. The significance of these specific two children was in the fact that they are from a family history line of extremely high hereditary cholesterol and accompanying cardiovascular disease spanning generations.
- Another limitation to this study is that only female participants were used due to very few males in the researcher's network having been diagnosed with High Cholesterol or they were unavailable to commit themselves for four to 10 session.

12. ELIMINATION OF BIAS

Bias in this study rests in the researcher being the therapist, because identification of physical signs and responses of reflexes on the feet were based on his observational and therapeutic skills.

Elimination of bias in this study was ensured in that the researcher used the standard case study templates to ensure uniformity in what was expected in each session and observational and therapeutic skills remained similar for all participants and during all sessions as the IARAMT therapeutic reflexology and meridian therapy skills and sequence were implemented to eliminate any bias while ensuring each participant received similar therapeutic sessions.

13. ETHICAL CONSIDERATIONS

Ethical considerations in research ensures the researcher's conduct is appropriate and does not interfere with the rights of the participants (Saunders *et al.*, 2009:600). Various ethical considerations were put in place in this study.

13.1 Ensuring participants consented

Informed consent had to be obtained from each participant to ensure they participated in the study voluntarily and understood all expectations and requirements (Saunders *et al.*, 2009:593).

In this study participants were provided with all the necessary information regarding therapeutic reflexology and what it is, possible benefits, possible after-effects and exactly what it is and what it is not prior to commencement of any therapy sessions. On the first consultation the participant was given an opportunity to ask questions and after they were satisfied with the answers provided, they signed the IARAMT standard consent form to provide informed consent to participate in the study.

13.2 Ensuring participants were not harmed

Ethically participants should not be harmed physically or psychologically during research (Goddard & Melville, 2001:49; Welman *et al.*, 2005:201). This study is part of the CAM industry and subsequently it was intended to benefit participants and not to harm them in any way, as is the motto in the healthcare industry: First do no harm! To ensure no harm came to participants, their progress and after-effects experienced were monitored by constantly making contact with all participants the day following any session in order to be aware of what they were experiencing and to provide guidance where possible.

13.3 Ensuring anonymity

Anonymity was ensured in this study by not mentioning the names of the participants or any information that may be used to make their identities known (Saunders *et al.*, 2009:587).

13.4 Ensuring confidentiality
Confidentiality was ensured in this study in that all information provided and all documents completed were kept private as is the case with all medical records (Saunders *et al.*, 2009:588).

13.5 Ensuring professionalism
Therapeutic reflexology is a profession regulated by the Allied Health Professions Council of South Africa (AHPCSA) and should at all times be performed professionally. Professionalism in this study was ensured in that the researcher fully complied with the AHPCSA's prescribed code of ethics.

14. EXCLUSIONS
The IARAMT requirement for inclusion in this study states the following: "In order to include these in the total number of required treatments, *a minimum of 4 (four) treatments must be completed per patient*."

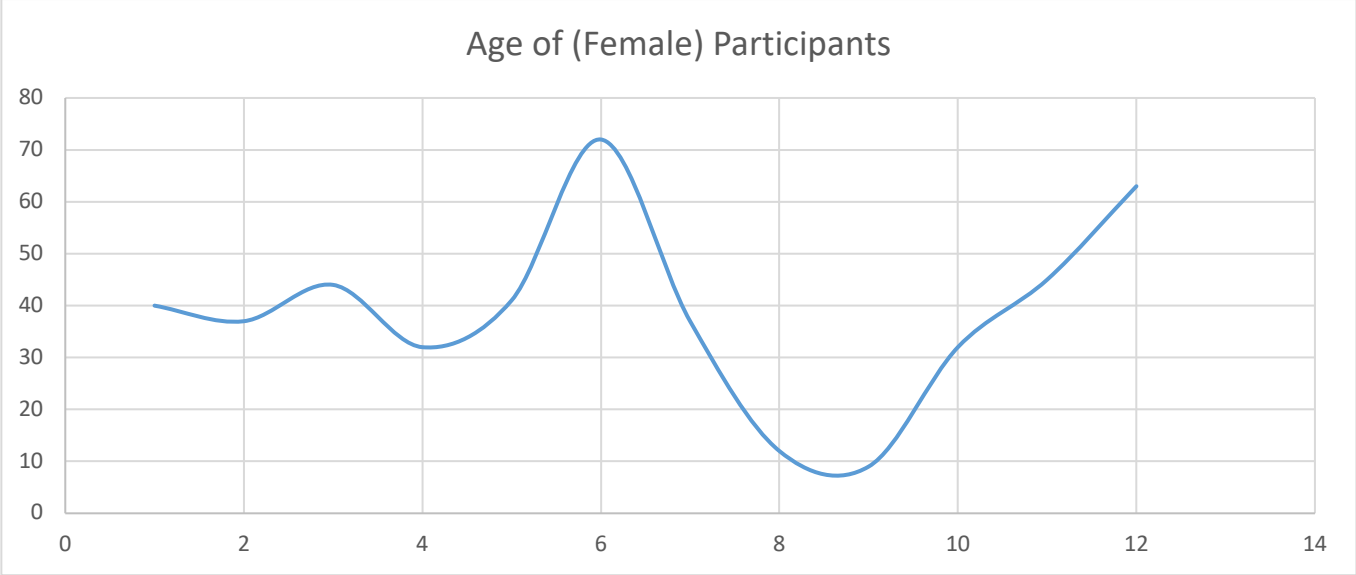
Four patients consulted the researcher for therapeutic reflexology sessions towards the end of the time span for this study and each received one session only before the study had to be concluded. These four patients were excluded from this study due to not complying to the minimum IARAMT requirements for the study as.

15. FINDINGS, RESULTS AND INTERPRETATION
15.1 Introduction
In this section the findings from the research study will be presented and interpreted by making use of the standard TCM templates which includes the following:

- TCM 1 – The Meridians;
- TCM 2 – Visual Assessments: Toes and Fingers;
- TCM 3 – The Five Elements;
- TCM 4 – Visual Assessments: The Face; and
- TCM 5: - Visual Assessments: Feet.

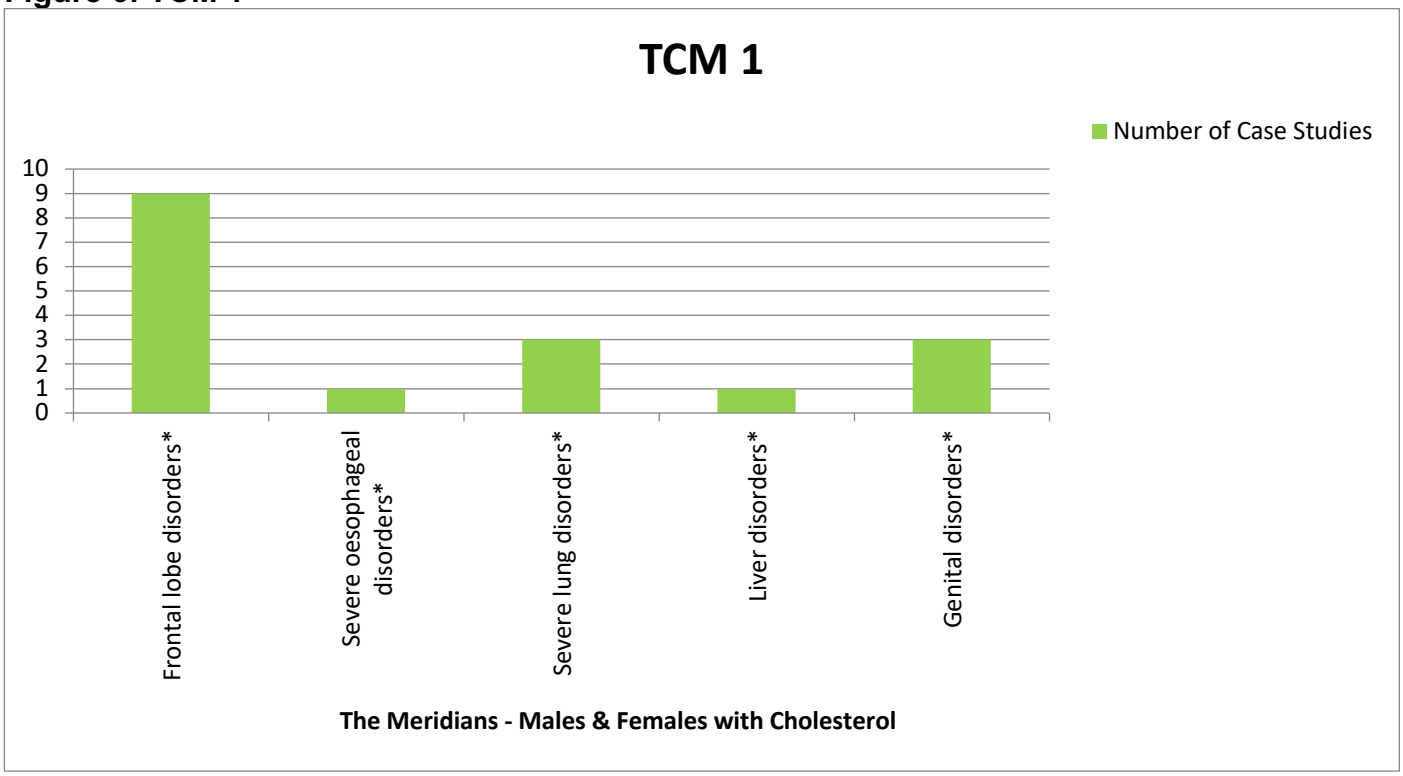
15.2 Response Rate
A 100 percent response rate was achieved and the results are based on 108 therapeutic reflexology sessions with 12 female patients (10 sessions each with 10 different participants plus four sessions each with 2 participants) from the age range of nine to 72 as demonstrated in figure 5.

Figure 5: Response Participants



15.3 Presentation of findings
15.3.1 TCM 1

Figure 6: TCM 1



Notes:

Frontal lobe disorders:

- No patients present with Alzheimer's;
- No patients present with Epilepsy;
- 1 Patient experienced Memory Loss;
- 4 Patients suffered with Depression;
- 4 Patients experienced Mood Swings;
- 8 Patients experienced Irritability;
- 1 Patient suffered with Attention Deficit Hyperactivity Disorder (ADHD);
- No patients present with Pituitary Gland Disorders; and
- No patients present with Hypothalamus Malfunction.

Severe oesophageal disorders:

- 1 Patient suffered with Dysphagia (difficulty in swallowing);
- No patients present with Thyroid disorders (leading to metabolism dysfunction); and
- No patients present with Globus Sensation (lump in throat).

Severe lung disorders:

- 1 Patient suffered with Emphysema;
- No patients present with Tuberculosis (TB);
- 2 Patients suffered with Pneumonia; and
- No patients present with Pleurisy.

Liver disorders:

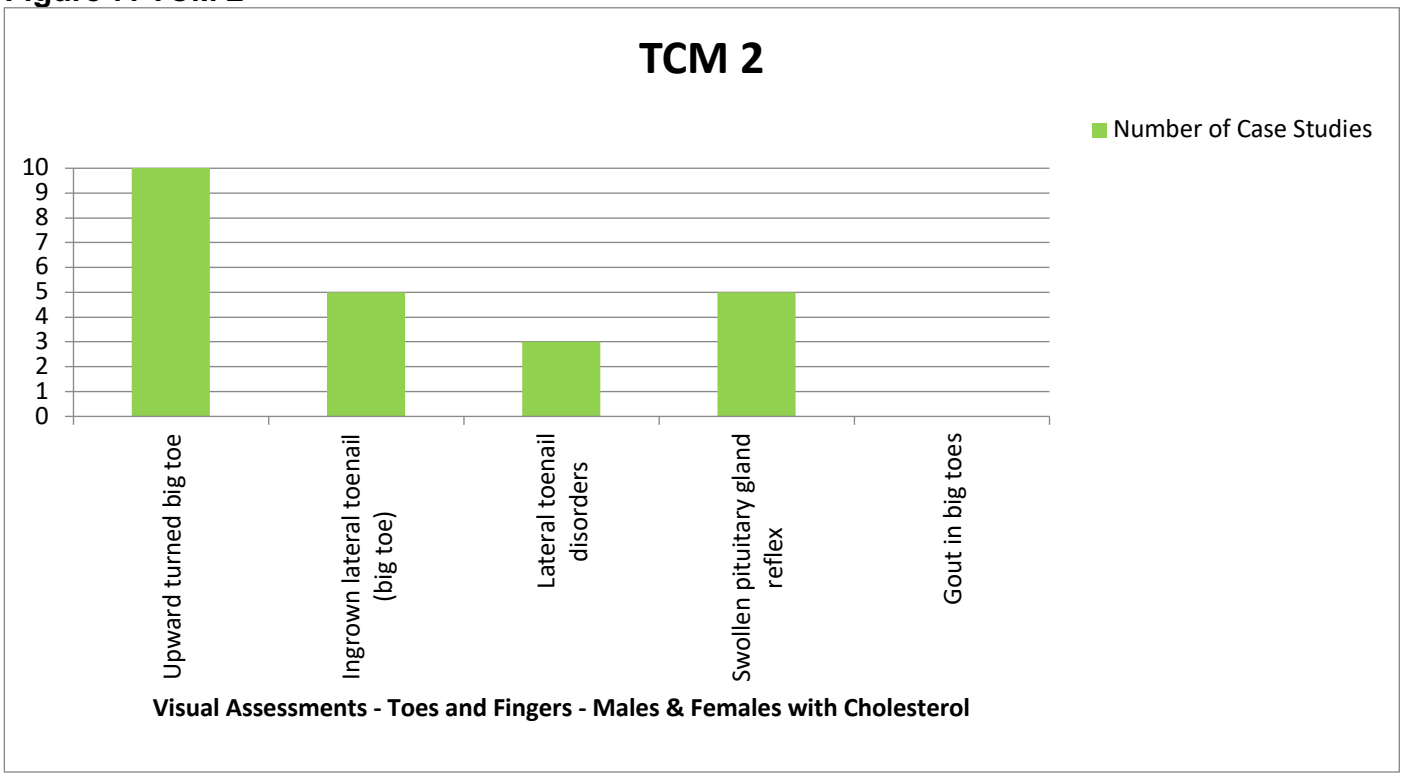
- 1 Patient suffered with Jaundice; and
- 1 Patient suffered with Hepatitis.

Genital disorders:

- No patients present with Genital Herpes or Warts;
- No patients present with Vaginal Yeast Infections (Candidiasis);
- No patients present with Sperm Disorders;
- 2 Patients experienced Low Libido;
- No patients present with Sexual Dysfunction; and
- 2 Patients suffered with Cervical Cancer.

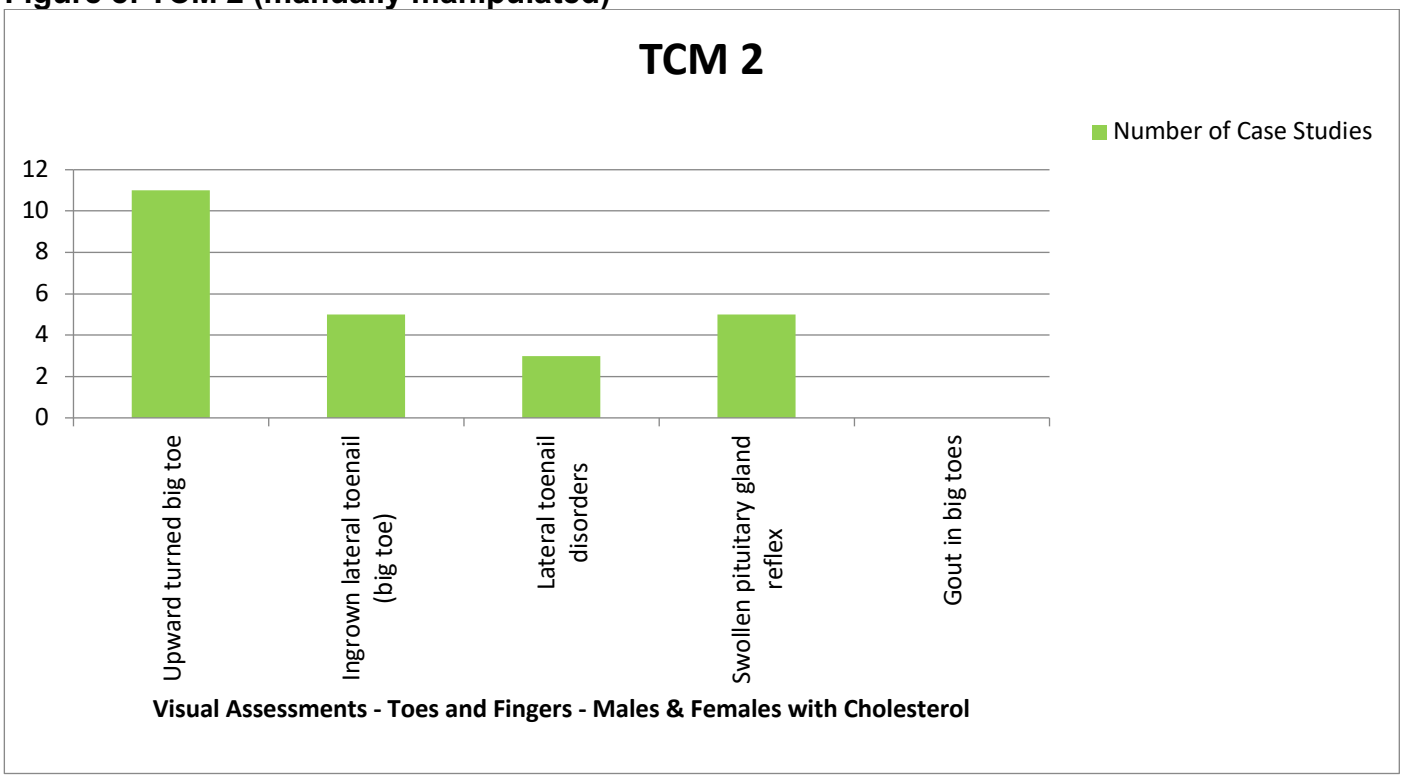
15.3.2 TCM 2

Figure 7: TCM 2



Notes:
This standard template graph only allows for a maximum of 10 patients and does not allow for additional patients, but it should be noted that the visual assessment of the upward turned big toe is in actual fact for 11 patients and not for 10 as indicated on this graph.

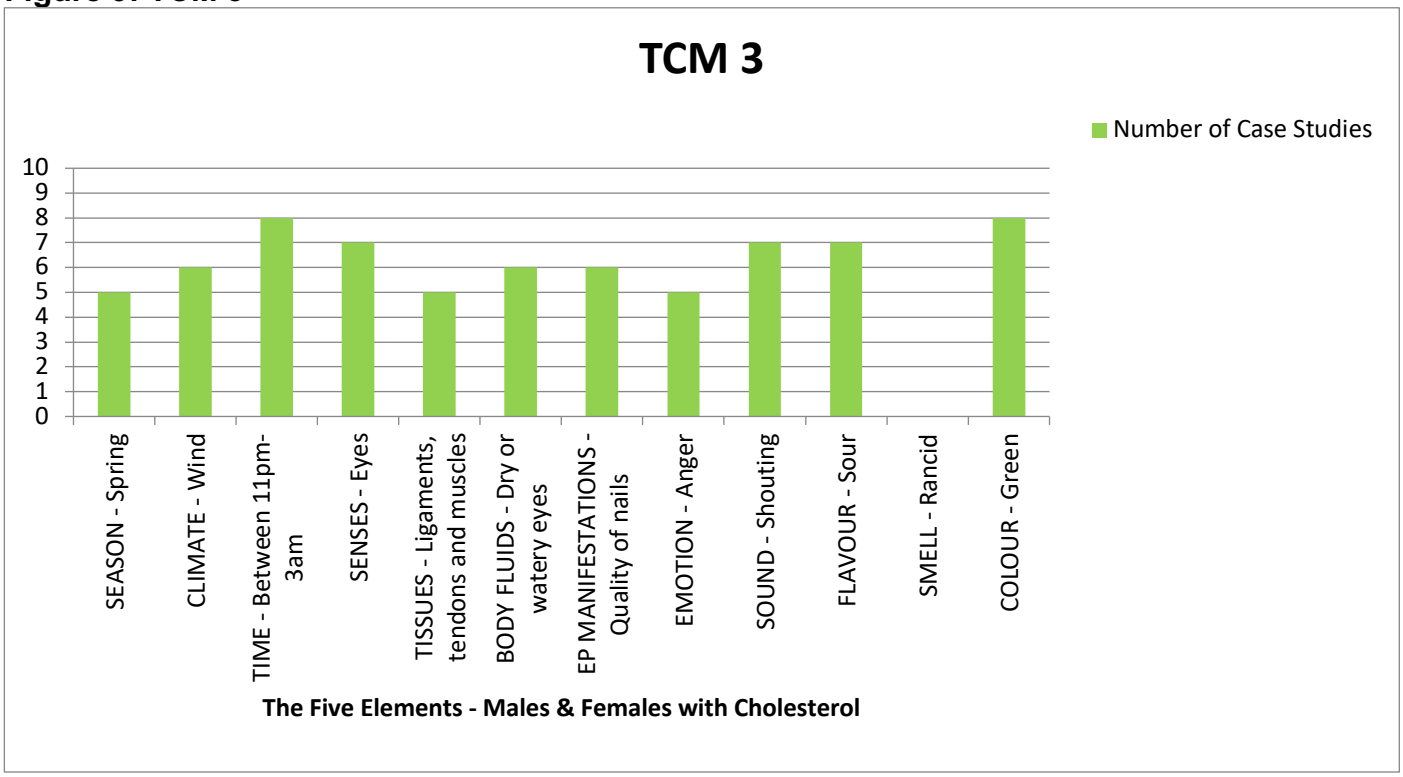
Figure 8: TCM 2 (manually manipulated)



Notes:
The standard TCM 2 template graph was manually manipulated to show up to 12 patients (as the standard graph only made provision for a maximum of 10 patients) in order to indicate that the visual assessment of the upward turned big toe was in actual fact observed in 11 patients.

15.3.3 TCM 3

Figure 9: TCM 3



Notes:

Season:

- 5 Patients indicated that their major presenting complaints were worse during spring season; these included chronic fatigue, conjunctivitis, dry eyes, endometriosis, heart palpitations, hip pain, hypertension, Irritable Bowel Syndrome (IBS), migraines, sinusitis, tightness in chest and others.

Climate:

- 6 Patients suffered more from their presenting complaints when the climate is windy and also indicated that they do not like the wind.

Time:

- 8 Patients struggled with insomnia during the time period 23:00 to 03:00.

Sense Organ Eyes:

- 7 Patients wore spectacles or contact lenses.

Tissues: Ligaments, Tendons and Muscles:

- 5 Patients experienced ligament, tendon and/or muscle pain and weakness; and
- 3 Patients experienced regular tension headaches.

Body Fluids:

- 6 Patients experienced dry or watery eyes; in all instances they experienced watery eyes at times, but dry eyes at other times (especially during the season of spring and during windy climates) when they use regular eye drops.

External Physical Manifestations:

- 6 Patients suffered from bad quality nails on their hands and/or feet; it was observed in single and also in multiple finger or toe nails.

Emotion:

- 5 Patients experienced anger with accompanying agitation, frustration and irritability.

Sound:

- 7 Patients had a high pitched (shouting) voice when talking.

Flavour:

- 7 Patients indicated that sour flavours had an influence on them; 4 Patients love sour flavours while 3 Patients disliked it and avoided it.

Smell:

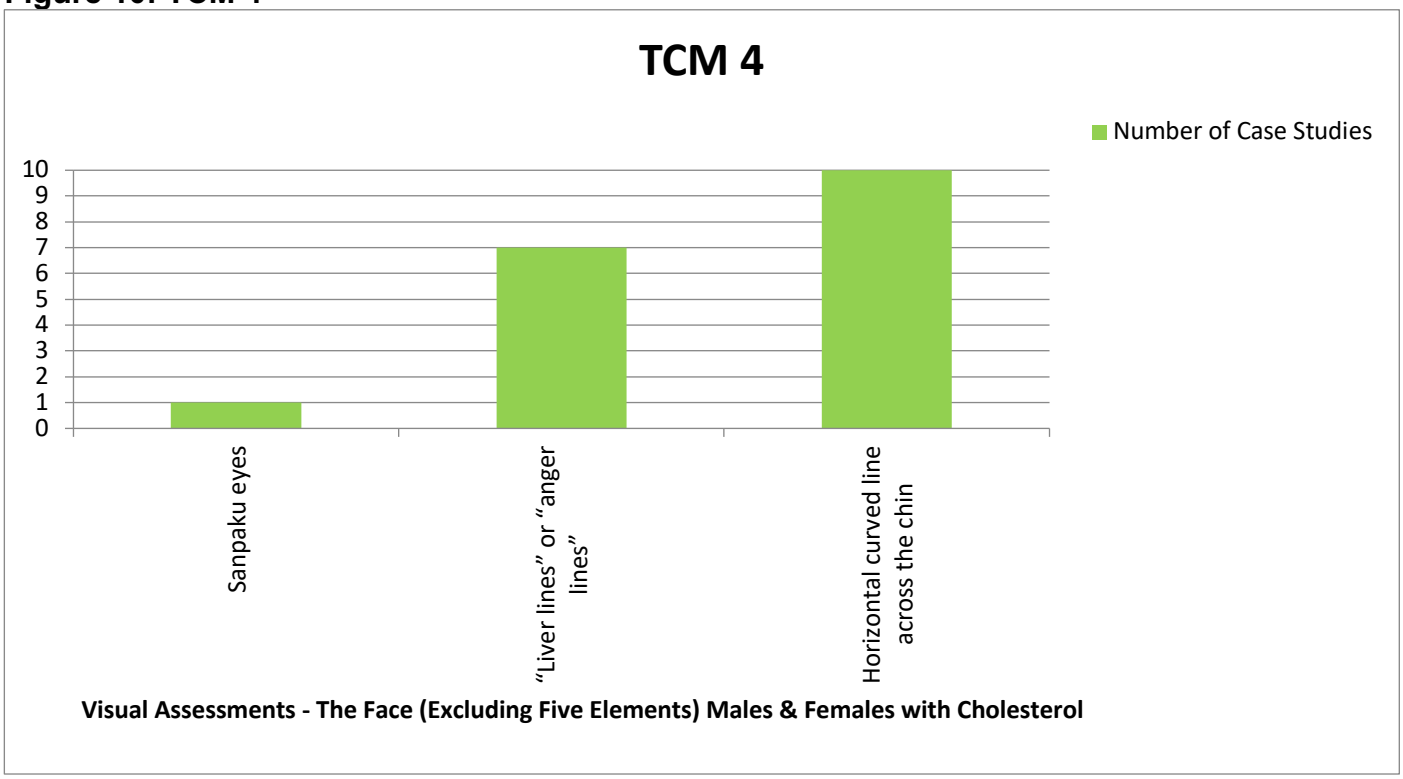
- No patients experienced any unpleasant smells and no patients were observed with any unpleasant odour on their person or body parts.

Colour:

- 8 Patients are affected by the colour green; 5 Patients like green, wear it often and even use it to decorate their homes while 3 Patients dislike green and avoid it.

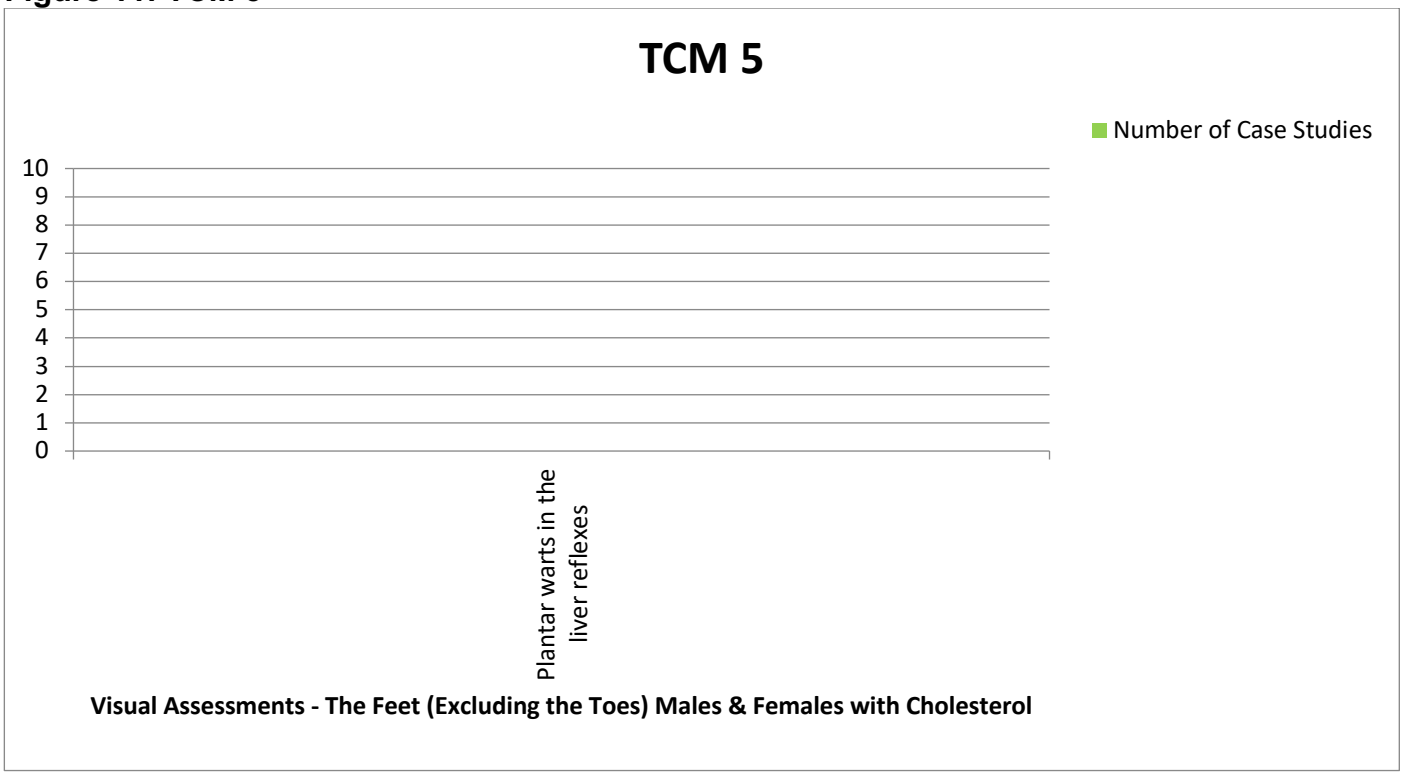
15.3.4 TCM 4

Figure 10: TCM 4



15.3.5 TCM 5

Figure 11: TCM 5



Notes:

Plantar warts in the liver reflexes:

- No Patients presented with plantar warts in the liver reflexes.

15.4 Interpretation and discussion
From the presented findings, the following can be deduced.

15.4.1 TCM 1: The Meridians
15.4.1.1 Frontal lobe disorders
Conditions patients experienced were mapped on the TCM 1 template and it was observed that 9 patients (75%) suffered from frontal lobe disorders which is a significant number and should be noted. The frontal lobe disorders these patients experienced, included the following:

- ADHD by 1 patient (8.33%);
- Depression by 4 patients (33.33%);
- Irritability by 8 patients (66.67%);
- Memory loss by 1 patient (8.33%); and
- Mood Swings by 4 patients (33.33%).

Two thirds of patients experienced irritability while a third experienced depression and a third experienced mood swings. This is a significant number of people that experienced these conditions which are along the liver meridian and it should be noted that in all probability based on this study that people struggling with High Cholesterol have an increased chance to also experience irritability, depression and memory loss.

15.4.1.2 Severe oesophageal disorders
Only 1 patient (8.33%) had an oesophageal disorder in the form of dysphagia (difficulty in swallowing). This is noted as a possibility, but based on the number of patients that experienced it, it should be noted that it is not seen as a regular condition associated with High Cholesterol.

15.4.1.3 Severe lung disorders
Three patients (25%) which is a quarter of the sample experienced severe lung conditions where one patient (8.33%) had emphysema and two patients (16.67%) had pneumonia.

15.4.1.4 Liver disorders
One patient (8.33%) experienced liver disorders which included two different conditions; jaundice and hepatitis. This patient had been living with High Cholesterol for a number of years.

15.4.1.5 Genital disorders
Four patient (33.33%) which is a third of the sample experienced genital disorders; two had low libido while two suffered with cervical cancer. No patients indicated that they experienced genital herpes, genital warts, vaginal yeast infections (candidiasis) or sexual dysfunction, but this is dependent on how truthful the patients were in their answering of these questions and whether they did not perhaps feel embarrassed and thus not revealed it, but even if that is the case, the fact that a third of patients experienced genital disorders is enough to take note of.

15.4.1.6 Summary of the meridians
High Cholesterol is associated with the liver meridian and this study found that a significant number experienced frontal lobe disorders while some also experienced lung disorders, genital disorders and a few experienced oesophageal disorders and liver disorders.

It can thus be concluded that there are certain conditions and complications along the liver meridian in patients with High Cholesterol.

An interesting finding from the study was that people with High Cholesterol also experienced various conditions that can be mapped on the gallbladder meridian, namely:

- 3 Patients (25%) experienced migraines;
- 3 Patients (25%) experienced tension headaches;
- 2 Patients (16.67%) experienced temple headaches;

- 5 Patients (41.67%) experienced neck and shoulder tension;
- 2 Patients (16.67%) experienced hormone (oestrogen and progesterone) level problems;
- 2 Patients (16.67%) experienced tightness in chest; and
- 2 Patients (16.67%) experienced eye disorders.

The gallbladder meridian is the supporting meridian of the liver meridian (Dougans, 2005:155; Fusionhealth, 2017; Tierra, 2017) and from the study it seems that even though High Cholesterol is a condition mapped on the liver meridian with many conditions and complications on the same meridian, there are also a considerable number of the patients who experienced conditions and complications along the supporting gallbladder meridian.

Three patients (25%) had surgery before that can be mapped on the liver meridian which included hysterectomy (2 patients; 16.67%) and knee surgery (1 patient; 8.33%). Five patients (41.67%) had surgeries that can be mapped on the supporting gallbladder meridian which included eye surgery (2 patients; 16.67%), shoulder surgery (1 patient; 8.33%) and gallbladder removal surgery (2 patients; 16.67%).

From the study it is evident that complications and conditions can be mapped along the liver meridian in people with High Cholesterol, but conditions and complications may also be listed on the supporting gallbladder meridian.

The limitation to this aspect of the study is that it was solely dependent on how truthful the patients were in completing the case study documentation and answering the presenting questions. There is no reason to believe that they were not truthful, but if they felt embarrassed about a condition they may have concealed it and the patients who did not perceive the researcher (therapeutic reflexology student) to be in the healthcare profession, but rather in the beauty industry, may not have seen the need to be truthful about conditions like genital disorders. This being said, based on the available information received from the patients, it could be concluded that conditions and complications can be mapped on the liver and supporting gallbladder meridian in people with High Cholesterol.

15.4.2 TCM 2: Visual Assessments of the toes and fingers

The visual assessments of the toes and fingers were based on the observations and perception of the researcher, but since all the patients received sessions from him, his method of observation remained the same throughout the sessions.

15.4.2.1 Upward turned big toe

11 Patients (91.67%) had an upward turned big toe that was very evident during observation. One patient (participant 11) (8.33%) did not have an upward turned big toe, but it was immediately observed that her big toe was downward turned. All 12 patients (100%) thus had an observable turned big toe. It could not be established why one patient's big toe was turned downward and not upward, but two speculations could me made as possible explanations.

Firstly, that specific patient had a spastic colon which is mapped on the spleen/pancreas meridian and since the spleen/pancreas meridian begins on the medial aspect of the big toe according to Dougans (2005:100), it stands to reason that this may have an effect on the position of the big toe.

Secondly, that specific patient experienced regular cramps in the calf muscles (mapped on the bladder meridian). Snell (2007:500-505) states that the calf muscles (Gastrocnemius and Soleus) are responsible for plantar flexion which is a movement in which the foot is pointing downward and when the foot goes into that position it is normal for the anterior muscles that affects the big toe's movement (Extensor Hallucis Longus and Extensor Digitorum Brevis) to be affected and the big toe may move downward in a plantar flexion motion.

This is pure speculation, but may provide a possible explanation for why the big toe of the one patient is turned downward instead of upward.

15.4.2.2 Ingrown lateral toenail

Five patients (41.67%) had an ingrown toenail on the lateral side of the big toe which is the side on the big toe where the liver meridian begins (Dougans, 2005:155). This is almost half of the participants and it is seen as a significant observation.

15.4.2.3 Lateral toenail disorders

Three patients (25%) presented with a lateral toenail disorder on the big toe; one patient (8.33%) had a fungal toenail which affected the lateral side of the nail as well; one patient (8.33%) had a hardened big toe nail which was hard on the lateral side of the nail as well and one patient (8.33%) had ridges on the big toenail which spanned across the lateral side of the nail as well. This is a significant observation as a quarter of participants presented with lateral toenail disorders.

15.4.2.4 Swollen pituitary gland reflex

Five patients (41.67%) had a swollen pituitary gland reflex on the big toe which is a significant number of participants that presented with this observation.

15.4.2.5 Other observations

No patients experienced gout in their big toes.

An interesting observation was that patients presented with other forms of observations on their big toes that were not listed on the standard TCM 2 template, namely:

- One patient (8.33%) presented with a wart on the lateral side of the big toe in-between the big and the second toe lateral to the mastoid reflex; and
- One patient (8.33%) presented with a knife-edge callous on the plantar aspect of the big toe which crossed the pituitary gland reflex.

It was furthermore observed that 10 patients (83.33%) presented with signs on their fourth toe which represents the end of the gallbladder meridian (Dougans, 2005:152) which included:

- 2 Patients (16.67%) had a bent fourth toe;
- 3 Patients (25%) had a curved fourth toe;
- 1 Patient (8.33%) had a hammertoe on the fourth toe;
- 1 Patient (8.33%) had a fungal nail on the fourth toe; and
- 2 Patients (16.67%) had a knife edge callous on the fourth toe.

15.4.2.6 Summary of visual assessments of the toes and fingers

From this study it can be deduced that there are definitely observations to be made on the toes in patients with High Cholesterol and it seems like most of them have an upward bent big toe, many have ingrown lateral big toe nails and swollen pituitary gland reflexes while some have lateral big toenail disorders. It can also be said that other observations on the big toe is possible while the majority of participants (83.33%) also presented with observable signs on the fourth toe in which the gallbladder meridian ends.

15.4.3 TCM 3: The Five Elements

From the standard TCM 3 template it was significant to find that many patients with High Cholesterol also present with an imbalance in the wood element.

15.4.3.1 Season: Spring

5 Patients (41.67%) mentioned that their major presenting complaints seemed worse during the spring season and these conditions included chronic fatigue, conjunctivitis, dry eyes, endometriosis, heart palpitations, hip pain, hypertension, IBS, migraines, sinusitis and tightness in chest.

Spring is the season associated with the wood element (Dougans, 2005:71).

15.4.3.2 Climate
6 Patients (50%) indicated that their presenting complaints worsened during windy weather and they also indicated that the wind upsets them emotionally and they do not like the wind. A windy climate is associated with the wood element (Dougans, 2005:71).

15.4.3.3 Time
8 Patients (66.67%) experienced insomnia during the evenings between 23:00 and 03:00. This time period is associated with the wood element where 23:00 to 01:00 is associated with the gallbladder and 01:00 to 03:00 with the liver (Dougans, 2005:71).

15.4.3.4 Sense Organ: Eyes
7 Patients (58.33%) experienced vision related problems and were wearing spectacles or contact lenses. The eyes, especially the sense of sight, is associated with the wood element (Dougans, 2005:71).

15.4.3.5 Tissues: Ligaments, Tendons and Muscles
5 Patients (41.67%) experienced ligament, tendon and/or muscle pain and weakness while 3 patients (25%) experienced regular tension headaches. Ligaments, tendons and muscles are the body tissue associated with the wood element (Dougans, 2005:71).

15.4.3.6 Body Fluids
6 Patients (50%) experienced dry or watery eyes. In all instances the patients had watery eyes at times, but at other times (especially during spring season and windy climates) had dry eyes and used eye drops regularly. Tears are the body fluids associated with the wood element (Dougans, 2005:71).

15.4.3.7 External Physical Manifestations
6 Patients (50%) suffered from bad quality nails on their hands and/or feet and it was observed in single as well as in multiple finger or toe nails. The nails are the external physical manifestation associated with the wood element (Dougans, 2005:71).

15.4.3.8 Emotion
5 Patients (41.67%) experienced anger with accompanying agitation, frustration and irritability. Anger is the emotion associated with the wood element (Dougans, 2005:71) and the liver organ (Suttie, n.d.).

15.4.3.9 Sound
7 Patients (58.33%) had a high pitched (shouting) voice when talking. Shouting is the sound associated with the wood element (Dougans, 2005:71).

15.4.3.10 Flavour
7 Patients (58.33%) indicated that they were affected by sour flavours; 4 patients (33.33%) loved sour flavours while 3 patients (25%) disliked sour flavours and avoided it. Sour flavours are associated with the wood element (Dougans, 2005:71).

15.4.3.11 Smell
No patients experienced any unpleasant or rancid smells and no patients were observed with any unpleasant or rancid odours on their person or body parts. This may not be entirely accurate as the researcher himself had three sinus surgeries in the past and his own sense of smell has been negatively affected as a result and this may have influenced the presence of an unpleasant smell on the patients' feet, but it is concluded that no patients presented with unpleasant smells. Rancid smells are associated with the wood element (Dougans, 2005:71).

15.4.3.12 Colour
8 Patients (66.67%) were affected by the colour green; 5 patients (41.67%) liked green and wore it often and even used it in their interior decoration, but 3 patients (25%) disliked green and avoided it. Green is the colour associated with the wood element (Dougans, 2005:71).

15.4.3.13 Summary of the five elements
It is significant that the majority of patients indicated an imbalance in the wood element and from this it is deduced that there is a definite link between people with high cholesterol and an imbalance in the wood element. Dougans (2005:66) mentions that the wood element is linked to the liver meridian and the gallbladder meridian and it represents the quality of food a person consumes.

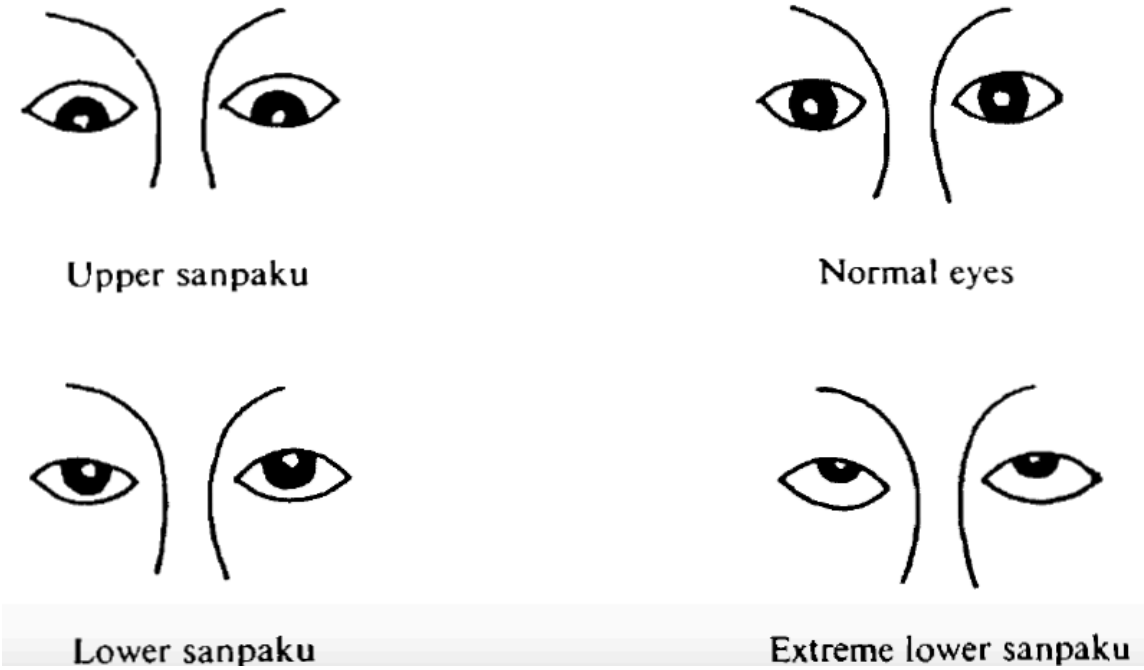
It stands to reason that since a portion of High Cholesterol is linked to a person's diet and the wood element represents quality of food, then High Cholesterol and an imbalance in the wood element will go hand-in-hand. This is confirmed in this study in that the majority of patients had an imbalance in one or more aspects of the wood element.

15.4.4 TCM 4: Visual Assessments of the face
There are various signs visible on the face, but what is relevant to High Cholesterol are Sanpaku eyes, liver lines and a horizontal curved line.

15.4.4.1 Sanpaku Eyes
1 Patient (8.33%) presented with Sanpaku Eyes and in this instance it was Lower Sanpaku Eyes.

Sanpaku is a Japanese word meaning three whites and refers to the white of the eyes (the sclera) being visible above or below the iris; when it is above it is called Upper Sanpaku Eyes and when it is below it is called Lower Sanpaku Eyes (Dougans, 2005:166-167; Griss, n.d.; Wood, 2016). Upper Sanpaku Eyes indicates an excess of meat, cheese and salt in the diet, while Lower Sanpaku Eyes indicate excess sugar, refined grains, alcohol and/or medical drugs in the diet (Mahdiyah, 2007).
This is a sign associated with High Cholesterol, but in this study only one patient presented with Sanpaku Eyes and is thus not significant enough to see this as a definite sign associated with High Cholesterol.

Figure 12: Sanpaku Eyes



(Kushi, 1998:78)

15.4.4.2 Liver Lines (Anger Lines)

7 Patients (58.33%) had definite liver lines which is a significant number as it is more than half the patients. Liver lines are two vertical lines on the forehead between the eyebrows that an be observed as seen in Figure 13.

Figure 13: Liver Lines

15.4.4.3 Horizontal curved line across the chin

10 Patients (83.33%) had a definite horizontal curved line across the chin which is very significant as this was almost all the participants. This line is seen in Figure 14.

Figure 14: Horizontal curved line across the chin

15.4.4.4 Summary of visual assessments of the face

Three distinct characteristics observed on the face are Sanpaku Eyes, Liver Lines and Horizontal curved line across the chin. From the study it can be deduced that people with High Cholesterol usually have a horizontal curved line across the chin as the majority of participants presented with this sign and they may also have liver lines as more than half the participants presented with this sign. The study was inconclusive in linking Sanpaku Eyes with High Cholesterol as only one patient presented with this sign.

15.4.5 TCM 5: Visual Assessments of the feet

The standard TCM 5 template can be confusing as it does not include any of the visual factors like arched feet or flat feet or longer toes or claw toes or pain in the ball of the feet and so on as these are all signs linked to the five elements. On the TCM 5 template only visual signs present on the liver reflex are noted and for this template only plantar warts in the liver reflex has been listed.

No patients presented with plantar warts in the liver reflex.

However, it should be noted that there were numerous other signs and symptoms observed, some being very subjective, but they can be listed as follows:

- 2 Patients (16.67%) had sensitive liver reflexes;
- 3 Patients (25%) had sore liver reflexes;
- 4 Patients (33.33%) had painful liver reflexes;
- 2 Patients (16.67%) had liver reflexes that felt hollow to the touch;
- 1 Patient (8.33%) had a liver reflex that had a spongy feeling;
- 1 Patient (8.33%) had crystals in the liver reflex that broke on stimulation of the reflex;
- 1 Patient (8.33%) had a liver reflex with a bluish colour;
- 1 Patient (8.33%) had many lines in the skin across the liver reflex (almost like folded skin);
- 1 Patient (8.33%) had dry skin over the liver reflex; and
- 2 Patients 916.67%) had deep grooves across the liver reflex.

It should further be noted that 5 Patients (41.67%) presented with puffy hip reflexes which would be mapped on the Gallbladder Meridian; one of these patients had a painful hip reflex. Furthermore, 4 Patients (33.33%) presented with a sore gallbladder reflex while one patient (8.33%) had a painful gallbladder reflex.

From the TCM 5 template this study could not link plantar warts on the liver reflex with High Cholesterol, but it could present some interesting observations on the liver and gallbladder reflexes.

16. CONCLUSION AND RECOMMENDATIONS

16.1 Findings from the study

This study aimed to list associated conditions and complications among people with diagnosed cholesterol and included secondary data collection through a literature review and primary data collection through qualitative research presenting all findings on the standard TCM 1-5 templates.

16.1.1 Findings from the literature review

The literature that was reviewed indicated the parameters of High Cholesterol within the medical industry as well as in the CAM industry. It was seen that High Cholesterol is diagnosed when the total cholesterol is higher than 5 mmol/L and the LDL is higher than 3 mmol/L, but in children when LDL is higher than 2.8 mmol/L then dietary adjustments become necessary and when higher than 4.9 mmol/L in children then drug therapy becomes necessary. It was seen that in TCM High Cholesterol is associated with the Liver Meridian and the supporting Gallbladder Meridian as well as with the Wood Element within the Five Elements Theory.

The literature viewed the controversy about cholesterol and the use of Statin medication and it was seen that Statins should be used for short periods of time in patients with cardiovascular disease instead of using it to lower cholesterol in patients without cardiovascular conditions. Numerous natural alternatives were mentioned in an attempt to prevent High Cholesterol which ranged from spices to herbs to supplements to tissue salts to diet with low or no saturated fats to lifestyle that is not sedentary to getting enough sunlight to ensure optimum vitamin D production. Literature stated that High Cholesterol is mostly due to hereditary factors and only 15 to 25% of High Cholesterol is diet and lifestyle related.

The literature review had a look at available studies on reflexology and high cholesterol, but only one such study could be sourced although numerous other studies on hypertension were found which secondary had a look at the effects of reflexology on cholesterol.

The studies presented in the literature review could not prove that reflexology lowers High Cholesterol, but it did find that it improves quality of life and improved certain associated symptoms.

16.1.2 Findings from the primary research

The primary research conducted indicated that there are associated conditions and complications among people with high cholesterol that can be listed on:

- The meridians (as seen in TCM 1);
- The toes (as seen in TCM 2);
- The wood element of the five elements (as seen in TCM 3);
- The face (as seen in TCM 4); but
- No plantar warts were observed on the liver reflex (as seen in TCM 5) although certain subjective factors regarding sensitivity indicated by the patient and appreciations observed by the researcher could be noted.

From the primary research findings, it became clear the people with High Cholesterol had associated conditions and complications that can be listed and therefore the aim of the study has been achieved.

16.2 Conclusion: Objectives

16.2.1 Objective 1

The first research objective of the study was to provide evidence of the link between typical conditions and complications associated with cholesterol and those along the Liver Meridian. This objective has been achieved.

16.2.2 Objective 2

- The second research objective of the study was to provide evidence of the link between typical behavioural patterns associated with patients suffering from cholesterol and those associated with the Wood Element. This objective has been achieved.

16.3 Conclusion: Hypothesis

The hypothesis of the study alluded to the fact that people with cholesterol will typically suffer from conditions and complications along the liver meridian and that the liver meridian is linked to the wood element and therefore any patients with cholesterol will express behavioural patterns associated with an imbalance of this element. The hypothesis has been proven within the limitations of the study.

16.4 Recommendations

Optimal vitamin D levels through exposure to sunlight is recommended in lowering cholesterol. Some studies indicate this is unproven, but it will be beneficial for patients in any case to exercise and reduce stress and if it is possible to do so within sunlight, it may also increase vitamin D levels.

It is recommended that patients take responsibility for their own health and not allow the medical profession to take over all decisions with regards to High Cholesterol. Patients have to realise they are ultimately responsible for their own health and wellbeing and should consume a healthy and balanced diet and follow it up with the correct lifestyle and added supplements.

With High Cholesterol prevention is better than cure and therefore it should be prevented with a healthy lifestyle.

17. RECOMMENDATIONS FOR FURTHER RESEARCH

Further research is recommended in order to determine whether therapeutic reflexology has a direct influence on lowering cholesterol and in this sense, laboratory blood tests will be necessary to determine whether therapeutic reflexology lowers total cholesterol, lowers LDL, lowers triglycerides and increases HDL.

It will also be beneficial to conduct further research in determining the effect of therapeutic reflexology on High Cholesterol by making use of a clinical study with a control group in place.

18. CONCLUSION

A qualitative study was embarked upon as part of the requirements in order to qualify with a Diploma in Therapeutic Reflexology and Meridian Therapy with the IARAMT. During the Block 3 practical case studies a minimum of 100 therapeutic reflexology sessions had to be done and as part of the research study on High Cholesterol these patients had to be diagnosed accordingly.

A total of 12 patients were used in this study for a total of 108 sessions (10 patients were given 10 treatments each and two patients were given four treatments each).

From the literature review it became evident that it could not be proved with statistical significance that reflexology affects blood cholesterol levels. This finding was proven with this study in that certain patients had lower cholesterol levels, but others had increased cholesterol levels after treatment while others had no change in cholesterol levels.

The aim of this study was not to prove that therapeutic reflexology lowers cholesterol levels, but to list associated conditions and complications among people with diagnosed cholesterol. This aim has been achieved and it could be proven with significant numbers that people with High Cholesterol have associated conditions and complications along the liver meridian (and the supporting gallbladder meridian) and that it is accompanied by behavioural patterns associated with an imbalance in the wood element.

What was interesting to note within this study, was the fact that although it could not be proven that therapeutic reflexology lowers high cholesterol, it became evident that associated conditions were definitely alleviated and thus increasing the quality of life of patients. Some of these conditions that were improved included Allergies, Chronic Fatigue, Constipation, Dry skin, IBS, Infertility, Insomnia and Sinusitis. It is noteworthy to mention that all patients in this study commented that therapeutic reflexology improved their overall wellbeing.

It is concluded that people with diagnosed High Cholesterol have associated conditions and complications along the liver meridian (and the supporting gallbladder meridian) with accompanying behavioural patterns associated with a wood element imbalance.

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