



**An exploration into the diagnosis and management of
Polycystic Ovarian Syndrome by Complementary and
Alternative Medical (CAM) practitioners in the eThekwin
area**

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Declaration

I, Faathimah Khan, do hereby declare that this research dissertation is my own work and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources) and has not been previously submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose.

Signature of student

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Dedication

To my parents, for giving me the gift of education.

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I cannot acknowledge my supervisor Dr Maharaj enough for being the absolute epitome of wisdom and grace in my eyes. Your guidance and profound knowledge have steered me sturdily throughout my research process. Your reassurance was always extended at junctures at which I doubted myself or reached a stumbling block, and this made all the difference. I cannot think of a greater inspiration and motivation.

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Abstract

Background

Polycystic Ovarian Syndrome (PCOS) is a prevalent reproductive endocrinopathy which presents a significant clinical and public health problem (Morgante *et al.* 2015). PCOS can affect females throughout their lifespan leading to serious complications such as obesity, infertility, type two diabetes mellitus and cardiovascular disease (De Leo *et al.* 2016). The conventional approach to treating PCOS is guided by what symptoms affect the patient most such as infertility, hirsutism, acne and so forth. Many of the conventional treatments for PCOS such as metformin, anti-androgens and oral contraceptives can cause harmful adverse side-effects (Lamba *et al.* 2018:65). Adverse side-effects, complications, dissatisfaction in various aspects of the patient-practitioner experience and failed therapies are among the main reasons that patients opt for Complementary and Alternative Medicine (CAM) therapy. CAM fulfils the expectations not met by conventional medicine, particularly the psychological impact of PCOS on patients, which are assessed by only a few conventional practitioners (Fauser *et al.* 2012).

Aim of the study

This study aimed to document existing therapeutic protocols in the management of PCOS from diagnosis to treatment used by practitioners within various disciplines of CAM in the context of their unique philosophical background. Furthermore, this information may be valuable in bridging any potential gap in information across the five CAM modalities investigated in this research with regards to PCOS. These modalities were: homoeopathy, Ayurveda (AV), Unani Tibb (UT), Traditional Chinese Medicine (TCM) and naturopathy.

Methodology

A qualitative approach was used to document the perceptions and protocols used in the diagnosis and management of PCOS by practitioners of the five selected CAM

modalities practicing within the boundaries of the eThekweni municipality. Stratified purposive sampling was implemented in order to select a sample frame of 12 participants. Data was collected by means of personalised, semi-structured interviews and the data collected was analysed using Tesch's (Tesch 1990:329) and Creswell's (Creswell 2014) methods.

Results

CAM philosophies are underpinned by the principles of innate healing, an individualised constitution and governing factors which manage homeostasis. TCM philosophy is guided by the yin and yang concept, homoeopathy by the vital force and miasms, AV by three doshas. UT by four humours and naturopathy by lifestyle factors. PCOS patients were generally classified as being sycotic and/or cancerinic (miasmatically) according to homoeopathy, having a melancholic, sanguineous temperament according to UT, presenting with excessive kapha and vata according to Ayurveda and a predominant yang deficiency with heat and moisture according to TCM.

PCOS is a multi-faceted reproductive endocrinopathy which requires extensive management. The different roles of a family physician, endocrinologist, dermatologist, dietitian and gynaecologist in the diagnosis and holistic management of PCOS is performed collectively by a CAM practitioner. PCOS is considered an affliction of the woman and not merely as a disease of the ovaries and therefore much attention is drawn to the emotional drivers, particularly stress and abuse which affect these patients' quality of life (QoL).

Diagnostics reported by participants included: 1) A clinical diagnosis congruent with established diagnostic criteria such as the Rotterdam criteria which identified the pathognomonic features of PCOS and 2) A CAM-specific diagnosis which evaluated the entirety of the patient's symptoms, emotions and characteristics in order to determine a constitutional weakness.

This study found that management of PCOS, according to CAM participants, was aimed at correcting hormonal, ovulatory and menstrual imbalances, improving fertility, reducing obesity, managing infertility and improving the patient's QoL. Management strategies generally comprised: 1) CAM-specific therapy which included medicines and/or procedures, 2) Adjunctive therapy which included supplements and the use of other modalities and 3) Lifestyle intervention which included dietary counselling, physical activity recommendations and emotional counselling.

Conclusion

In conclusion, PCOS is a multi-faceted condition which requires emotional support concomitantly with therapeutic support due to the clinical spectrum of changes that can have an impact on females' psychological health.

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List of Abbreviations

AGA	Androgenic Alopecia
AGE	Advanced Glycated End products
AV	Ayurveda
BMI	Body Mass Index
BPA	Bisphenol A
CAM	Complementary and Alternative Medicine
CVD	Cardiovascular Disease
DHT	Dihydrotestosterone
FSH	Follicle Stimulating Hormone
H	Homoeopath
IGT	Impaired Glucose Tolerate
IR	Insulin Resistance
NAFLD	Non-Alcoholic Fatty Liver Disease
NIH	National Institutes of Health
NP	Naturopathy
OCP	Oral Contraceptive Pill
OGTT	Oral Glucose Tolerance Test
PCOS	Polycystic Ovarian Syndrome
PMS	Pre-Menstrual Syndrome
T2D	Type 2 Diabetes <u>Mellitus</u>
TCM	Traditional Chinese Medicine
UT	Unani Tibb
WHO	World Health Organisation

Chapter One: Introduction

1.1 Introduction

Polycystic Ovarian Syndrome (PCOS) is a reproductive endocrinopathy affecting 5-10% of women of reproductive age thus making it a prevalent condition and one of the leading causes of oligo-ovulatory infertility today (Morgante *et al.* 2015). As of 2010, The World Health Organization (WHO) estimates that PCOS affects up to 116 million women worldwide (3.4% of women) (Mirza, Naaz and Alim 2016:24). According to Teede, Deeks and Moran (2010), the lack of consensus regarding a clearly defined diagnostic criterion makes PCOS a major challenge for medical practitioners to diagnose and manage. PCOS has significant implications regarding reproductive (hirsutism, menstrual dysfunction and hyperandrogenaemia), metabolic (IR) and psychological (depression, anxiety and a poorer QoL) systems which can lead to morbidities such as infertility, obesity, type two diabetes mellitus (T2D) and cardiovascular disease (CVD) (Teede, Deeks and Moran 2010).

Medications for PCOS such as metformin, oral contraceptives and anti-androgens have various long-term side effects including lactic acidosis, hepatic toxicity, weight gain and cardiovascular events (Domecq *et al.* 2013). Given that PCOS is a condition which has various complications and risks associated with the side-effects of conventional therapy that incur major financial costs (Teede, Deeks and Moran 2010), cost-effective and safer alternative therapies should be considered.

Patients are drawn to alternative medicine due to its holistic nature, safety, cost-effectiveness as well as the collaborative relationship experienced with CAM practitioners (Eurocam 2014). A recent study reported dissatisfaction with the delay in initial diagnosis, information and emotional support provided by health-care practitioners in women with PCOS (Gibson-Helm *et al.* 2017). CAM practitioners generally offer a more involved, patient-centred relationship wherein emphasis is placed on communication, information and providing their time (McCaffrey, Pugh and O'Connor 2007). Females with PCOS seek CAM therapy particularly for cost-effective fertility and ovulatory therapy with reduced side-effects (Wu *et al.* 2014). Thus,

consulting with CAM practitioners regarding PCOS may satisfy the demands not met by conventional practices (Kooreman and Baars 2011). A noteworthy conclusion established by Fauser *et al.* (2012) in their evaluation of the impact of the QoL of patients with PCOS is that very few conventional medical practitioners included instruments and criteria to assess the QoL in patients with PCOS as part of their diagnosis. This implies that conventional medicine prioritises the clinical diagnosis of PCOS whilst neglecting the assessment and inclusion of the psychological impact of PCOS on patients. On the other hand, CAM practitioners prioritise patients' psychological afflictions equally with their clinical complaints which distinguishes their approach to disease management.

Many groups have prepared papers on various aspects of the diagnosis and management of PCOS (Aziz *et al* 2009, Legro *et al* 2012). However, no research papers based on the diagnosis and management of PCOS have been developed using a validated evidence-based approach (Orio and Palomba 2013). Established and evidenced protocols have also not been documented formally in the CAM systems of medicine to date. This study aims to document existing therapeutic protocols in the diagnosis and management of PCOS by various disciplines of CAM within the context of their unique philosophical background and thereafter to determine whether the information presented is evidence-based. Furthermore, documenting this information may be valuable in bridging any potential gap in information between these five CAM modalities by providing extensive knowledge and evidence (where possible) regarding specific CAM therapies available for managing PCOS.

1.2 Research problem

Protocols in the diagnosis and management of PCOS have not been documented formally in the CAM systems of medicine to date. Furthermore, there may be potential gaps in information between CAM modalities with respect to diagnostics and management of PCOS.

1.3 Research aims

This study aimed to document existing therapeutic protocols in the management of PCOS from diagnosis to treatment used by practitioners within various disciplines of CAM in the

context of their unique philosophical background. Furthermore, this study aimed to bridge the gap between CAM practitioners by documenting information on diagnosing and managing PCOS specifically across five common CAM modalities.

1.5 Research questions

The interview guide for the interviews can be found in Appendix D.

Grand Tour Question

How, given your chosen modality, do you manage PCOS from diagnosis to treatment?

Sub Questions

1. Describe your understanding of PCOS based on the philosophical foundation of your specific medical system/modality.
2. Describe how you would diagnose a patient with PCOS?
3. What is your approach to managing patients with PCOS?
4. What treatment do you prescribe?
5. What additional modalities do you employ or recommend for patients with PCOS?

Chapter Two: Literature Review

2.1 Definition

Polycystic Ovarian Syndrome was first described in 1935 by Stein and Leventhal. It was originally named for its most salient feature: polycystic ovaries (Azziz 2014). Thereafter it was characterised more extensively in 1985 by signs of infertility, irregular menstrual cycles, hirsutism and obesity occurring in young women after the onset of puberty (Stein 1958). PCOS is considered a common reproductive endocrinopathy with an estimated prevalence of around 10% (Daniilidis and Dinas 2009) whose aetiology remains elusive (Teede, Deeks and Moran 2010). PCOS is not definitively characterised by pathognomonic manifestations; rather it presents as a clinical spectrum of symptoms which can mimic various pathologies (Panda *et al.* 2014). PCOS is currently distinguished by the presence of polycystic ovaries on ultrasound, ovarian disturbances manifesting as menstrual irregularities as well as metabolic disorders (Arentz 2015: 20). PCOS is defined as a syndrome because it is characterised by a composite of symptoms and is not confined to a single diagnostic criterion (Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group [Rotterdam ESHRE/ASRM] 2004). There remains no cohesive definition and diagnostic criteria for PCOS and this has been a source of debate for many years. The three commonly used criteria are those developed by National Institutes of Health (NIH) (1990), Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group [Rotterdam ESHRE/ASRM] (2003) and the Androgen Excess and PCOS Society (AE-PCOS) (Azziz *et al.* 2006). The widely adopted Rotterdam ESHRE/ASRM criteria can be characterised according to the Rotterdam ESHRE/ASRM (2003) criteria require two or more of the following:

1. Oligo-ovulation or anovulation;
2. Clinical and/or biochemical signs of hyperandrogenism; and/or
3. Polycystic ovaries.

2.2 Epidemiology

As of 2010, the WHO estimates that PCOS affects up to 116 million women worldwide (3.4% of females) (Mirza, Naaz and Alim 2016). PCOS is a highly prevalent condition

which affects up to one in five women of reproductive age (Teede, Deeks and Moran 2010). This prevalence varies depending on the criteria being used (McEwen 2017).

The Rotterdam ESHRE/ASRM (2003) criteria allows the diagnosis of PCOS to be made in females with polycystic ovaries and chronic anovulation, but without evident hyperandrogenism (Lauritsen *et al.* 2014). Additionally, this classification considers the ethnic variants in the phenotypic expression of PCOS (Dewailly 2016). The prevalence of PCOS appears to be higher in women of South Asian origin, who have more severe symptoms which are expressed at a younger age (Arora, Aura and Patel 2014). The AE-PCOS (2006) criteria proposes that PCOS is a disorder predominantly of androgen excess and that the diagnosis of PCOS should be based on the presence of clinical or biochemical hyperandrogenism together with ovarian dysfunction (Lizneva *et al.* 2016). On the other hand, the NIH (1990) criteria indicate that hyperandrogenism and chronic oligo-anovulation, after the exclusion of related disorders, are considered the main diagnostic features (Lizneva *et al.* 2016). Higher occurrences of PCOS have ultimately been identified by the application of the Rotterdam ESHRE/ASRM criteria compared to the AE-PCOS and NIH diagnostic criteria (March *et al.* 2010).

2.3 Pathogenesis

PCOS is a heterogeneous disorder whose precise pathogenesis remains uncertain and controversial however, the interplay of genetic, endocrine and environmental factors contributes to the development of this condition (De Leo *et al.* 2016). These factors are elucidated below.

1) Genetics

PCOS is regarded as hereditary due to the common occurrence of PCOS within families and its genetic basis is thought to involve multiple, complex gene mutations (Arentz 2015). The putative gene/s responsible for causing PCOS remain unidentified, making this a challenging condition to manage (Goodarzi and Azziz 2006). The aetiology of PCOS has been associated with genes linked to gonadotropin and neuroendocrine action, ovarian androgen biosynthesis and the action of insulin, all of which require further genetic analysis and confirmation (Azziz 2016). Despite strong

evidence alluding to the possibility of polygenic mutations, the precise genetic mutations are still inconclusive. Furthermore, the genetic basis for the development of PCOS is thought to be responsive to environmental triggers (Arentz 2015) which act during early and susceptible stages of development, from prenatal growth to puberty (Diamanti-Kandarakis, Christakou and Marinakis 2012). Obesity, the excessive intake of advanced glycated end (AGE) products and industrial products such as bisphenol A (BPA) are identified as potential environmental triggers that can either stimulate the conversion of the PCOS genotype into its phenotype or exacerbate the clinical severity of the condition (Diamanti-Kandarakis, Christakou and Marinakis 2012).

2) Insulin resistance

Insulin resistance (IR) is defined as the diminished ability of insulin to facilitate the delivery of glucose into target tissues, or a reduced glucose response to insulin (Ben-Haroush, Yogev and Fisch 2004), and plays a major role in the pathogenesis of PCOS. It is estimated that IR affects 50%–70% of women with PCOS (Sirmans and Pate 2014:1) Although IR is related to obesity, women with PCOS present with IR independent of their body mass index (BMI) (Giandalia *et al.* 2018). The body compensates for IR by increasing insulin production, resulting in hyperinsulinaemia, which impacts the reproductive and metabolic elements of PCOS. Despite metabolic IR, the ovary remains paradoxically insulin sensitive which results in reproductive implications (Franks and Hardy 2010). Polycystic ovaries display theca and granulosa cells which become hypertrophic as a result of hyperinsulinaemia (Arentz 2015). High insulin levels work synergistically with luteinising hormone (LH) to induce excess androgen production by theca cells (Marshall and Dunaif 2012). Elevated levels of LH stimulate ovarian hyperthecosis and promote complications of the condition (Arentz 2015). Hyperinsulinaemia and peripheral IR are therefore regarded as the central attributes of metabolic dysfunction and are inextricably interrelated with hyperandrogenism in PCOS. Although some studies indicate that androgens can induce hyperinsulinemia, most of the evidence supports hyperinsulinemia as the primary factor leading to hyperandrogenism (Ben-Haroush, Yogev and Fisch 2004).

3) Obesity and adipose tissue dysfunction

Many women with PCOS are obese or overweight, although, 40-50% of women diagnosed with PCOS are not obese (Goodarzi *et al.* 2011). Whether obesity is directly involved in initiating PCOS is a debatable topic. It seems apparent that the phenotype of PCOS is aggravated by the presence of excessive adiposity which increases the risk of developing complications (Dumesic *et al.* 2015). Given that the prevalence of obesity in females with PCOS is higher than healthy females within the same age group without PCOS; it is evident that adiposity-independent IR is associated with PCOS (Goodarzi *et al.* 2011). Furthermore, obesity is linked to the inhibition of sex hormone binding globulin (SHBG) which counteractively promotes hyperandrogenaemia and extends follicular phases, resulting in a prolonged menstrual cycle (Diamanti-Kandarakis, Christakou and Marinakis 2012). Mounting evidence implies that subcutaneous adipocyte size is raised in obese women with PCOS which results in a derangement of adipocyte functionality (Dumesic *et al.* 2015). This derangement leads to decreased circulating levels of adiponectin which is a biologically active adipokine secreted by adipose tissue (Kadowaki and Yamauchi 2005). Abnormal adipocyte functionality also results in decreased lipolytic effects of catecholamines (Dumesic *et al.* 2015). Weight loss in women with PCOS improves many of the metabolic and reproductive implications of this syndrome although there is inconsistent evidence as to whether it can be fully resolved (Diamanti-Kandarakis, Christakou and Marinakis 2012).

4) Androgen excess

Excessive ovarian androgen synthesis sits at the pathophysiologic centre of PCOS and manifests as the most distinctive morphological feature of the disease – the presence of small antral follicles located in the cortex of the ovary. Hyperandrogenaemia has been culpably involved as one of the main contributors to follicular derangement (Lebbe and Woodruff 2013), causing intraovarian paracrine effects and neuroendocrine effects on the hypothalamic pituitary axis (HA), both of which are associated with anovulation (Diamanti-Kandarakis, Christakou and Marinakis 2012). It has been proposed that deranged preantral folliculogenesis occurs from an early stage independent of gonadotrophin although the cause of this aberrant development is elusive (Franks and Hardy 2010). Androgen receptors are expressed in all cell types of the ovarian follicle, including the oocyte, granulosa and theca cells

(Sen and Hammes 2010). Androgen excess stimulates these androgen receptors causing the growth of the pre-antral and small antral follicles inside the ovaries from their primordial stages. These small antral follicles have raised concentrations of anti-mullerian hormone, which are produced by the granulosa of these follicles. In turn, increased anti-mullerian hormone may suppress the activity of follicle stimulating hormone (FSH) (Diamanti-Kandarakis, Christakou and Dunaif 2012) and as a result, serum FSH levels are too low to allow follicle maturation which leads to oligo-ovulation or anovulation (Franks and Hardy 2010). Peripherally, hyperandrogenaemia may exacerbate the metabolic effects of PCOS such as IR and increased visceral fat. This may be mediated by upregulation of $\beta 3$ adrenergic receptors and lipase expression in visceral adipose tissue through testosterone or DHEAS signalling, which alters lipolytic activity (Rojas *et al.* 2014). Hyperandrogenaemia paired with peripheral IR can reduce the secretion of SBGH leading to increased bioavailability of androgens peripherally including in the brain, liver, pilosebaceous unit, and so on (Legro 2012). Some studies indicate that androgens can induce hyperinsulinemia, and evidence supports hyperinsulinemia as being the primary factor leading to hyperandrogenism (Ben-Haroush, Yogev and Fisch 2004) Thus, hyperandrogenaemia and IR may continuously stimulate each other in an endless loop of ovarian dysfunction and polycystic ovaries (Rojas *et al.* 2014).

5) Foetal origins

Alteration in the intrauterine environment has been linked to the aetiology of PCOS. It has been hypothesised that increased exposure to maternal serum androgens during foetal development can contribute to PCOS (Goodarzi *et al.* 2011). However, a recent cohort study tested this hypothesis in normal female pregnancy. The study gathered clinical data from maternal offspring in adolescence and reported negative associations between prenatal androgen levels in normal pregnancy and PCOS found in adolescent offspring (Diamanti-Kandarakis, Christakou and Marinakis 2012).

The adipose tissue expandability hypothesis is another tentative theory that attempts to explain the foetal origins of PCOS. An impaired expansion of subcutaneous adipose tissue in the infant during foetal development may reduce the ability of adipose tissue to store lipids which may predispose to IR and contribute to hyperandrogenaemia and PCOS (Diamanti-Kandarakis, Christakou and Marinakis 2012).

Another theory surrounding the foetal origins of PCOS is foetal malnutrition and foetal over-nutrition. The offspring of diabetic women have an impaired glucose tolerance (IGT) from a young age leading to childhood obesity. Compensatory hyperinsulinaemia can then induce ovarian and adrenal steroidogenesis which may predispose adolescents to PCOS (Abbot and Bacha 2013).

6) Environmental factors

Lifestyle has been extensively implicated in the phenotypic expression of PCOS. Weight gain worsens the complications of PCOS, particularly the metabolic and reproductive complications as evidenced by increased visceral obesity, IR, menstrual irregularity and hyperandrogenism. Conversely, weight loss decreases androgen and insulin levels, while improving hirsutism, ovarian dysfunction, menstruation as well as dyslipidaemia (Goodarzi *et al.* 2011). Given that excess visceral adiposity is an aetiological feature in PCOS, it is only logical that weight-loss improves the metabolic features of PCOS by reducing visceral fat and improving IR (Bruner, Chad and Chizen 2006)

Environmental endocrine disrupting chemicals may also interfere with ovarian and metabolic function, causing PCOS-like alterations (Goodarzi *et al.* 2011). BPA is a widely used oestrogenic industrial plasticiser which the ovary is highly sensitive to. Higher levels of BPA have been discovered in women with PCOS and have been positively associated with androgens which may imply a pathophysiological role in the development of PCOS. This is due to the decreased hepatic clearance that arises from androgen excess which has caused suspicion that BPA may exaggerate the severity of the PCOS phenotype (Kandaraki *et al.* 2011).

2.4 Complications of PCOS

Mounting evidence suggests that PCOS impacts a woman throughout her lifespan, beginning *in utero*, clinically appearing at the onset of puberty and persisting throughout her reproductive years. PCOS has various clinical complications which can be broadly categorised and is described below.

2.4.1 Reproductive complications

2.4.1.1 Ovarian dysfunction and subfertility

PCOS is one of the most common causes of infertility due to anovulation with almost 40% of females being infertile (unable to conceive within 12 months) (Brassard, AinMelk and Baillargeon 2008). Ovarian dysfunction, often arising from chronic oligo-ovulation or anovulation, is the predominant cause of subfertility (Goodarzi *et al.* 2011). Increased body weight has also been shown to exacerbate infertility independently (Brassard, AinMelk and Baillargeon 2008). Most statistical and clinical data provided on subfertility and infertility in PCOS are represented by a specific population based at hospitals or fertility clinics, therefore making comparisons difficult. In a cohort study following 786 females diagnosed with PCOS more than 30 years previously and documented in hospital records, 65% of females with PCOS reported infertility (Azziz *et al.* 2016). In addition to decreased ovulation, changes in the endometrium associated with IR, reduced implantation and raised miscarriage rates, may also promote subfertility (Setji *et al.* 2006). Whilst some women with PCOS have normal embryo development and pregnancy outcomes, others have impaired oocyte development. These susceptible females experience an increased rate of miscarriages which can be associated with the increased exposure to maternal androgens, hyperinsulinaemia and/or adiposity-dependent IR which can interact with the oocyte and follicle (Goodarzi *et al.* 2011).

2.4.1.2 Obstetrical morbidity

PCOS is a primary risk factor for adverse pregnancy outcomes (Yu *et al.* 2016). Women with PCOS have a higher risk of pregnancy complications such as gestational diabetes, gestational hypertensive disorders (pre-eclampsia, gravid hypertension), preterm delivery and perinatal mortality (Peigné and Dewailly 2014). This was substantiated by a population-based study among 3,787 women with PCOS and over a million without PCOS based on the Swedish medical birth registry between 1995 and 2007 (Azziz *et al.* 2016). Additionally, infants of women with PCOS were also found to have a significantly higher risk of admission to a neonatal intensive care unit (Kjerulff, Sanchez-Ramos and Duffy 2011: 588). This was due to the increased risk of

infants being large for gestational age, having meconium aspiration and having an Apgar score of less than seven (Azziz *et al.* 2016). Conclusive data on the adverse impact of PCOS in pregnancy is still limited (Yu *et al.* 2016).

2.4.1.3 Menstrual Irregularities

A consistent and regular menstrual cycle is regarded as an indicator of women's reproductive health (Dovom *et al.* 2016), therefore it can be conversely assumed that problems in the menstrual cycle are indicative of reproductive health concerns in women. Seventy to eighty percent of females with PCOS have ovarian dysfunction which presents as oligomenorrhea or amenorrhea (characterised by the absence of at least three menstrual cycles in a row) (Brassard, AinMelk and Baillargeon 2008). Oligomenorrhea/oligo-ovulation is defined according to the Rotterdam ESHRE/ASRM (2003) criteria as eight or less menstrual cycles per year (Bhagavath and Carson 2012). Up to 90% of females suffering with oligomenorrhea will be diagnosed with PCOS whilst only 40% of females suffering with amenorrhea will be diagnosed with PCOS (Brassard, AinMelk and Baillargeon 2008). Irregular menses exclusively is not considered a reliable criterion to make a diagnosis of PCOS since ovarian volume naturally fluctuates from menarche till up to four years later (Welt and Carmina 2013).

Evidence has supported that IR and ovulatory dysfunction are the direct attributing factors to 87% of women with PCOS suffering from menstrual irregularities (Dovom *et al.* 2016). IR plays a role in disrupting the menstrual cycle by exacerbating hyperandrogenaemia thereby interfering with follicular growth. IR, oligo-ovulation or anovulation and menstrual irregularity are closely related, however the former two are costly to diagnose using laboratory testing whilst the latter may serve as an easy marker to identify ovulatory dysfunction and therefore, IR (Panidis *et al.* 2013). A recent study which aimed to investigate the association between menstrual cycle length and metabolic parameters concluded that menstrual irregularity can be used to estimate the presence and degree of IR in women with PCOS (Alebić *et al.* 2016). The largest prospective study evaluated the association between the menstrual cycle and IR in 1,285 patients with PCOS and concluded that identifying the sub-type of menstrual irregularity may provide a useful diagnostic tool (Panidis *et al.* 2013). These sub-types were specified as primary amenorrhea (women with a single cycle

irregularity), secondary amenorrhea (multiple cycle irregularities), oligomenorrhea or polymenorrhea (women with regular menstrual cycles alternating with a single cycle irregularity) and finally, women with regular menstrual cycles (Panidis *et al.* 2013).

3 Hyperandrogenaemia and dermatological sequelae

a) Hirsutism

Hirsutism is defined as excessive terminal hair growth in women which follows a typical male distribution and occurs in androgen-dependent areas (Escobar-Morreale 2010). The presence of hirsutism often signifies an underlying endocrinopathy, such as PCOS (Nelson and Nelson 2010:100). Hirsutism is regarded as a cosmetic problem which significantly affects the self-esteem of women, particularly their feminine identity (Hohl, Ronsoni and Oliveira 2014). Before puberty, the hair follicle contains a soft vellus hair which accompanies a sebaceous gland to form a pilosebaceous unit. This unit is sensitive to androgens which naturally increase after puberty, causing the vellus hair to convert into terminal hair which is coarse and contains a medulla (Escobar-Morreale 2010). Hair growth occurs in an asynchronous pattern and follows three phases: an anagen or growing phase accounting for 85-90% of the hair cycle duration, a catagen or rapid involution phase and a telogen or resting phase during which the hair falls off and anagen restarts. Androgens stimulate the growth of terminal hair by prolonging its most extensive phase which is the anagen phase (Unluhizarci, Karaca and Kelestimur 2012: 104). As a result of early activation of androgenic hormones, the untimely development of pubic and axillary hair known as premature pubarche may also be present. In some cases, this has been considered an early warning sign of PCOS (Welt and Carmina 2013).

b) Acne Vulgaris

Four major factors play roles in the development of acne vulgaris: hyperplasia of sebaceous glands and increased sebum production, hyperkeratinisation of pilosebaceous ducts, *Propionibacterium acnes* (*P. acnes*) colonisation and dermal inflammation (Emiroğlu, Cengiz, and Kemeriz 2015). Acne that is imputed to PCOS has a prevalence of 10-34%. In addition to facial lesions, 50% of women diagnosed with PCOS exhibit lesions on their neck, chest and upper back (Chuan and Chang 2010). Androgens are thought to play a crucial role in the pathogenesis of acne, this

has been substantiated by studies showing an increased level of androgens in women with acne when compared to healthy controls (Arora, Yadav and Saini 2011). Elevated glucose levels have also been reported in patients with acne vulgaris and this stimulates insulin secretion which may contribute to hyperkeratinisation within the pilosebaceous duct and abnormal desquamation of follicular corneocytes. Insulin may also stimulate androgen production and activity due to decreased levels of SHBG, thus, stimulating acne formation (Arora, Yadav and Saini 2011).

c) Androgenic Alopecia

In women, androgenic alopecia (AGA) typically presents as a diffuse thinning over the top of the scalp yielding a “Christmas tree” pattern with more thinning towards the front, though the frontal hairline is maintained (McElwee and Shapiro 2012). In the normal hair cycle, the anagen or growth phase accounts for 85-90% of scalp hairs. In the setting of hyperandrogenaemia, androgen-sensitive hair follicles shorten during the anagen phase, resulting in AGA. The pattern of hair loss in women with hyperandrogenism is variable and can typically involve the vertex, crown, or a diffuse pattern (Goodman *et al.* 2015). The association of AGA with other androgen-dependent clinical features such as acne and hirsutism can be used in the diagnosis of PCOS (Schmidt 1994).

2.4.2 Metabolic complications

1) Diabetes Mellitus

Many women with PCOS present with IR and compensatory hyperinsulinaemia, independent of BMI. Mounting data confirms that metabolic syndrome, gestational diabetes mellitus, IGT and T2D are increased in pre-menopausal women and persist during late reproductive years (Azziz *et al.* 2016). PCOS has been established as a prominent risk factor in the development of T2D by the International Diabetes Federation (Alberti, Zimmet, and Shaw 2007). South Africa is undergoing an emerging epidemic of non-communicable diseases (NCDs), which is a national priority in terms of healthcare. The four deadliest NCDs according to the WHO are: CVD, cancers, chronic respiratory disease and T2D, which threatens human health and development (Shisana *et al.* 2014). Performing the oral glucose tolerance test (OGTT) is indicated

in obese women with PCOS, and/or those with increased visceral adiposity, as measured by waist circumference. The highest risk of IGT and T2D is assigned to women who have both oligo/anovulation and hyperandrogenism, which is further exacerbated by obesity (Fauser *et al.* 2012).

2) Non-alcoholic fatty liver disease

Non-alcoholic fatty liver disease (NAFLD) is characterised by the abnormal accumulation of fat in liver parenchyma in the absence of alcohol over-consumption (Macut *et al.* 2016). Studies have also shown that PCOS is associated with an early development of NAFLD (Setji *et al.* 2006). Since obesity and IR seem to be contributing factors in the pathogenesis of NAFLD (Macut *et al.* 2016) and are also culpable factors in the pathogenesis of PCOS, it seems apparent that NAFLD could present as a complication of PCOS.

2.4.3 Cardiovascular complications

Although the risk of developing CVD is not sufficiently attestable in women with PCOS, there is evidence supporting an increased incidence of CVD (Carmina 2009). Dyslipidaemia, IR and IGT as well as the presence of increased truncal obesity are all factors that collectively predispose to the development of endothelial dysfunction and CVD (Lo *et al.* 2006). Dyslipidaemia is also common in women with PCOS and is marked by higher triglycerides than females without PCOS who are the same weight (Meyer, McGrath and Teede 2005). A broad range of pro-inflammatory cytokines have been involved in contributing to the progression of atherosclerosis, thereby worsening CVD (Svendsen *et al.* 2010). CVD markers such as intimal calcification and thickening of vascular walls imply a higher risk of CVD in women with PCOS than in women without PCOS, although it is being debated whether these findings indicate an actual increase in cardiovascular mortality since the incidence of CVD increases anyway after 50 years (Azziz *et al.* 2016).

2.4.4 Cancer

Women with PCOS have an increased risk for developing endometrial cancer due to the presence of hyper-oestrogenic anovulation and hyperinsulinaemia. They may also

have an increased risk for ovarian cancer. However, no associated increased risk of breast cancer has been shown (Azziz *et al.* 2016).

2.4.5 Psychological complications and the DSM-IV classification of PCOS

Changes in fertility and physical appearance (associated with obesity and hirsutism) negatively affect women with PCOS (Hahn *et al.* 2005) and challenge their female identity (Teede, Deeks and Moran 2010). These clinical features can affect women with PCOS psychologically and predispose them to anxiety, depression and a decreased QoL (Teede, Deeks and Moran 2010). A decreased QoL may also reduce the patient's motivation to improve their lifestyle (Glintborg and Andersen 2010). Furthermore, patients with PCOS are at risk for developing psychological and behavioural problems (Dokras *et al.* 2011). Coffey and Mason (2003) observed the lack of research on health-related QoL in women with PCOS in a validated study which concluded that PCOS has a profound impact on the QoL of females affected with PCOS when compared to controls. The most significant contributing factor to decreased QoL was weight. A noteworthy conclusion established by this study is that very few practitioners included instruments and criteria to assess the QoL in patients with PCOS (Fauser *et al.* 2012). This implies that conventional medicine prioritises the clinical diagnosis of PCOS, but it neglects the assessment and inclusion of the psychological impact of PCOS on the QoL of patients. On the other hand, CAM practitioners prioritise patients psychological affliction equally to their clinical complaints which distinguishes their approach to the disease.

A few studies have investigated the depressive symptoms of women with PCOS and have concluded that PCOS confers a greater risk of developing depressive symptoms as defined by the Diagnostic and Statistical Manual IV (DSM-IV) (Hollinrake *et al.* 2007:1370). Depressive disorders are defined as subjects experiencing a depressed mood and loss of interest in daily activities for at least two weeks. Depressive symptoms as defined by the DSM-IV include: appetite changes, altered sleep patterns, suicidal thoughts, feelings of worthlessness or guilt, decreased energy levels and difficulty thinking or concentrating. Major depressive disorders are diagnosed if the patient experiences four out of the related symptoms whilst minor depression,

classified under DNOS (depression not otherwise specified), requires less than four symptoms (Hollinrake *et al.* 2007:1369-1370).

2.5 Diagnosis of polycystic ovarian syndrome

The diagnosis of PCOS can vary at different stages of growth. During adolescence, many normal attributes of puberty coincide with PCOS symptoms, which make it almost indiscernible for diagnostic purposes (Welt and Carmina 2013). There are three sets of available diagnostic criteria which are used predominantly in the diagnosis of PCOS in conventional medicine (Table 1), as described below.

Table 1: The requirements for diagnosis of PCOS as per the three established diagnostic criteria sets for PCOS

Features	NIH (1990): Requires all of the following)	Rotterdam ESHRE/ASRM (2003): Requires two of the following)	AE-PCOS (2006): Requires all of the following
Hyperandrogenism	✓	✓	✓
Oligo-anovulation	✓	✓	✓
Polycystic Ovaries		✓	✓

2.5.1 National Institutes of Health

The NIH (1990) criteria were summarised by doctors Zawadzki and Dunaif following the first expert conference on PCOS in April 1990 (Azziz *et al.* 2009). The NIH criteria stipulated that PCOS should include:

1. Clinical and/or biochemical signs of hyperandrogenism after exclusion of other disorders. Hyperandrogenism manifests clinically as acne, hirsutism or androgenic alopecia. According to Palomba (2018: 23), the NIH criteria interprets clinical hyperandrogenism as hirsutism, since more than 70% of women exhibiting hirsutism are hyperandrogenic. The presence of hirsutism should be estimated using the Ferriman-Gallwey scale (Livadas *et al.* 2014) and women with a score ≥ 8 are classified as having hirsutism (Svendsen, Madsbad and Nilas 2010). Hyperandrogenaemia, according to Palomba (2018: 23) is defined as the finding of elevated androgen levels in the blood as well as free serum testosterone which

could mark androgen excess. Based on the Rotterdam ESHRE consensus (2003), the limitation in this criterion is that many PCOS patients do not demonstrate overt androgen excess in serum analysis.

2. Anovulation or oligo-ovulation: Anovulation may present as frequent episodes of vaginal bleeding at intervals of 35 days or < 10 menstrual bleeds per year and polymenorrhea as ≤ 25 days (Azziz *et al.* 2009).
3. The exclusion of other related disorders (Table 2) include: “adrenal congenital hyperplasia (post-ACTH stimulation 17 hydroxyprogesterone higher than 300 ng/dL), hyperprolactinemia (prolactin levels higher than 12 mg/L), hypothyroidism (TSH higher than 4.5 mIU/L), Cushing’s syndrome (11 pm salivary cortisol higher than 0.15 ug/dL, 24-hour urine free cortisol higher than 50 ug/d, overnight 1 mg dexamethasone suppression higher than 1.8 ug/dL), premature ovarian insufficiency (FSH higher than 30 mIU/mL and oestradiol lower than 20 pg/mL) and virilising adrenal and ovarian cancer” (Palomba 2018: 13-14). The NIH criteria indicates that hyperandrogenism and chronic oligo-anovulation, after the exclusion of related disorders, are considered the main diagnostic PCOS features (Lizneva *et al.* 2016). However, it has been established that anovulation is not necessarily chronic and that episodic, regular ovulatory cycles could be present with the pattern of anovulatory vaginal bleeding or amenorrhea in PCOS (Franks 2006).

Table 2: Androgen-Excess related disorders requiring exclusion for PCOS diagnosis

- | |
|--|
| <ul style="list-style-type: none"> • Ovarian/ adrenal androgen-secreting tumours • Thyroid disease • Hyperprolactinemia • Non-classical congenital adrenal hyperplasia |
|--|

Table 2 lists the most common androgen-excess related disorders which must be excluded before making a PCOS diagnosis according to the NIH (1990) criteria. These disorders generally involve the ovaries, adrenals, thyroid gland, or pituitary gland resulting in high androgen levels and clinical features which mimic PCOS.

2.5.2 The Rotterdam ESHRE/ASRM criteria

The Rotterdam ESHRE/ASRM (2003) consensus was established in order to revise the NIH (1990) criteria. The Rotterdam ESHRE/ASRM (2003) criteria has ultimately expanded but not replaced the NIH (1990) criteria, according to Palomba (2018: 15). The impact of implementing the Rotterdam ESHRE/ASRM (2003) criteria which entail a broader definition, against the more restrictive NIH (1990) criteria, is an increased reported prevalence of PCOS (Azziz *et al.* 2009).

The Rotterdam ESHRE/ASRM (2003) PCOS criteria require the presence of two of the following three findings:

1. Signs of clinical or biochemical hyperandrogenism;
2. Ovulatory dysfunction/ Oligomenorrhea; and
3. Polycystic ovaries on ultrasound (Table 3) specified as ≥ 12 follicles measuring 2-9 mm in diameter, or ovarian volume at 10 ml in at least one ovary.

Table 3: Sonographic requirements of diagnosing PCOS

Number of follicles	≥ 12 follicles
Measurement of follicles	2 –9 mm in diameter
Ovarian size	10 ml

Table 3 shows the sonographic requirements of diagnosing PCOS according to the ESHRE/ASRM (2003) PCOS criteria which specifies the number of follicles, measurement and ovarian size required to make a diagnosis.

With the advancement of ultrasound technology, a recent challenge has arisen with regards to follicle count, particularly that it is now possible to view a higher number of follicles which may result in the over diagnosis of PCOS (Duijkers and Klipping 2010). In order to overcome this challenge, the measurement of anti-mullerian hormone (> 35 pmol/l) which is a glycoprotein produced by antral follicles has been proposed to substitute diagnosing polycystic ovaries (Lauritsen *et al.* 2014:792). Furthermore, hirsutism assessment based on the Ferriman-Gallwey scale has been used as a clinical indicator of hyperandrogenism and is subjective to ethnicity since hirsutism is more commonly seen among darker skinned women and rare in Japanese women with PCOS (Rashidi *et al.* 2014). This further indicates that the diagnostic criteria for

PCOS is subjective and differs from individual to individual, which opens the possibility for a more individualised criteria that considers all variations of the patients presenting symptoms.

2.5.3 AE-PCOS

The AE-PCOS task force proposed the following diagnostic criteria for PCOS:

1. Hirsutism and/or hyperandrogenaemia
2. Oligo-ovulation and/or polycystic ovarian morphology
3. Exclusion of other androgen-excess related disorders.

The AE-PCOS (2006) criteria can potentially identify women with PCOS who are at an increased risk of developing metabolic dysfunction, albeit less than the NIH (1990) criteria (Palomba 2018).

2.6 Limitations

It is now evident that PCOS is a complex syndrome which does not have a single diagnostic marker to provide a gold standard for reference. The consensus-based diagnostic criteria, the Rotterdam ESHRE/ASRM (2003) criteria, has provided clinical and scientific evidence which can guide practitioners to make a more accurate diagnosis (Wang and Mol2017). However, there have been cases of over-diagnosis and misdiagnosis due to the advanced imaging technology allowing ovarian follicles to be visualised clearly (Duijkers and Klipping 2010). There is also a lack of definitive diagnosis using blood or ultrasound tests of subclinical phenotypes of the disease as well as different recruitment processes of study populations and dissimilar cut-off points to define each criterion (Rashidi *et al.* 2014) This further highlights that the diagnostic criteria for PCOS is subjective, which opens up the possibility for a more individualised criteria that considers all variations of the patients presenting symptoms.

2.7 The allopathic approach to treating PCOS

Conventional medication used to manage PCOS symptoms include metformin, the oral contraceptive pill (OCP), antiandrogens, clomiphene citrate and thiazolidinediones but these medicines are associated with long-term side-effects.

The most commonly used pharmacological agents are metformin, anti-androgens and OCP's.

Metformin is an oral anti-hyperglycaemic agent known for its use in the treatment of T2D. Metformin acts on various tissues such as the liver, skeletal muscle, adipose tissue and the ovary which are relevant to the reproductive and endocrine aberrations in PCOS. Metformin acts by suppressing lipolysis in adipose tissue, increasing glucose uptake in skeletal muscle and reducing androgen synthesis in the ovaries (Sam and Ehrmann 2017: 1657). Metformin has been adversely associated with fatal or nonfatal lactic acidosis (Domecq *et al.* 2013). Furthermore, the risk of developing glucose intolerance or diabetes is highest in women who have both oligo/anovulation and hyperandrogenism, which is worsened by obesity. Management of women at risk for T2D should focus on improving diet and lifestyle as first-line treatment. Metformin treatment is safe when indicated in those with an IGT or frank diabetes who cannot adhere to calorie restriction and lifestyle changes (Fauser *et al.* 2012).

OCPs can effectively lower androgen levels and block the effect of androgens via suppression of ovarian androgen production (Goodman *et al.* 2015: 1296). Treatment with OCPs is known to stabilise menstrual function and to improve acne and hirsutism, while the effects on IR are debatable (Panidis *et al.* 2013: 587). However, OCPs have been associated with weight gain, cardiovascular and thromboembolic events (Domecq *et al.* 2013).

The mechanism of anti-androgen therapy is competitive antagonism of the androgen receptor (spironolactone, cyproterone acetate, flutamide) or inhibition thereof. The choice of anti-androgen therapy is dependent on which symptoms affect the patient, as well as whether the androgens are thought to be of ovarian or adrenal origin (Goodman *et al.* 2015: 1296). However, anti-androgens can result in hepatic toxicity and fatality (Domecq *et al.* 2013).

2.8 Experiences of women suffering with PCOS

Gibson-Helm *et al.* (2017) conducted a survey on 1,385 women worldwide who were diagnosed with PCOS in order to assess women's overall satisfaction with their

diagnosis and initial treatment recommendations for PCOS. It was discovered that more than a third of the women spent more than two years seeking a diagnosis to explain their symptoms and visited a minimum of three practitioners before being diagnosed. Furthermore, only 33% of the women included in the survey were satisfied with the information provided regarding their treatment options. Another recent cross-sectional study conducted by Lin *et al.* (2019: 1005-1006) included 332 US-based women and aimed to compare truth and beliefs in primary care physicians regarding women with and without PCOS. The study provided evidence to support claims that patients received limited information regarding lifestyle and dietary changes which needed to be implemented as part of their treatment plan. Most women included in this study reported dissatisfaction with their early medical care as well as a lack of information with regards to their individual healthcare. At present, there is no South African literature investigating the truth and beliefs of females with PCOS with regards to their primary care physicians.

Patients' confidence and satisfaction with their primary care physicians is associated with their adherence to their treatment plan. PCOS has a myriad of psychological implications which requires emotional support from health care providers. Coffey and Mason (2003) observed the lack of available research on the QoL in women with PCOS which was found to be related to their weight gain, followed by menstrual problems, fertility, emotional concerns and hirsutism (McCook, Reame and Thatcher 2005). In an online cross-sectional study aimed to compare perceptions in primary health care physicians between women with and without PCOS, it was concluded that women with PCOS had a greater uncertainty and lack of confidence in their health-care providers. Participants imputed this distrust and dissatisfaction to a lack of empathy, encouragement and/or emotional support from their practitioners which manifested as disagreements between patient and practitioner (Tomlinson *et al.* 2017).

Based on the relayed experiences of participants, it is evident that a need exists for practitioners to develop a comprehensive holistic plan for the early management and treatment of PCOS with equal emphasis on psychosocial support (Weiss and Bulmer 2011). In the light of evident dissatisfaction with regards to diagnosis, communication

and emotional support from primary care practitioners, there is an opportunity for CAM practitioners to intervene because their philosophies emphasise holistic management and extensive patient-centred support. Consulting with CAM practitioners may be able to satisfy the personal requirements of patients that are not met by conventional practices (Kooreman and Baars 2011).

2.9 The need for Complementary and Alternative medicine (CAM)

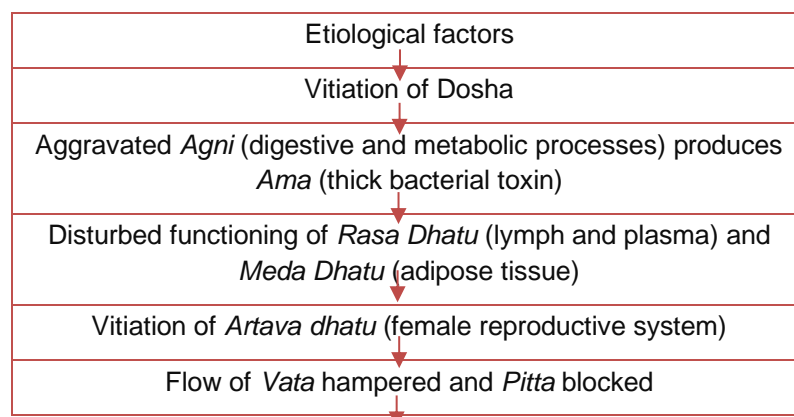
CAM is defined as “a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine” (Kooreman and Baars 2011). CAM practitioners share a collaborative relationship with their patients wherein emphasis is placed on listening, providing time and communicating with patients (McCaffrey, Pugh and O’Connor 2007). Patients are generally motivated to use CAM when they are dissatisfied with conventional medicine (due to unsuccessful therapy or unpleasant side-effects) or they encounter negative experiences with their medical practitioner which can be perceived as a “top-down” system rather than a collaborative relationship. Patients also opt for CAM due to the holistic nature of therapy as opposed to a one-dimensional pharmacological approach (Eurocam 2014). Females with PCOS seek CAM therapy particularly for improving fertility and ovulation with reduced side-effects (Wu *et al.* 2014). CAM treatments could be as beneficial as the conventional medical management of PCOS (Raja-Khan *et al.* 2011). A study on the perceptions of PCOS patients towards CAM therapy found that 99% of 657 women responded ‘yes’ when asked whether they would prefer if their PCOS could be safely and effectively managed by something else besides fertility drugs or birth control pills (Sills *et al.* 2001). Therefore, with respect to the general dissatisfaction of various aspects of the diagnosis and management of PCOS, consulting with CAM practitioners may be able to satisfy the demands of patients that are not met by conventional medical practices (Kooreman and Baars 2011).

2.9.1 CAM Modalities

2.9.1.1 Ayurveda

Ayurveda is the oldest documented system of medicine and has an age-old history since the 2nd Century BC (Jaiswal and Williams 2017:50). This system is based on

philosophical teachings called *Vaisheshika* and the school of logic called *Nyaya*. The basic doctrine of Ayurveda proposes that the five elements of air, water, ether, earth and fire collectively form three humours within the body: pitta, kapha, vata. It is believed that these humours are responsible for controlling the basic physiological functions of the body. Another important factor considered in Ayurveda is the removal of wastes such as urine, faeces and sweat. The accumulation of waste products is thought to cause obstruction in the body and manifests as various pathologies such as urinary tract infections, diarrhoea, constipation, asthma and rheumatoid arthritis among others (Jaiswal and Williams 2017). Ayurveda describes PCOS according to three doshas and does not speak in terms of hormones since hormones are considered as fire elements, expressed as a pitta nature. The pitta nature is responsible for various female reproductive processes and a dominance of this nature will manifest in hirsutism, acne, painful and clotted menses as well as heart disease. Conversely the heavy, cool qualities of the kapha tendency is responsible for follicle growth and ovulation during the menstrual cycle and a dominance of this nature manifests as weight gain, subfertility and diabetic tendencies. Vata enables the movement of the follicle during the ovarian cycle and a dominance of this dosha manifests as painful menses and scanty or severe menstrual irregularity (Patel and Prajapati 2017). PCOS is also regarded as an obstructive disease to the pelvis resulting in an impaired outflow. The objective of the treatment is to clear out any obstruction, stabilise metabolism and regulate the female reproductive system in order to relieve the symptoms of PCOS (Siriwardene *et al.* 2010). Figure 1 shows a possible pathophysiology of PCOS as per Ayurvedic philosophy adapted from a flow diagram by Nehra (2019:10).



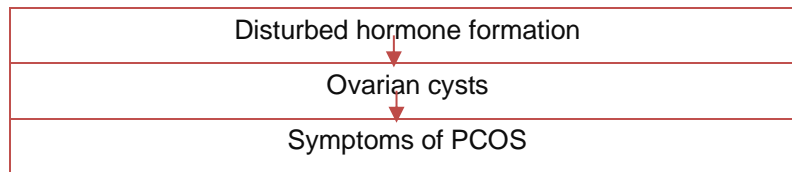


Figure 1: Pathophysiology of PCOS as per an Ayurvedic philosophy

Figure 1 shows the pathophysiology of PCOS as per an Ayurvedic philosophy from aetiology, to progression and doshic imbalances and finally, to derangement of the reproductive system resulting in PCOS.

One of the fundamental aspects of Ayurvedic management is to eliminate toxins and cleanse the body prior to administering palliative therapy; this is known as *Panchakarma* therapy (PKT). PKT involves emesis (*vaman karma*), purgation (*virechana karma*), enema (*vasti karma*), errhines (*nasya karma*), and bloodletting (*raktamokshana*). According to Singh (2012:3), the classical PKT is done in three stages:

1. Preparatory procedures (PREP) (*purvakarma*). These procedures are conducted to prepare the body to undergo a proper and thorough cleansing. They involve applying as well as ingesting oils and fats, sweating, and using herbs to improve the digestion and metabolism in tissues.
2. Main cleansing procedures (MCP) (*pradhana karma*). These procedures consist of five purification procedures especially designed to eliminate toxic materials from the imbalanced doshas of the body. They are emesis, purgation, enema, errhines, and bloodletting.
3. Post procedures (*pashchatya karma*). These procedures consist mainly of recuperative measures in the form of diet, lifestyle changes, and rejuvenating herbs.

In Ayurveda, herbal medicines are known to regulate body functions. Each herb has five categories known as taste (*rasa*), energy released (*veerya*), post-digestive effect (*vipaka*), unique and variable action (*prabhava*) and therapeutic action (*karma*). There are six tastes: sweet, sour, salty, pungent, bitter and astringent; each taste influences a dosha. The energy released from a herb can either be cooling or heating. The former is present in sweet, astringent and bitter herbs which reduce inflammation. The latter

is obtained from sour, salty and pungent herbs which improve circulation and help digestion. The therapeutic action of a herb can be classified as a stimulant (*deepana*), digestive (*pachana*), purification (*shodana*), carminative (*anuloman*) and purgative (*virechana*) (Parasuraman, Thing and Dhanaraj 2014). In Ayurveda, single or multiple herbs are used for treatment. Ayurvedic medicines can also, in addition, be administered with hot water, milk or honey (Parasuraman, Thing and Dhanaraj 2014). Common herbs prescribed in the treatment of PCOS have been summarised by Arora (2018) and expanded on by various literature sources, a summary of which follows.

- *Shatavari* (*Asparagus racemosus*) is a herbal reproductive tonic which is translated as “who possesses a hundred husbands” because it is associated with fertility and vitality. *Shatavari* is found at low altitudes throughout India and its roots are used to prepare the herbal tonic, this is because the roots are believed to have tonic, diuretic and galactagogue effects as well as ulcer healing properties. *Shatavari* contains various phytochemicals including steroidal saponins, alkaloids, isoflavones, carbohydrates, flavonoids, trace minerals, sterols and many other miscellaneous constituents. *Shatavari* has various pharmacological effects: antitussive, adaptogenic, antibacterial, antiprotozoal and GIT (for healing stomach ulcers). *Shatavari* has reported positive inotropic and chronotropic effects on the heart when tested on mice and cats. Other reported miscellaneous effects include immunomodulation, antioxidant effects, anti-inflammatory, aphrodisiac and antilithiatic effects among others. *Shatavari* is a versatile female tonic which acts to reduce inflammation of sexual organs, enhance ovulation, prepare the womb for conception, normalise the uterus and hormones and is also beneficial for the treatment of leukorrhea and menorrhagia. Furthermore, *Shatavari* helps improve insulin sensitivity in IR PCOS patients, reducing blood glucose levels ultimately. Another important effect of *Shatavari* is on stress levels; extracts have been shown to inhibit pro-inflammatory cytokines which increase serum corticosterone levels (Alok *et al.* 2013).
- *Shilajit* (Purified *Asphaltum*) is an exudation obtained from mountain ranges across the world and has four varieties: gold, copper, silver and brownish-black. This natural product has been scientifically validated by modern medicine its

chemical constituents comprise mainly of humus (60-80%) and other components namely; benzoic acid, hippuric acid, fatty acid, ichthyol, ellagic acid, resin, sterol, amino acids among others (Agarwal *et al.* 2007:402). With respect to minerals, potassium, calcium and magnesium comprise more than 90% of its mineral content and overall, while more than 40 mineral constituents have been reported (Stohs 2014). Published human and animal studies show that *Shilajit* increases spermatogenesis in infertile males. Several animal studies have indicated that *Shilajit* has antioxidant and anti-inflammatory effects, as well as improving energy levels and physical performance by improving ATP production at a mitochondrial level. Studies examining the potential effects of *Shilajit* on neurotransmitters have indicated significant cholinergic and parasympathomimetic effects which enhances fertility (Stohs 2014). This is particularly important in the treatment of PCOS which is characterised by reduced fertility as a result of ovulatory dysfunction.

- *Tumeric (Curcuma longa)*, also referred to as *Curcumin*, is a bright yellow spice obtained from the root of *Curcuma longa* and originates from the ginger family. In Ayurveda, *Turmeric* is used widely for its medicinal properties via various routes of administration. Curcuminoids are components of *Turmeric* and includes curcumin (diferuloyl methane), demethoxycurcumin and bisdemethoxycurcumin. Various studies have indicated the anti-inflammatory effects of *Turmeric* which inhibits key-players in inflammation such as phospholipase, lipoxygenase, COX-2, leukotrienes, thromboxane, prostaglandins, nitric oxide, collagenase, elastase and many others. *Turmeric* is applied topically for wounds, blistering lesions, parasitic skin infections and acne. Orally, *Turmeric* is often administered for the common cold, liver diseases, urinary tract infections and as a blood purifier. *Turmeric* has also been inhaled for chronic rhinitis and coryza (Chainani-Wu 2003). In relation to PCOS, *Turmeric* is able to normalise testosterone levels as well as decrease serum estradiol and progesterone. PCOS is a metabolic disorder associated with T2D and hyperglycaemia in early stages which leads to IR. *Turmeric* reportedly prevents IR and diabetic complications as indicated in a study which showed a significant decrease in fasting blood glucose and HbA1c. *Turmeric* reportedly exerts effects similar to clomiphene citrate in PCOS by inducing

ovulation, restoring hormone and lipid profiles, antioxidant and glycaemic indices as well as ovarian morphology by shrinking cysts and pyknotic granulosa cells, thereby enhancing fertility (Reddy *et al.* 2016).

- *Bibhitikaki* (*Terminalia belerica*) is a dry fruit which is a dirty white colour with a velvety, corrugated surface (Kumar and Singh 2013:592). *Bibhitikaki* has numerous phytoconstituents including glucosides, resins, lignans, tannins, mannitol, glucose and fructose among others. Traditionally, it is used as an expectorant. The bark has a mild diuretic effect and is useful in anaemia. The fruits are astringent, acrid, digestive, anthelmintic, aperient, expectorant, anodyne, styptic, narcotic, ophthalmic, antipyretic, antiemetic and rejuvenating. The seeds of *Bibhitikaki* can be used as an aphrodisiac whilst its oil can be used for leukoderma and alopecia (Saraswathi *et al.* 2012: 96-97). Latha and Daisy (2010) investigated the effects of the fruits extracts on diabetic mice and the results indicated a decrease in serum cholesterol, glucose, triglycerides. Untreated PCOS can progress into complications such as T2D and CVD, characterised by high glucose levels, triglycerides and high cholesterol. Thus, it can be concluded that the beneficial effect of *Bibhitikaki* on PCOS is primarily to reduce its complications.
- *Cinnamomum verum* is an age-old aromatic spice which is pale brown in colour and mildly sweet. True cinnamon is a spiral of dried bark which is brittle and easily crushed. Chemically, *Cinnamon* bark contains moisture (9.9%), carbohydrates (22.6%), protein (4.65%), fibre (20.3%), total ash (3.55%) and in small amounts calcium, phosphorous, iron, sodium, potassium, vitamin B1 and B2, vitamin C and niacin. The primary chemical constituents of the spice crop are cinnamaldehyde, gum, tannin, mannitol, coumarins and essential oils (Thomas and Kuruvilla 2012:192-193). In Ayurvedic medicine, *Cinnamon* is used to treat a variety of diseases like bronchitis, colds, congestion, diarrhoea, dysentery, oedema, flu, gas, metabolic and heart strengthening, hiccups, indigestion, liver problems, menorrhagia, melancholy, muscle tension, nausea and vomiting. It also assists uterine contractions during labour and menstrual pain from low metabolic function. Topically, *Cinnamon* is used against headaches and pain. The polyphenolic

polymers present in *Cinnamon* may function as antioxidants, potentiate insulin action, and may be beneficial in the control of glucose tolerance and T2D. A chemical called methoxy hydroxy chalcone polymer is present in *Cinnamon* which can reduce the blood glucose level (Anderson *et al.* 2004). Overall, PCOS treatment should aim to help regulate blood sugar levels, improve insulin sensitivity and boost fertility, which is addressed by this remedy.

- *Guduchi* (*Tinospora cordifolia*) is a large, deciduous shrub which climbs to altitudes of 300 metres. *Guduchi* belongs to the family *Menispermaceae*. The main constituents in *Guduchi* are alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides. The mineral content of *Guduchi* is mainly protein, calcium and phosphorus (Singh *et al.* 2003). *Guduchi* is widely recognised for its hypoglycaemic effects and is also a powerful anti-inflammatory which counteracts inflammation caused by IR and ovarian cysts (Pachiappan, Matheswaran and Pushkalai 2017), and is also widely used to treat T2D. Furthermore, *Guduchi* helps regulate blood sugar and boosts libido in females with the added benefit of treating liver conditions (Arora 2018). Oral administration of *Guduchi* root extract in diabetic rats caused a significant reduction in blood glucose, with an effect equivalent to one unit/kg of insulin (Singh *et al.* 2003).
- *Neem* (*Azadirachta indica*) is a popular, versatile Ayurvedic medicine with a wide spectrum of biological activity. *Neem* is an evergreen tree in India and every part of the tree has been extracted to form medicines against myriads of human ailments. Chemically, more than 135 compounds have been isolated from *Neem*, mainly isoprenoids and non-isoprenoids. The non-isoprenoids include proteins (amino acids), carbohydrates (polysaccharides), sulphurous compounds, polyphenolics such as flavonoids and their glycosides, dihydrochalcone, coumarin and tannins, aliphatic compounds, etcetera (Biswas *et al.* 2002:1336). The leaf of the *Neem* tree can be used to treat eye problems, epistaxis, anorexia and skin ulcers. The bark can be used as an analgesic. The flower can help suppress bile, eliminate intestinal worms and phlegm. The fruit can be used to relieve urinary disorders, diabetes and wounds. The twig, seed pulp and oil can

help treat leprosy and intestinal worms (Biswas *et al.* 2002: 1339). *Neem* is useful in PCOS probably because of its hypoglycaemic ability. PCOS is characterised by IR, leading to hyperinsulinaemia which contributes hyperglycaemia and increases the risk of developing T2D. Aqueous extracts of *Neem* leaves can significantly lower blood sugar levels. This was confirmed by various studies on experimentally induced diabetic rats and fasting rabbits. Topical applications of dried *Neem* in lotions have been shown to treat a variety of dermatological diseases due to its antibacterial activity, making it a good topical treatment for acne, a common complaint in PCOS patients (Biswas *et al.* 2002: 1340-1341).

- *Lodhra* (*Symplocos racemosa*), also known in Europe as the *Cinchona* bark, is a common indigenous Ayurvedic herb with a wide range of medicinal uses. It contains various phytochemicals such as flavanol glucosides, leucopelargonidin, glycosides, triterpenoids, alkaloids etc. *Lodhra* vitiates the doshas of the body through its pacifying ability. *Lodhra* has been used to treat GIT disorders, especially diarrhoea and is also beneficial for treating fever, gingivitis, skin diseases, dropsy and liver complaints. Relevantly, *Lodhra* is an important female gynaecological drug of choice for menorrhagia, leukorrhea and menstrual irregularities which are common occurrences in certain cases of PCOS (Singh *et al.* 2015). Furthermore, *Lodhra* is rich source of flavanol glycosides which effectively treat uterine disorders thus regulating ovarian hormones and restoring fertility (Arora 2018).
- *Ashwagandha* (Figure 2 below), also known as *Withania somnifera*, Indian Ginseng and Winter Cherry, has been a vital herb in Ayurvedic medical systems for over 3000 years. Historically, the plant was used as an antioxidant, adaptogen, liver tonic, anti-inflammatory and anti-bacterial agent among other clinical uses (Gupta and Rana 2007). Stress, hormonal imbalance, nutrient deficiencies and illnesses can contribute to impaired fertility in females. Clinical studies show that *Ashwagandha* improves the functioning of the thyroid gland which is responsible for regulating reproductive hormones. Thus, by promoting relaxation and decreasing stress, *Ashwagandha* can balance hormones and improve fertility (D'Souza 2016). Extracts of *Ashwagandha* have been shown to improve the

symptoms of PCOS by lowering blood testosterone, glucose and cholesterol levels whilst decreasing the weight of the ovaries and improving insulin sensitivity (Saiyed *et al.* 2016).

- *Triphala* is a polyherbal Ayurvedic formulation which is composed of equal proportions of *Terminalia chebula*, *Terminalia beleric* and *Embllica officinalis*. Phytochemical analysis of *Triphala* has reported tannins, phenols, lignans and flavonoids which are reported to have antioxidant properties against free radicals which can induce cellular damage and lead to diseases such as cancer, rheumatism, liver injury and ischaemic heart disease (Vani *et al.* 1997: 315). *Triphala* acts as a cleansing tonic of the blood, liver and other organs, supporting organ detoxification and has also been suggested to be useful in weight management, since *Triphala* can stimulate the release of the satiety hormone while boosting digestion and GIT function (Mukherjee *et al.* 2006). Since most cases of PCOS are associated with weight gain and obesity, the use of *Triphala* can assist in weight loss which improves the metabolic parameters of PCOS.

A subfertility Ayurvedic centre based in Rajagiriya, Sri Lanka, treated 40 sub-fertile females over a six month period and reported an astounding 85% improvement, while 75% of females achieved conception (Siriwardene *et al.* 2010). A similar study has not been conducted in South Africa up until now. It is thus evident that Ayurveda offers promising treatment for females with PCOS and needs to be explored within the eThekweni municipality.



Figure 2: Ashwagandha
Source: Senckenberg (2009)

2.9.1.2 Homoeopathy

Homoeopathy is a 200-year-old system of alternative medicine which was founded by German physician Samuel Hahnemann and is underpinned by the principal that “like cures like” (Trop 2018). Hahnemann proposed the theory of a physical, inimical energy called the vital force (VF) which encompasses the body and mind and maintains homeostasis. It is also believed that the VF possesses the ability to promote self-healing. Disease manifests when the VF is weakened by external stressors, and medication is therefore required to re-establish homeostasis in the body (Bailey 2002). According to homoeopathic philosophy, chronic disease is the manifestation of a dynamic infection by a chronic miasm. The miasmatic theory is a fundamental principle of homoeopathy which denotes a profound level of derangement of the VF and susceptibility to certain diseases which are primarily inherited. This theory was Hahnemann’s crowning glory as it helped distinguish between acute prescribing and the treatment of chronic disease. The miasmatic theory surpassed allopathic medicine, which only focussed on symptomatic treatment whilst Hahnemann’s theory focussed on permanent healing or improving chronic ailments (Croce 2000). Hahnemann based his three miasms on the three diseases that were dominant in his time: scabies, gonorrhoea and syphilis, which were described as three basic metabolic pathways of

homeostasis (psora), anabolism (sycosis) and catabolism (syphilis) (Hatherly 2016). After Hahnemann, other homoeopaths identified the tubercular and cancerinic miasms with a mixture of the original three miasms (Owen 2015:220). Sankaran extended the original miasms to include the acute, typhoid, malaria, ringworm and leprosy miasms (Owen 2015:290). De Schepper (2001) describes psora as “the sensitising miasm”, sycosis as “the miasm of excess and overgrowth” and syphilis as “the destructive miasm”. He also refers to the tubercular miasm as the “reactive/responsive miasm” and the cancerinic miasm as “the mixed miasm”.

The concept of miasm identification is advantageous in determining patterns of pathological tendencies after which the remedies that the patient may need can be predicted and administered (Drew 2004). Miasms are not an isolated affliction and people usually have several active or dormant miasms which the practitioner will attempt to find based on the totality of symptoms (Croce 2000). According to Hahnemannian classification of disease, PCOS falls mainly under the sycotic miasm. Initially, when there are functional changes at the level of neuro-hormonal axis it belongs to psora, and then moves on to sycotic with proliferation by development of cysts (Anon. 2019). The sycotic miasm is believed to be transferred either through sexual intercourse, saliva or hereditary transmission and is thus infectious in nature (Degroote 2012). Paterson (1978) described the sycotic miasm as being characterised by overgrowths of the skin with an oily, sallow appearance and the tendency to blemishes which are frequent on the neck, face, chest and trunk. The sycotic patient perspires profusely on the scalp and genitals; this perspiration may have a musty odour and does not relieve the patient. The patient also has a ravenous appetite and experiences frequent indigestion and stomach cramps. Sycosis generally affects the entire pelvic cavity leading to all types of gynaecological and uterine conditions, including ovarian cysts. Typically, the menstrual flow is accompanied by colic-type pain, dark and stringy clots as well as an unpleasant fishy odour. Generally, the patient is chilly and sensitive to damp weather. The mental status of a sycotic patient is nervous, emotional, irritable and anxious, which gradually declines into confusion and forgetfulness. PCOS from an aetiological and psychological background may also be imputed to be an active and dominant cancerinic miasm. This miasm is situated between the sycotic and syphilitic miasm, which explains why there is an overlap in

characteristics. There is the excessiveness of sycosis together with the destructive nature of the syphilitic miasm (Sankaran 2005: 278).

Drew (2004) lists the keynote traits of the cancerinic miasm as:

- Highly conscientious, dutiful, responsible, caring, hardworking.
- Exhibiting a strong tendency to bear the weight of other people's burdens.
- People pleasing constantly.
- Often there is a history of a strained or detached relationship with parents.
- Internalising their emotions by bottling up anger, resentment and/or hostility.
- Poor coping mechanisms for their stressful lifestyle.
- Poor resolution of child-hood conflicts.

Owen (2007: 233) lists the major characteristics of the cancerinic miasm as:

- The presence of blue sclera, café-au-lait spots, birth marks or moles.
- Family history of cancer, diabetes or TB.
- History of dysfunctional parenting, emotional trauma and abuse.
- Chronic insomnia.
- Compromised immunity: recurrent severe infections in childhood, prolonged antibiotic therapy, corticosteroid use, excessive immunisation.
- Suppression of strong emotions.
- Overworking and overexertion.

One or more of the above conditions should be present to prescribe the nosode *Carcinosin*. The main indication for *Carcinosin* is based on the mental picture. Gruber (1996) described the progression of the mental state of this remedy further in an article titled The Cycle of *Carcinosin* which describes the segments/stages of this patient:

1. Fear: *Carcinosin* patients have fears, which can be perceived as stressors, such as being alone, health-related issues and anticipation.
2. Dependence: This pattern is usually developed during childhood; they become co-dependent on people and need to be taken care of. They feel better when comforted, loved and validated. They submit themselves to their caretaker.
3. Inwardness: Their co-dependence eventually leads to suppression of their individuality which slowly depletes their self-esteem, a common psychological

complaint in PCOS. They become passive and unreactive, internalising their emotions. Tell-tale physical symptoms usually accompanying this phase of the cycle are abdominal pains, styes, stiffness of the lower jaw, swelling of the mammae before menses and constricted movements.

4. Resentment: Their internal feelings contradict their outward portrayal of benevolence and passiveness. They feel anger, disgust, discontent and feel as if they have been wronged. At this stage, the patient feels angered by their circumstances and those involved in it. Many CAM practitioners have reported emotional and physical abuse as strong aetiological factors in the development of PCOS, this patient may have initially internalised their feelings and thereafter experience deep resentment towards those at fault.
5. Overwork: The patient goes through a stage of excitability, overwork, setting unrealistic goals for themselves. They begin overreacting and throwing themselves into new ventures with vitality. They experience symptoms such as sleep talking and insomnia. Cancerous affections tend to develop at this stage as the cells lose their cancer-suppressing ability.
6. Burnout: finally, the excessive expenditure of energy wears them out and they become depressed.

When investigating the remedy picture of the patient in order to reach a similimum, the following points are considered: (1) The disease has to be considered holistically and not locally (2) The physician has to go in depth with case taking to individualise the case (3) The fundamental cause should be established by having a clear concept of the miasm (4) To cure the chronic disease, the physician has to cure the inner miasm otherwise other remedies or external applications are futile (Chatterjee 2010).

All homoeopathic medications have been recognised by the Food and Drug Administration of the United States of America as medicine. Furthermore, homoeopathic remedies have been approved as efficacious, safe and cost-effective in numerous countries (Bornhöft and Matthiessen. 2011:76-81). Remedies are prepared methodically using serial dilutions and succussion which Hahnemann proposed increased the effectiveness of a substance (Bornhöft and Matthiessen 2011:11). He also postulated that a drug substance has a primary and secondary

effect (called the paradoxical effect in modern pharmacology) and that the primary effect of a substance in a healthy individual can indicate the curative effects of the same substance in a diseased individual. It is thus believed that this secondary effect may stimulate healing in a diseased individual (Teixeira 2013). PCOS treatment would thus encompass remedies that in a crude dose would stimulate similar pathologies in healthy individuals. Practitioners arrive at a treatment plan by accumulating the patient's physical complaints together with their mental and emotional symptoms in order to arrive at a remedy that most closely resembles the patient's entire disease picture. PCOS itself is a multi-faceted condition which requires emotional support concomitantly with medicinal support due to the clinical spectrum of changes that can impact females psychologically. The philosophical approach of homoeopathic practitioners towards their patients can be beneficial in providing the holistic support required by females suffering with PCOS.

Common clinical homoeopathic remedies prescribed for the treatment of PCOS as listed by Tsan (2019) and elaborated further by various literature sources, include:

- *Sepia offinalis* is a remedy prepared from the ink of the cuttlefish and is known to be a powerful female reproductive remedy, affecting the venous circulation of the female pelvic organs. Affections of the female are broadly described as prolapse, uterine troubles, prostration and dragging abdominal sensations (Phatak 1999: 639). Other characteristic features are dryness of the vagina which causes painful and exhausting coitus. The female can also present with milky leukorrhea, cracking of the nipples around the crown, hot flushes and a tendency to abortion in the second trimester. Pathological features particularly relevant to PCOS are: scanty, delayed periods especially at puberty, profuse menses, amenorrhea, sterility, pigmentation, hormonal acne which is worse before menses, a voracious appetite for sweet and acidic (inflammatory) foods (Phatak 1999: 642-643). Psychologically, this patient is sensitive, angry and miserable and becomes averse and indifferent to her family and loved ones. Her main complaints are generally regarding health and domestic affairs (Phatak 1999: 640). The discerning characteristics which guide the selection of this remedy selection are that the female tends to feel a bearing down sensation

in the pelvic region, experiences mental irritability, cold sensitivity and indifference towards loved ones (Tsan 2019).

- *Pulsatilla pratensis* is a remedy prepared from the windflower or pasque flower (Figure 3) and is known as the “weathercock” of remedies due to the changeability of symptoms. *Pulsatilla* is a common polycryst used for treating PCOS-related symptoms. The keynote of *Pulsatilla* is changeability, which is why Boericke aptly described this remedy as “The weathercock among remedies”. *Pulsatilla* is pre-eminently a female remedy and has certain keynotes: symptoms appear on one side or shift to the dependent side, there is thirstlessness, chilliness and shortness of breath, symptoms tend to occur with digestive or menstrual complaints. The pains experienced by this patient tend to be burning, stitching and numb. Discharges are profuse, bland, thick, yellow or green. The temperament of this female is distinctly mild, gentle, plethoric, weepy and sensitive (Phatak 1990: 581). Specifically related to PCOS, *Pulsatilla* is indicated for menstruation suppressed for a long period of time, and thus clinically restores the menstrual flow. This remedy is particularly appropriate for young girls at puberty who suffer with irregular menses (Tsan 2019). Females also have amenorrhea resulting from anaemia, creamy leukorrhea, soreness in the mammae with menses and dark, thick menstrual blood in clots. Interestingly, *Pulsatilla* patients crave foods that aggravate them and feel hungry frequently (Phatak 1990: 582), a common occurrence in PCOS.



Figure 3: *Pulsatilla pratensis*

Source: The Norwegian Biodiversity Information Centre (Johannessen 2017).

- *Calcaerea carbonica* (*Calc carb*) is the chief representative of calcium metabolism affecting glands, bone and skin primarily. This remedy is well indicated for patients who are fat, flabby, fair, forty, perspiring, cold and damp (Phatak 1990: 153). The female requiring *Calc carb* tends to have an early menarche with menses being profuse, too long and accompanying dizziness, leukorrhea is thick and milky, breasts are tender before menstruation. Obese females tend to have delayed menses with headaches and dyspnoea. There are often issues related to infertility (Phatak 1990: 155). PCOS is especially associated with weight gain and obesity, profuse and prolonged menstruation as well as some peculiar manifestations such as: excessive head sweating, cold sensitivity and cravings for salty and sweet foods (Tsan 2019). Furthermore, these females are described as indolent, inactive, lethargic, complacent and self-indulgent in food. Emotionally, the *Calc carb* patient is slow, tends to be nurturing, responsible and wise. *Calc carb* is a good remedy for pathology that is rooted in childhood malnutrition and lack of emotional

support. These children develop deep and irrational fears because they were separated or abandoned from their loved ones at a young age (Lilley 2001).

- *Natrum muriaticum* (*Nat mur*) is a popular remedy prepared from common table salt which profoundly primarily affects the blood, heart, liver, spleen and has a marked psychological affection. *Nat mur* is a gradual, deep acting remedy when potentised and is one of homoeopathy's most renowned remedies. Experienced physicians learn to classify their *Nat mur* patients swiftly by appearance and shortly into the consult (Kent 1905). Physically the patient appears emaciated and weak with marked prostration. The skin is often greasy, sallow, with affections such as vesicular eruptions, acne and psoriatic conditions (Kent 1905). Other physical complaints typical of the *Nat mur* patient are congestive headaches, sinus infections, strong salt cravings, insomnia and fluid retention (Korentayer 2012). The congestive headaches experienced by these patients are throbbing and hammering on the head upon waking, they are also periodical and sometimes are only ameliorated by sweating (Kent 1905).

Nat mur, from a constitutional point of view, holds onto the past and the key mental theme revolves around betrayal and loss of trust. Therefore, if this patient was abused emotionally or physically, they will constantly recall this abuse and allow it to affect them deeply. The *Nat mur* patient is overly sensitive but withdraws and puts up a barrier which leads to emotional suppression. The mental state of a *Nat mur* is well documented, and its prescription is based significantly on mental symptoms. Aetiologically, there is strong evidence of chronic grief and disappointment. This patient presents as a melancholic, no matter how joyful a situation is. During the consult, the patient may lose their train of thought and forget what they are about to say. The *Nat mur* patient tends to be easily reactive to noise, preferring solitude, they feel worse when confined to their homes or warm spaces and enjoy the open air (Kent 1905). This patient is often tearful but does not like consolation, they tend to dwell over their problems which can produce a throbbing headache worse on mental exertion. These patients appear vulnerable and are reserved because they are afraid of being hurt again, which is why they prevent themselves from developing emotional connections with people. *Nat mur* is a remedy that treats PCOS associated with both a suppressed and irregular menstrual cycle. Other common indications are dryness of the vagina and pain during coition,

dysmenorrhoea with convulsions, infertility, debilitating leukorrhea, hot flushes during menses. They have oily or dry unhealthy-looking skin with inflammation and scarring (Phatak 1990:498-503).

- *Thuja occidentalis* is a major anti-sycotic remedy which acts chiefly on mucous membranes of the genitourinary tract, intestines, skin, glands and mind. It is the main remedy for excrescences in the body. The patient is frail and generally exhausted. Aetiologically, this patient feels unwell since vaccination. This patient tends to have fixed ideas, they speak hastily, are sad or averse to life itself manifesting as depression. They become anxious and overexcited when talking about their trifles. They are also irritable, jealous and quarrelsome towards their partners but control themselves and wear a mask of affability around strangers and doctors (Phatak 1990: 708-711). *Thuja* treats PCOS associated with a retarded menstrual flow resulting from ovarian cysts, marked with tearing pains that are worse for menses. *Thuja* has the ability to dissolve abnormal growths which include cysts that are prominent on the left-side. In addition, *Thuja* also addresses hormonal imbalances and can help treat hirsutism (Tsan 2019). *Thuja* skin is described as “dirty and spotted” with oily acne, luxuriant hair growth on the face and burning eruptions which become ulcerated (Phatak 1990:712).
- *Folliculinum*: *Folliculinum* has been described extensively by Ari (n.d.) as a low potency “clinical” or “keynote” remedy. It is derived from the hormone oestrone which is secreted by the ovaries. This remedy is primarily indicated in female pathologies associated with a hormonal imbalance. Clinically, *Folliculinum* is indicated in case of functional and organically manifested female diseases, which can be attributed to an impaired ovulation cycle, such as PCOS. A brief materia medica of *Folliculinum* is provided under the categories: mental, general and clinical indications, and modalities. The essence of this remedy is based on the idea of “being lost in devotion”.

Mental symptoms include: Delusions of being lost in devotion, difficulty expressing their identity, co-dependence, a doormat mentality, sensitivity and heightened emotions such as fear, irritability and anger. Fears include losing control and neglecting her duties. General and clinical indications include: A history of abuse (sexual, physical or psychological), lack of libido or increased

libido, eating disorders, serotonin deficiency syndrome, depression, burnout syndrome and psychosis, immune deficiency syndrome, sterility, vasomotor disorders and frequent infections. Modalities include: Aggravation, through wind, heat, noise, touch, rest, alcohol, nicotine. Amelioration through fresh, cool air and exercise outside, through commendation and appreciation. Furthermore, these patients crave wheat and sugar (pastry, pasta). Based on the materia medica of the remedy, it is evident that *Folliculinum* conforms perfectly to the general picture of PCOS from both a physical and emotional picture with cysts, irregular menses, impaired fertility, cravings for wheat and sugary foods which spike insulin levels, depression and a history of abuse. This remedy, very much like PCOS patients, is improved with exercise, commendation and appreciation.

- *Delpinium staphysagria*, referred to by homeopaths as *Staphysagria*, is a remedy prepared from a plant belonging to the *Ranunculaceae* family and it is highly toxic in crude form. *Staphysagria* has marked nervous affections of the genitourinary system and the skin and produces physical, moral and sexual disturbances (Phatak 1999: 661-662). There is a great sensitivity of the female with leucorrhoea and a prolapsing sensation in the abdomen. The mental characteristics which leads to the remedy selection are due to the ill effects of anger and insult. *Staphysagria* is impetuous, passionate, hypochondriacal and very sensitive to the opinion of others. She also dwells on sexual matters. (Boericke 1901). The *Staphysagria* female feels hungry even when her stomach is full and desires stimulants, bread and milk. The patient's libido is excessively high, accompanied by sensitivity of the genitalia, ovarian pain which radiates to the thighs, amenorrhea from indignation and menses accompanied by aching around the hips (Phatak 1990: 664).
- *Lachesis muta*, referred to as *Lachesis*, is a snake poison remedy prepared from the venom of the Bushmaster with the leading theme "ill effects from suppressed discharges". Symptoms appear on the left and then migrate to the right side, particularly affecting the throat and ovaries. *Lachesis* is a great female remedy with keynote characteristics such as dark haemorrhages, blueness of affected parts, excessive neuralgic pain and a sensation of suffocation (Phatak 1990: 410-412). It can thus be indicated in PCOS patients

with suppressed menses that become aggravated by suppression. The *Lachesis* female experiences hot flashes, palpitations and climacteric troubles. Her menses are too short and feeble. PCOS tends to affect the left ovary more, causing pain and swelling. This remedy acts well at the beginning and ending of menses. The skin tends to be hot and prone to boils, carbuncles and blisters. Symptoms tend to aggravate with sleep or constriction but ameliorate with discharges and warm applications. The mental symptoms of *Lachesis* are marked by loquacity, jealousy and suspicion. There is also an aspect of religious insanity, either being obsessively spiritual or sinful (Boericke 1901).

- *Apis mellifica* is a well-known polycryst remedy that acts on cellular tissues inducing oedema of the skin and mucous membranes, particularly on the eyes, face, throat and most importantly, the ovaries. The main sensations of this remedy are burning, stinging, smarting and prickling (Phatak 1990: 61-62). It is indicated for ovarian cysts with stinging pains and tenderness over the abdomen region. Other indications for *Apis* also include congestion and numbness in the ovaries from suppressed menses, amenorrhea, dysmenorrhoea with scanty discharge of slimy blood, profuse, green leukorrhea and swelling of the labia (Phatak 1990: 65). Cysts are worse on the right side accompanied by dysmenorrhoea, profuse menorrhagia and a bearing down sensation. The *Apis* patient aggravates with heat and is better with cold applications. A few mental symptoms present as apathy, indifference, fright and difficulty concentrating (Boericke 1901).

A recent study on PCOS and its treatment in different medicinal systems concluded that homoeopathy can be considered to offer a more effective and less harmful treatment without compounding side effects whilst allopathy can only help control the symptoms of PCOS (Sawant, Patil and Shah 2017). It can thus be concluded that homoeopathy can provide the individualised, patient-centred care required by females suffering with PCOS by focussing on their mental, emotional and physical complaints without compromising on clinical management and effective treatment.

2.9.1.3 Naturopathy

Naturopathy (NP) is a versatile modality with multiple modalities integrated into it. The basic principles of NP, according to Western philosophy, are described by Nair and Nanda (2014:142) as follows:

- The healing power of nature: naturopathic medicine recognises the body's natural innate healing ability if given the proper stimulus and tools.
- Identify and treat the causes: attempt to treat the underlying root cause of illness, rather than focussing merely on presenting symptoms.
- First do no harm: NP's begin with minimal interventions and proceed to higher level interventions only as necessary.
- Doctor as teacher: educate patients, involve them in the healing process, and emphasise the importance of the doctor-patient relationship.
- Prevention: naturopathic medicine emphasises optimal wellness and the prevention of disease.

NP encompasses nutrition, herbal medicine, massage and homoeopathy but focusses mainly on lifestyle behaviours that results in the expression of PCOS (Arentz *et al.* 2017). It is thus difficult to ascertain the exact protocol used by NP practitioners to manage PCOS. This study provided an opportunity to investigate the approach used by local practitioners in the eThekweni area. NP integrates a modality known as phytotherapy, which is based on scientifically proven herbal medicine and addresses some of the following fundamental contributing factors to disease, namely: diet, exercise, trauma, psychosocial factors, nutrients and radiation among others (Pizzorno and Murray 2013). The epidemiology of PCOS has been strongly linked to IR although the exact mechanism remains elusive. The starting point for many NP practitioners is IR, which often correlates with PCOS, and is often the result of poor lifestyle and dietary choices. This correlation between IR and a diet high in glycaemic content forms the primary focus of NP treatment. Another important feature considered in the management of PCOS is chronic stress, which increases sympathetic stimulation and inhibits FSH, a hormone responsible for ovulation (Hywood 2012). Therapy is usually a combination of herbal, lifestyle and dietary interventions and aims to correct the diet in order to normalise ovarian function and combat hyperinsulinemia. (Hywood 2012). A modest 5% reduction of total body weight has been shown to

improve metabolic parameters of PCOS such as reduce IR, reduce testosterone levels, improve menstrual function as well reduce hirsutism and acne (Marsh and Brand-miller 2005). It has been proposed that diet is more effective than exercise alone. Villella (2016: 3) summarised the presenting concerns of PCOS patients along with the most established treatment options, which are expanded upon by the researcher.

1. Insulin resistance and metabolic features

- Diet: although the optimal diet has not yet been confirmed for PCOS (Marsh and Brand-Miller 2005: 154), Douglas *et al.* (2006) found that a diet low in carbohydrates (CHO) (43%) and cholesterol, high in fibre, and comprising 45% fat (18% MUFA and 8% saturated fat) improved the metabolic profile of women with PCOS within 16 days. A meta-analysis of overweight adults found that low carbohydrate (CHO) diets achieved significant improvements in waist circumference, total cholesterol, fasting glucose and serum insulin compared to low fat diets. It also showed significant improvements in weight and lipid profiles (McGrice and Porter 2017).
- Exercise: physical activity is often prescribed as a component of primary PCOS management to reduce weight, improve metabolic parameters and improve overall QoL. Endurance exercise which is moderate-to-vigorous may improve insulin sensitivity via weight-loss mechanisms (Aye *et al.* 2018: 592), thus reducing the effects of IR, a central feature of PCOS. Harrison *et al.* (2010) conducted a systematic review on the effect of exercise therapy on PCOS and concluded that regular, moderate-intensity aerobic exercise over a short period improved reproductive outcomes including ovulation and menstrual cycle regulation in addition to the reduction of weight and IR in young, overweight women with PCOS. Based on the results from this review, it was suggested that women with PCOS should engage in at least 90 min of aerobic activity per week at moderate intensity to achieve improved reproductive and cardiometabolic outcomes.
- Cinnamon (*Cinnamomum verum*) is a popular spice which has been traditionally prescribed for T2D given its role in controlling blood glucose levels. The effects of daily ingestion of 1000mg of *C. verum* was studied in a small number of

PCOS patients over a period of 8 weeks. Results showed an improved glucose response in terms of the OGTT and improved IR parameters (Kasim-Karakas and Mishra 2009: 324).

- Chromium picolinate is a supplement which improves glucose tolerance, insulin sensitivity, ovulation rates and gut absorption. The use of chromium in a daily dose of 1000 mg in adolescent girls diagnosed with PCOS for 6 months significantly improved the regularity of their menstrual cycles, decreased their ovarian volume as noted on ultrasonography, decreased the number of ovarian follicles between 2-9 mm, and decreased free testosterone (FT) levels. Patient compliance is reported as being excellent, and side effects have not been reported, making this mode of treatment a promising one (Amr and Abdel-Rahim 2015).
- Omega-3 fatty Acids are found in fish oils and are used preferentially for energy production and increased glycogen storage. There is a large body of evidence which indicates that fish oils reverse IR imputed to a high-fat diet by shrinking the size of adipocytes which decreases the levels of circulating fatty acids. This further facilitates the utilisation of glucose by muscle and improves insulin sensitivity throughout the body (Kasim-Karakas and Mishra 2009: 324). Suggested mechanisms include: (1) Improve insulin sensitivity by modifying the levels of glucose transporters in muscle and adipose tissue and suppressing both the activity and expression of glucose-6-phosphatase. (2) Anti-inflammatory action which helps to combat pro-inflammatory cytokines in PCOS (Villella 2016: 6).
- Alpha lipoic acid is a potent antioxidant and its controlled release has been reported to improve blood glucose levels in PCOS patients, improve insulin sensitivity, reproductive and metabolic disorders (Cianci *et al.* 2015: 484).

2. Hyperandrogenic features – hirsutism and acne

- Zinc picolinate is a basic element serving many vital functions including fertility and reproduction, inflammation and oxidative stress (Jamilian *et al.* 2016: 278). Zinc has been found to have anti-inflammatory actions which may decrease sebum production, thus reducing acne in PCOS patients (Villella 2016: 9).

- Chromium (mentioned previously) has been shown to decrease FT levels in the body (Amr and Abdel-Rahim 2015).

3. Anovulation and fertility issues

- *Inositol*: Inositol is a polyalcohol which belongs to the vitamin B complex and has nine stereoisomers including the most common form, myo-inositol (MYO). MYO has a mechanism of action which improves insulin sensitivity of target tissues. In a study by Unfer *et al.* (2012), all the PCOS patients showed a significant improvement of typical hormonal parameters such as insulin and glucose levels after MYO treatment. Furthermore, MYO also had a positive effect on restoring ovulation and improving oocyte quality through the reduction of insulin plasma levels.
- *Paeonia lactiflora* (White peony) and *Glycyrrhiza glabra* (Liquorice) combined. *Paeonia* contains an important constituent known as *paeoniliflorin* derived from the dried root of *P. lactiflora* and has been indicated for elevating progesterone levels and lowering androgen levels. *G. glabra* contains a water-soluble constituent known as *glycyrrhizin* which has demonstrated androgen lowering effects. The synergistic action between these herbs reduces FT and improves the oestrogen-testosterone ratio after four weeks. The proposed mechanism of action is that this combination promotes aromatase activity in the ovaries which increases the rate of conversion of testosterone to oestrogen, thus improving pregnancy rates.
- *Black cohosh* (Figure 4), also known by the Latin name *Cimicifuga racemosa*, belonging to the Ranunculaceae family, is commonly referred to as a “woman’s herb” due to its wide range of action on female gynaecological conditions. *C. racemosa* is commonly used in naturopathy to treat anovulatory and fertility issues. The action of phytoestrogens in *C. racemosa* has been suggested as the mechanism which is responsible for ovulation induction (Villella 2016: 6). Three randomised controlled trials corroborated the positive fertility effects of *C. racemosa* in women with PCOS when used in combination or compared against clomiphene citrate, a first line drug treatment for ovulatory disorders in women with PCOS (Kousta, White and Franks 1997: 359). In a study comparing

the *Cimicifuga* against clomiphene, pregnancy rates were reported to be higher in those taking the former (Arentz *et al.* 2014: 13).



Figure 4: *Cimicifuga racemosa*
Source: Thomas (2007)

A randomised controlled trial conducted by Arentz *et al.* (2017) implemented an exercise routine adhering to 150 minutes of exercise per week including 90 minutes of aerobic activity to increase heart rate as well as a strict diet modification which restricted calorie content and eliminated all carbohydrates with a high glycaemic index. Furthermore, herbal intervention was implemented using tablets that contained a combination of extracts which have been mentioned previously in detail, namely: *Glycyrrhiza glabra* and *Paeonia lactiflora* which aimed to potentially reduce androgens, *Cinnamomum verum* which improves insulin sensitivity (Wang *et al.* 2007) as well as irregular menses (Kort and Lobo 2014) and *Hypericum perforatum* which reduces the effects of anxiety and depression (Gaster and Holroyd 2000).

Hypericum perforatum is known as *St John's wort* and is a herbaceous perennial plant native to Europe and Asia. *H. perforatum* is reported to have sedative and astringent properties and used traditionally to treat anxiety, neuralgia, fibrositis, sciatica, depression and as a nerve tonic. *H. perforatum* is best known for its use in treating mild-to-moderately severe depressive disorders. A systematic review and meta-

analysis of randomised controlled trials of *H. perforatum* extracts included 23 trials involving a total of 1757 patients with depressive disorders who reported significant improvements when compared to placebo. *H. perforatum* was found to be as effective as conventional anti-depressants. The exact mechanism of *Hypericum*'s antidepressant action remains elusive, initially the constituent *hypericin* was named as the role player in this activity but, recently, experimental and clinical evidence has indicated that *hyperforin* is one of the major constituents responsible for the antidepressant activity of *H. perforatum* (Barnes, Anderson and Phillipson 2001: 585-588).

Although no studies on the effects of naturopathy on PCOS have been found in South Africa, other studies on the evidence and efficacy of the herbal medicines used by NPs on PCOS have been conducted (Arentz *et al.* 2014).

2.9.1.4 Traditional Chinese Medicine

TCM has the longest history in Asia and is focussed on restoring balance to the organ systems and combines scientific knowledge of metabolism, immunity and homeostasis. TCM stresses the importance of preventative medicine, thus, many healthy patients visit practitioners to strengthen any weakness identified by their practitioner (Cheung 2011). TCM uses the theory of qi, yin and yang and wuxing (five elements) as a philosophy to guide its practices (Qiu 2015). The concept of qi is described as a basic element which flows and maintains all functioning of the body (Kam *et al.* 2019:395). The qi force to thought to comprise of two dynamically opposite yet harmonising energies known as yin (female and negative energy) and yang (male and positive energy). Yin and yang can be further divided into four broad qi families: hot, warm, cool and cold and the clinical application of herbal medicine is governed by these properties (Fei *et al.* 2018).

TCM regards imbalances in the body as a direct imbalance of organ systems contributing to a disease and as such regards PCOS as an imbalance in the kidneys, liver and spleen. Reproductive dysfunction is believed to be linked to a deficit in the kidney which is viewed as the main problem in PCOS which needs to be corrected (Raja-Khan *et al.* 2011). In TCM, the major therapeutic principles of PCOS includes

tonifying the kidney, dispersing stagnated liver qi, regulating blood, and clearing damp and resolving phlegm (Lin *et al.* 2019: 3). TCM practitioners implement a dual approach to treating the PCOS patient: acupuncture and Chinese Herbal Medicine (CHM).

Acupuncture is an ancient therapeutic practice in TCM involving thin needles inserted into the skin which stimulate specific points on the body surface serving to remove any obstruction of qi. Some research articles have postulated theories to explain the acupuncture effect on female sex hormones through actions on the HA axis as its mechanism of action (Lim and Wong 2010: 473). Other scientific studies have investigated the acupuncture meridians and their neuro-endocrinological attributes and proposed that acupuncture may stimulate the production of endorphins which thus provides an analgesic effect. It has been reported that acupuncture may help regulate menstrual cycles by improving ovulation, however, there is insufficient evidence to support the effects of acupuncture on live births (Lin *et al.* 2019:8). There remains a lack of evidence-based clinical trial to conclusively define the role of acupuncture in the treatment of patients with PCOS (Lim and Wong 2010: 476-477).

The second part of TCM is CHM which involves the use of several herbs in a formula to ameliorate a set of problems (Ling *et al.* 2015:1) and is widely prescribed for endocrinological disorders such as PCOS (Zhang *et al.* 2010). One of the main aims of CHM is to enhance pregnancy rates and fertility. A systematic review on the efficacy of CHM in the management of female infertility suggested that fertility can be improved using CHM by increasing the pregnancy rate two-fold within a four-month period (Ried and Stuart 2011: 236). The treatment strategy for PCOS generally comprised (I) Prescribing one formula with a sovereign medicinal action throughout the menstrual cycle (II) Assistant medicinal formula to relieve secondary symptoms or tempers the action of the sovereign ingredient (Zhang *et al.* 2010: 3).

The commonly used herbs in the treatment of PCOS and gynaecological conditions are extensive and subjective to practitioners. According to Arentz *et al.* (2014: 3), the most common Chinese herbs featuring in almost every gynaecological formula are *Cimicifuga racemosa*, *Cinnamomum cassia*, *Curcuma longa*, *Glycyrrhiza*, *Matricaria*

chamomilla, Mentha piperita, Paeonia lactiflora, Silybum marianum, Tribulus terrestris and Vitex agnus-castus.

- *Cimicifuga racemosa* is a perennial herb native to North America and is commonly referred to as a “woman’s herb” due to its wide range of action on female gynaecological conditions. Furthermore, *C. racemosa* has been widely advocated as a replacement hormone therapy for females experiencing menopausal symptoms. The rhizome contains numerous chemical components including triterpene glycosides, phenolic acids, flavonoids, volatile oils and tannins, and the overall effect of *C. racemosa* is believed to be the result of the synergistic action between these components. Extracts of the rhizome of *C. racemosa* have been used for pain relief during menses or childbirth and dysmenorrhoea as well as other conditions such as dyspepsia, epilepsy, kidney ailments, malaria and rheumatism (Borrelli and Ernst 2002: 235). Three randomised controlled trials corroborate the positive fertility effects of *C. racemosa* in women with PCOS when used in combination or compared against clomiphene citrate, a first line drug treatment for ovulatory disorders in women with PCOS (Kousta, White and Franks 1997: 359). In a study comparing the *C. racemosa* against clomiphene, pregnancy rates were reported to be higher in those taking the former (Arentz *et al.* 2014: 13).
- *Cinnamomum cassia (Cinnamon)* is a common spice obtained from the inner bark of trees and has been widely used in TCM for conditions such as flatulence, amenorrhea, diarrhoea, toothache, fever, leukorrhea, common cold and headache. This herbal supplement was also traditionally recommended for treatment of impotency, frigidity, dyspnoea, eye inflammation, vaginitis, cough, rheumatism, and neuralgia, as well as cardiovascular diseases. Furthermore, several scientific studies have found that *Cinnamon* has many therapeutic effects including antiviral, antifungal, antibacterial, antioxidant, antihypertensive, antilipemic and antidiabetic among other effects (Hajimonfarednejad *et al.* 2019). *Cinnamon* was compared for effectiveness against the pharmaceutical metformin on hormone concentration in rats with PCOS. This study reported significant improvements when compared to controls for serum testosterone, LH concentration and IR (Arentz *et al.* 2014:14). *Cinnamon* extracts reported a significantly higher glucose infusion rate when

compared with controls. OGTT following an 8-week treatment of *Cinnamon* extract showed a 21% reduction in glucose and increase in insulin sensitivity (Qin, Panickar and Anderson 2010). Since IR is a core defect in PCOS, it is highly beneficial as a herbal treatment. Furthermore, there is strong evidence that *Cinnamon* decreases systemic inflammation by inhibiting postprandial overproduction of intestinal lipoproteins and serum triglycerides as well as TNF- α which has been linked to obesity and IR. There have been five corroborative studies reporting beneficial effects of *Cinnamon* on blood glucose levels, insulin and low-density lipoproteins (LDL) in relation to T2D, however, which are also central features of PCOS (Qin, Panickar and Anderson 2010).

- *Curcuma longa* is a perennial herb belonging to the *Zingerberaceae* family, it is widely cultivated in Asian tropical regions. The importance of turmeric in medical treatment primarily stems from the colourant *C. longa* which is the most active component. *C. longa* is a lipophilic polyphenol substance which constitutes 2-5% of *Turmeric* powder. Studies have shown antioxidant, antimicrobial, anti-inflammatory, antiangiogenic, antimutagenic, and antiplatelet aggregation properties which helps protect against various types of disease, one of these types being metabolic diseases (Kocaadam and Şanlier 2017). In relation to PCOS, *C. longa* is able to normalise testosterone levels as well as decrease serum estradiol and progesterone. PCOS is a metabolic disorder associated with T2D and hyperglycaemia in early stages which leads to IR. *Curcumin* reportedly prevents IR and diabetic complications as indicated in a study which showed a significant decrease in fasting blood glucose and HbA1c. *C. longa* reportedly exerts effects similar to clomiphene citrate in PCOS by inducing ovulation, restoring hormone and lipid profiles, antioxidant and glycaemic indices as well as ovarian morphology by shrinking cysts and pyknotic granulosa cells, thereby enhancing fertility (Reddy *et al.* 2016).
- *Glycyrrhiza glabra* is also known as Liquorice and is the most widely prescribed herb in China after Ginseng. The main water-soluble constituent in this herb is glycyrrhizin followed by liquiritigenin, flavanones, isoflavones, isoflavans, 3-arylcoumarins and others. The stems or roots are used primarily for respiratory

tract ailments, particularly as an antitussive and demulcent. Other reported effects of *G. glycyrrhiza* are that it is a thrombin inhibitor and has antimicrobial, antiviral, anti-ulcerative, anti-inflammatory and antioxidant effects. Furthermore, *G. glycyrrhiza* has been described as antidiabetic because it exhibits a potent PPAR- γ ligand binding activity thus reducing blood glucose levels in diabetic mice (Saxena 2005). *G. glycyrrhiza* has also demonstrated androgen lowering effects in two clinical trials and one laboratory study on rats. One animal study showed a significant reduction in total testosterone and increased estradiol in sterilised rats whilst another demonstrated increased ovulation rates by the number of corpus luteum in polycystic ovaries compared with controls. Another clinical study indicated a reduction in testosterone during the first four days of taking the drug spironolactone which causes a flare up of androgens during the initial phase of treatment (Arentz *et al.* 2014:14).

- *Matricaria chamomilla* is known by an array of names, such as Baboonig, Babuna, Babuna camornile, Babunj, German chamomile, Hungarian chamomile, Roman chamomile, English chamomile, Camomilla, Flos chamomile, Single chamomile, Sweet False chamomile, Pinheads, and Scented Mayweed, suggesting its widespread use. *M. chamomilla* is a branch of the Asteraceae family and has been used in herbal remedies for thousands of years from ancient Egypt, Greece, and Rome. It is included in the pharmacopoeia of 26 countries finding its place in Unani Tibb, homoeopathy and Chinese herbal formulations. More than 120 chemical constituents have been identified in *M. chamomilla* flowers including 28 terpenoids, 36 flavonoids and 52 additional compounds with potential pharmacological activity (Singh *et al.* 2011: 82-86). The most characteristic constituents of *M. chamomilla* are unstable oil, sesquiterpene lactones, ascorbic acid, and phenol compounds, primarily the flavonoids, apigenin, quercetin, patulin, luteolin, and glycosides (Shoorei *et al.* 2018: 219). Components, such as α -bisabolol and cyclic ethers are antimicrobial, umbelliferone is fungistatic, whereas chamazulene and α -bisabolol are antiseptic. *M. chamomilla* also has sedative effects on the central nervous system which can be used to cure insomnia (Zangeneh *et al.* 2010). *M. chamomilla* is mainly used as an anti-inflammatory, antiseptic and antispasmodic. It is taken orally for dyspepsia, flatulence, colic, fever and many other GIT disturbances

(Singh *et al.* 2011: 82-86). Studies have shown that high concentrations of hydroalcoholic extract of *M. chamomilla* can inhibit cell proliferation and can decrease the estradiol level in PCOS which may be related to the high concentration of flavonoids and/or phytoestrogens (Shoorei *et al.* 2018:224).

- *Mentha piperita*, commonly referred to as *M. piperita*, belongs to the *Labiatae* family and is cultivated worldwide. *M. piperita* is used in numerous forms including the leaf, leaf extracts and water. *M. piperita* is used commonly for flatulent colic, abdominal pain, fever, nausea and vomiting. It has been found that peppermint has antioxidant, antitumor, antiallergenic, anti-inflammatory, antiviral, antibacterial, and antifungal activity. Furthermore, *M. piperita* has anti-androgenic properties which reduce the level of FT in the blood. One of the clinical manifestations of PCOS is hyperandrogenaemia, which results in high levels of free circulating testosterone in up to 80% of PCOS patients contributing to hirsutism and acne. In a study which aimed to evaluate the protective role of *M. piperita* on letrozole induced PCOS in female rats, treatment with *M. piperita* exhibited a significant recovery of testosterone, estrogen, LH levels, ovarian and uterine tissue. The histopathological observations of the *M. piperita* treated group showed improvement of the ovarian tissue with restored menstrual cycles. Furthermore, *M. piperita* showed anti-androgenic effects by reducing increased androgen levels and prevented ovarian cell dysfunction in PCOS to improve fertility. The documented recovery of ovarian tissue as well as antiandrogen potential of *M. piperita* may thus be beneficial in the management of PCOS (Amoura *et al.* 2015).
- *Paeonia lactiflora* (*P. lactiflora*), also known as Chinese peony, is a herbaceous perennial flowering plant from the family Paeoniaceae with fleshy roots and annual stems. *P. lactiflora* has been used for centuries in China, Korea and Japan as a decoction of the dried root. A water/ethanol extract of the root has shown the total glucosides of peony (TGP) which contains more than 15 compounds, the main ingredient being paeoniflorin which is most abundant and accounts for the pharmacological effects in both *in vitro* and *in vivo* studies. The most common indication for *P. lactiflora* is pain, given its prominent analgesic effects which is caused by inhibition of the production of prostaglandin E2, leukotriene B4, nitric

oxide and intracellular calcium ion concentration. Therapeutically, *P. lactiflora* is used to treat autoimmune diseases such as systemic lupus erythematosus and rheumatoid arthritis (He and Dai 2011:10). For PCOS treatment specifically, *P. lactiflora* is usually combined with *Glycyrrhiza glabra* and works to reduce testosterone levels. This is supported by two clinical trials including women with PCOS which showed a significant reduction in serum testosterone at four weeks of treatment (Arentz *et al.* 2014:14).

- *Silybum marianum*, also known as Milk Thistle or Silymarin, is a plant belonging to the family Asteraceae, with its seed being commonly used in TCM as well as by Western herbalists in the treatment of liver disorders. It is currently recommended for dyspeptic complaints, toxin-induced liver damage, hepatic cirrhosis and supportive therapy for chronic inflammatory liver conditions. *S. marianum* has also become increasingly popular in its use for adult and paediatric oncology and has been under investigation for its role as a chemoprotective agent and possible treatment in cancer. The main flavonoid complex, which is the basis of clinical research, has been on the action of silymarin. In traditional medicine, *S. marianum* has been used as a digestive aid, anti-inflammatory, anti-neoplastic, hypotensive, styptic, diuretic and general tonifier (Greenlee *et al.* 2007: 158). A randomised double-blinded study which compared *S. marianum* to placebo in 51 T2D patients indicated a significant reduction in HbA1c, fasting blood glucose, total cholesterol, LDL-cholesterol and triglycerides, which are commonly increased in PCOS as the syndrome progresses. Due to its antioxidant and anti-proliferative properties, *S. marianum* possesses a potential hepato-protective effect. Since fatty liver disease is a common complication of PCOS, this plant may be beneficial in preventing such complications (Kasim-Karakas and Mishra 2009: 325).
- *Tribulus terrestris* is a popular medicinal herb belonging to the family Zygophyllaceae and is an annual shrub found in various parts of the world, including China. A preliminary phytochemical study of *T. terrestris* revealed saponins, flavonoids, glycosides, alkaloids, and tannins. In TCM, the fruit are used for the treatment of eye trouble, oedema, abdominal distension, emission, morbid leukorrhea, and sexual dysfunction. It has also been prescribed in the oldest known

TCM pharmacopoeia *Shern-Nong* for its restorative ability to the liver, as well as treating fullness in the chest, mastitis, flatulence, acute conjunctivitis, headaches and vitiligo (Chhatre *et al.* 2014:46-47). Two randomised control trials conducted on rats with PCOS found that *T. terrestris* significantly improved ovulation rates in just two doses. The endocrine effects of *T. terrestris* has shown a significant increase in mean serum FSH concentrations (Arentz *et al.* 2014:13). Given that anovulation/oligo-ovulation often accompanies PCOS, *T. terrestris* may be a beneficial herb to include in TCM treatment.

A 2017 study on the effectiveness of TCM for PCOS when combined with a conventional therapy concluded that the cycle ovulation rate, the pregnancy rate and the total effective rate of symptom treatment were higher in treatments that included TCM (Ma and Tan 2017). It can thus be concluded that TCM for the purpose of conception has been well established in literature and would be beneficial to females with PCOS who trying to conceive.

2.9.1.5 Unani Tibb

Unani Tibb (UT) is a modality of CAM which is based on traditional Islamic medical knowledge and the teachings of three iconic pioneers of medicine, namely, Hippocrates, Galen and Ibn Sina (Hoosen 2017). It is a holistic system which states that disease impairment occurs when there is an imbalance in the body humours. The humoral theory was first propounded by Hippocrates who postulated four humours: blood, phlegm, yellow bile and black bile. The humours are distinguished according to appearance, colour, composition, physical properties and proportions. Disease itself can be caused by either a deficiency, excess or segregation of a particular humour and the aim of treatment is to restore the humour to its normal state. In addition to the four humours, there are four complexions which are used in UT philosophy, namely: hot, cold, dry and moist, and these complexions can occur simultaneously (Israili 1981).

UT describes four temperaments, which are characteristic personality types that can interrelate: sanguine, choleric, melancholic and phlegmatic. The sanguine personality is extroverted, enthusiastic, active and social. The choleric personality is introverted,

decisive, dependent, goal-oriented and dominant. The melancholic personality is analytical and fanatical over minute details, they are perfectionists and deep thinkers. Phlegmatic individuals tend to be relaxed, peaceful, quiet and easy-going who are deeply sympathetic but hide their emotions (Ekstrand 2012).

Athar (2016: 3166-3167) described the pathophysiology of ovarian cysts as excessive coldness leading to the dominance of a bloody temperament. This was described as excessive fat deposition in the body caused by the excessive intake of fatty food, cold items in diet, a sedentary lifestyle, excessive sleep particularly after meals which are responsible for fat deposition which affects fertility. The ingestion of cold food results in excessive chyme which is ineffectively converted into blood, and forms phlegm instead – this leads to stagnation in blood in the liver which can result in amenorrhea and infertility. The cold temperament of the blood affects the uterine temperament which in turn becomes cold, leading to an altered ovarian function which causes impaired follicle development and anovulation. Shameem and Khatoon (2018: 319) described PCOS as amenorrhea, obesity, phlegm accumulation and liver disorders. It is based mainly on the concept of an abnormal cold temperament of the liver which may lead to the abnormal production of phlegm. The liver becomes defective in converting chyme into blood resulting in the conversion of phlegmatic blood which can accumulate in sacs to form ovarian cysts. Some of the phlegmatic swellings are the result of excessive diluted form of the phlegm which exhibits a gaseous nature, resulting in fluid retention and cyst formation (Iqbal *et al.* 2018). In the overweight cold-temperament PCOS patient, the excessive fat deposition in the body is usually caused by the excessive intake of fatty and cold food, a sedentary lifestyle, excessive sleep, particularly after meals – all of which affects fertility. The ingestion of cold, moist food results in excessive chyme which is ineffectively converted into blood, forming phlegm instead – this creates stagnation in the liver which can lead to amenorrhea and infertility. The cold temperament of the blood affects the uterine temperament which in turn becomes cold, leading to an altered ovarian function which causes impaired follicle development and anovulation (Athar 2016: 3166-3167).

Different diagnostic approaches to PCOS have been detailed by Iqbal *et al.* (2018: 495-496):

- PCOS accompanying a cold temperament can be associated with the following symptoms:
 - Deep sleep
 - Whitened skin appearance
 - Whitish-green appearance of vessels
 - Slow pulse
 - Cold sweats
 - Polyuria
 - Frothy stool
- PCOS with amenorrhea and hepatic weakening can be associated with the following symptoms:
 - Irregular menstrual cycle
 - Pain and heaviness in the right hypochondriac region
 - Anorexia
 - Pallor and a puffy face
- PCOS is associated with a dominant phlegmatic temperament, can be indicated by:
 - White-hued and diluted menstrual blood
 - Soft and scanty pubic hairs.

According to Iqbal *et al.* (2018: 498-499), the management of *Marz Akyas Khusyatur Rehm* (PCOS) consists of the treatment of phlegmatic (melancholic) and sanguineous diseases, amenorrhea and obesity and is therefore categorised under three headings:

1. *Ilaj Bit Tadbeer* (Regimental therapy)

- Procure rapid descent of food from the stomach and intestines, in order to prevent completion of absorption by the mesentery.
- Consume bulky but nutritious food.
- Take a bath before eating a meal.
- Include rigorous exercise.
- Massage with resolvent oils.

- Electuaries.
- Consume vinegar and salt, while fasting.

2. *Ilaj Bid Dawa* (Pharmacotherapy)

If the disease is “hot” in nature, then “cold” drugs should be used but if there is coldness in the body then “hot” drugs should be given. UT formulations consist of obesity suppressing active substances (diosgenin and camphene) as well as phytohormones like flavonoids, saponins, and glycosides which help in menstrual regulation and conception (Khan *et al.* 2017). The most recent study on the efficacy of the UT in PCOS was an observational study conducted at the National Institute of Unani Medicine Hospital in Bengaluru. The study was aimed at evaluating the efficacy of Unani formulations in infertility among obese women and included women with PCOS. The study concluded that UT formulations reduce weight, regulate menses and improve lipid profiles (Khan *et al.* 2017). Specific herbs commonly featured in PCOS pharmacology, according to a systematic review on UT by Firdose and Shameem (2016: 587-589) include:

- *Abhal*, known by the Latin name *Juniperus communis*, is the most widespread evergreen shrub in the world, occupying a variety of habitats. *Abhal* berries contain volatile oils, sugars, resins, flavonoids, proanthocyanidines, lignan desoxypodophyllotoxin and its isomer desoxypicropodophyllotoxin, diterpene acids and sesquiterpenes as well as five diterpenes. In UT, *Abhal* has been used as a diuretic, antiseptic, aromatic, rubefacient, stomachic and antirheumatic. Traditional uses include cystitis, flatulence and colic. Furthermore, studies have shown that *Abhal* has hypoglycaemic effects which may be beneficial in reducing blood glucose levels in PCOS patients (Lim 2012: 725-729). *Abhal* can be used clinically to treat oligomenorrhea in PCOS. A study showed that 12 out of 19 PCOS cases reported menstrual regulation following treatment with *Abhal* through its effects on the ovaries (Firdose and Shameem 2016).
- *Neem* (*Azadirachta indica*) is a well-known and versatile medicinal plant which has been used for more than 2000 years in India and has been referred to as “the reliever of sickness”. *Neem* has been used across modalities such as homoeopathy, Ayurveda and Unani Tibb. The chemical analysis of *Neem* reveals

more than 135 compounds including isoprenoids (diterpenoids and triterpenoids, limonoids etcetera) and nonisoprenoids (proteins, carbohydrates, sulphurous compounds, polyphenolics etcetera). The *Neem* compound *nimbidin* has displayed various biological activities such as anti-inflammatory, anti-pyretic, antifungal, antibacterial and diuretic effects among others. The seed oil has potential spermicidal, antibacterial, antimalarial and antifungal effects. The bark possesses anti-inflammatory, immunomodulatory and anti-tumour abilities (Biswas *et al.* 2002). According to UT philosophy, *Neem* has a warming, drying effect and purifying effect (Singh and Singh 2002). Anjum, Shameem and Mubeen (2018: 1938) selected *Neem* as the most potent hypoglycaemic, insulin sensitiser, hypolipidemic and anti-thrombotic of UT drugs.

- *Zanjabeel* (*Zingiber officinalis*) is an important drug in UT made from its dried rhizomes. According to Bashir and Afrin (2019: 723), some of the indications for *Zanjabeel* in the UT system of medicine include asthma, alopecia, abdominal complaints, anorexia, chest disorders, dementia, eye pathologies, ear pathologies, gout, rheumatism, headaches, gastrointestinal disorders, paralysis, elephantiasis, and jaundice among others. Indications related to PCOS include: leucorrhoea, amenorrhea and T2D (Bashir and Afrin 2019). *Zanjabeel* and *Neem* are often prescribed together and have a synergistic effect when treating PCOS. A study concluded that both drugs reduced hirsutism and acne by inducing menstruation in patients with PCOS. *Zanjabeel* and *Neem* further reduced BMI, fasting insulin, cholesterol and triglycerides (Anjum, Shameem and Mubeen 2018: 1944). A clinical study on both *Neem* and *Zanjabeel*, usually combined in PCOS treatment, confirmed anti-androgenic, hypoglycaemic and insulin sensitising activities synergistically (Firdose and Shameem 2016). Hence, it can be deduced that both drugs can be beneficial in the treatment of PCOS.
- *Shatavari* (*Asparagus racemosa*) is a herbal reproductive tonic possessing tonic, diuretic and galactagogue effects as well as ulcer healing properties. *Shatavari* contains various phytochemicals which exert various pharmacological effects such as an antitussive effect, adaptogenic effects, antibacterial effects, antiprotozoal effects and GIT effects. *Shatavari* is a versatile female tonic which acts to rejuvenate and subdue inflammation of sexual organs, enhance folliculogenesis and ovulation, normalise the uterus and hormones and is also beneficial for the

treatment of leucorrhoea and menorrhagia. Furthermore, *Shatavari* helps improve insulin sensitivity in IR PCOS patients, ultimately reducing blood glucose levels. *Shatavari* extracts have also been shown to inhibit pro-inflammatory cytokines which increase serum corticosterone levels (Alok *et al.* 2013) and can be beneficial for addressing any stress related to PCOS.

- *Darchini* (*Cinnamomum zeylanicum*) is a popular medicinal plant which is mainly indicated for the treatment of arthritis, rheumatism, sprains, muscles aches, constipation, hypertension and dementia. *Darchini* contains essential compounds including cinnamonaldehyde, fibre, calcium, magnesium and iron. Calcium and fibre bind to bile salts, aiding their removal from the body, which enhances the breakdown of cholesterol to form new bile, thus lowering cholesterol levels in diabetic PCOS patients. There have been five corroborative studies reporting beneficial effects on *Darchini* on blood glucose levels, insulin and LDL in relation to T2D. Since these are also central features of PCOS, *Darchini* can be a beneficial drug in this condition (Qin, Panickar and Anderson 2010).
- *Aşl al-Sūs* (*Glycyrrhiza glabra*) is a widely prescribed herb in UT. The temperament of the drug has been described as hot and dry, or hot and wet whilst *Ibn Sina* and *Kirmani* consider it a moderate drug. *Aşl al-Sūs*, is used for the treatment of cold ailments and temperaments such as phlegmatic and melancholic disorders, epilepsy, hemiplegia, facial palsy, anxiety, pharyngitis and bronchitis among others. *Aşl al-Sūs* has been primarily indicated in UT for respiratory and bladder ailments, however, it has been experimentally proven to possess hypoglycaemic and oestrogenic effects which may be beneficial in the treatment of PCOS (Fatima *et al.* 2019). Clinical studies conducted on *Aşl al-Sūs* confirmed that it reduces serum testosterone probably due to the block of 17-hydroxysteroid dehydrogenase and 17-20 lyase in PCOS (Firdose and Shameem 2016).
- *Alsi* (*Linum usitatissimum*) is one of the most important herbaceous, medicinal plants used in UT. *Alsi* is grown predominantly for its oil and fibre which are the main sources of its nutrients. The *Mizaj* of the oil has been described as hot and wet (Umer *et al.* 2017). In UT, *Alsi* is prepared as the principal constituent for pneumonia, cardiac asthma and bronchitis to liquefy phlegm. Clinical trials conducted on PCOS patients using *Alsi* (30 mg/day) showed significant reductions in serum insulin, serum total and FT levels (Firdose and Shameem 2016).

Furthermore, Umer *et al.* (2017) described the efficacy of *Alsi* as a paste in the topical treatment of acne as well as ingested for the treatment of inflammatory conditions of the uterus, such as PCOS. In a prospective, interventional study, *Alsi* supplementation resulted in significant reduction in ovarian volume and number of follicles in polycystic ovaries as well as an overall improvement in the frequency of menstrual cycles; however, there was no reported effect on body weight, blood sugar and hirsutism. The positive effect on ovarian volume could be due to the effect of *Alsi* in the reduction of testosterone, oestrogen, LH and insulin levels which contribute to follicular maturation and inflammation.

- *Mentha spicata* (known in UT as *Pudina*) belongs to the Labiateae family, is known in Unani Tibb as *Pudina* and is prepared as a tea or essential oil which is used to treat hirsutism and obesity in PCOS, and is reported to have antiandrogenic effects and so alleviate hirsutism and menstrual pain. *Pudina* also has antioxidant, anticancer, anti-inflammatory and antidiabetic properties (Ataabadi *et al.* 2017:651). RCTs carried out on hirsute patients with *Pudina* tea confirmed that it has anti-androgenic properties as FT levels and degree of hirsutism were reduced. Furthermore, it was established that *Pudina* oil decreases body weight in PCOS patients (Ataabadi *et al.* 2017:653). Hence, *Pudina* could be a natural alternative for women having mild hirsutism and obesity.



Figure 5: *Mentha spicata*

- *Elwa* (*Aloe barbadensis*/ *Aloe vera*) is an ancient medicinal plant used widely for cosmetology, wound healing and as a laxative from the early 1800s. *Elwa* belongs to the Liliaceae family and is described as a shrubby, perennial, xerophytic, succulent plant which grows in dry regions. *Elwa* contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids. The gel from the plant has various biological activities, most popularly, healing properties on the skin, moisturising and anti-ageing effects, anti-septic effects as well as protective effects against radiation. Furthermore, *Elwa* possesses antiviral and antitumor effects (Surjushe *et al.* 2008). Animal trials on female rats using *Elwa* gel confirmed that it exerts a protective effect against PCOS by restoring the ovarian steroid status and altering steroidogenic activity due to the presence of phyto-components (Firdose and Shameem 2016).
- *Methi* (*Trigonella foenum*), commonly known as *Fenugreek*, is a leguminous herb cultivated in Indian and North African countries. *Methi* belongs to the Fabaceae family and its seeds have been used medicinally for 2500 years (Srinivasan 2006: 203). The fibres of *Methi* offers substantial benefits to PCOS and diabetic patients as it has hypoglycaemic potential and the ability to improve glucose tolerance. Studies have shown that these fibres delay gastric emptying and suppress the release of gastric inhibitory peptides and insulinotropic hormones, thus reducing insulin and glucose levels (Srinivasan 2006: 207).
- *Khar-khasak* (*Tribulus terrestris*) was a common medicinal plant among ancient Greek physicians. The parts of *Khar-khasak* used therapeutically are the fruits, seeds, leaves and roots. The *Mizaj* of the drug is reported as (I) cold and dry in the first degree (II) hot and dry in the second degree. Therapeutic indications of this drug include renal calculi, dropsy, aphthous ulcers, anaemia, coughing, chronic cystitis, dribbling of urine, spermatorrhea and dysuria. *Khar-khasak* is also an effective female fertility tonic which has demonstrated the ability to improve ovulation rates in just two doses. The relevant female UT indications of *Khar-khasak* is sterility and amenorrhea, two common clinical complaints in severe PCOS (Khan, Khan and Parveen 2019: 848-849). The endocrine effects of *Khar-khasak* have also shown a significant increase in mean serum FSH concentrations (Arentz *et al.* 2014: 13).

- *Kalonji* (*Nigella sativa* Linn) is popularly referred to as black seed and belongs to the *Ranunculaceae* family. *Kalonji* is widely cultivated, especially in India and Pakistan and its importance is based on the saying of the Prophet Muhammad (Peace be upon him): “In the black seed is the medicine for every disease except death”. Phytochemically; *Kalonji* contains fixed oils, proteins, alkaloids, saponin and essential oils. The biological effects of *Kalonji* have been reported as antioxidant, hepatoprotective, antiparasitic, anticancer, antidiabetic, antimicrobial, antiparasitic, analgesic and anti-inflammatory, anti-nociceptive, anti-ulcer, anti-histaminic. Traditionally, the seeds were prescribed to treat headaches, relieve congestion, intestinal worms and as a diuretic. Furthermore, *Kalonji* was prescribed to promote menstruation and milk production (Tembhurne *et al.* 2014:167). *Kalonji* oil was proved to be effective in IR patients, thus alleviating obesity. Various components of *Kalonji* like thymoquinone, thymol, unsaturated fatty acids, lipase and tannins are responsible for its beneficial effects in IR syndrome (Firdose and Shameem 2016). Studies have shown that plant extracts of *Kalonji*, particularly its oil, can produce hypoglycaemic effects which is due to its inhibition of gluconeogenesis in the liver (Tembhurne *et al.* 2014: 171). IR and resulting hyperglycaemia are common manifestations of PCOS, thus *Kalonji* may be beneficial in treating these aspects.

3. *Ilaj Bil Yad/Jarahat* (Surgery)

Surgery should be only used when *Ilaj bid Dawa* is impossible (Iqbal *et al.* 2018: 499). Recently, bariatric surgery has been advocated as a weight-loss strategy for morbidly obese patients. Seventeen women with a mean BMI of 50.7 and PCOS who underwent Bariatric surgery, had significant weight-loss and improvement in ovulation, IR, hyperandrogenism and hirsutism (Mirza, Naaz and Alim 2016: 2329).

A common physical therapy used in AV is wet cupping (*Hijamah*) which is originally a TCM procedure. Cupping has been widely used for female issues such as amenorrhea, menstrual disturbances and acne (Akhtar and Siddiqui 2008: 573). There are two types of cupping, one with bloodletting known as wet cupping therapy or prophetic cupping which is based on UT, and the other without bloodletting known as

dry cupping which is based on TCM (El Sayed *et al.* 2014: 46). *Hijamah* is an excretory treatment which aims to filter blood, lymph and intercellular fluids from causative pathological substances. Cupping causes ecchymosis of superficial blood vessels, swelling and temporary bruising but has no serious side-effects (Akhtar and Siddiqui 2008: 573). A clinical study conducted on the use of *Hijamah* for female infertility was conducted on 59 females between the ages of 20 and 50 years old. Of the sample, 61% had a normalised hormonal profile whilst 20% fell pregnant after cupping therapy, suggesting that it may be beneficial in women with fertility issues such as PCOS (Abduljabbar *et al.* 2016).

The most recent available study on the efficacy of UT on PCOS was an observational study aimed at evaluating the efficacy of Unani formulations in infertility among obese women, including women with PCOS. The study concluded that UT formulations can be used as an alternative treatment for PCOS and obesity as these significantly reduce weight, regulate menses and improve lipid profiles. However, there were no effect on conception during the study period (Khan *et al.* 2017).

2.10 Summary

PCOS is a clinical and public health problem (Morgante *et al.* 2015) which can affect females through-out their lifespan (De Leo *et al.* 2016: 2). The conventional management of PCOS is generally based on the presenting complaints. The common pharmacological agents such as metformin, anti-androgens and OCPs, have been associated with harmful side-effects (Domecq *et al.* 2013). Studies have shown that females report dissatisfaction with their primary care physicians (Gibson-Helm *et al.* 2017) and are drawn to CAM therapy which fulfils the needs of the patient not met by conventional medicine (Eurocam 2014: 11). The CAM systems explored by the researcher were Ayurveda, homoeopathy, naturopathy, TCM and Unani Tibb. All CAM philosophies conform to the idea of innate healing which must be augmented by therapy rather than opposed or suppressed. Each philosophy is governed by a set of factors which require homeostasis such as yin and yang (TCM), three dosha's (AV), four humours (UT) and lifestyle factors (NP).

Prior to drug therapy, AV management aims to eliminate toxins in the body through emesis, purgation, enema, errhines and bloodletting. Common drugs selected to correct doshic imbalances include *Shatavari*, *Shilajit*, *Tumeric*, *Bibhitikaki*, *Cinnamon*, *Guduchi*, *Neem*, *Lodhra*, *Ashwagandha*, *Triphala*. Homoeopathic remedies are selected based on the totality of symptoms in order to correct miasmatic/constitutional imbalances. Commonly used remedies for the treatment of PCOS are: *Sepia*, *Pulsatilla*, *Calc carb*, *Nat mur*, *Thuja*, *Folliculinum*, *Staphysagria*, *Lachesis* and *Apis*. TCM uses herbs and Acupuncture to address disease conditions with the therapeutic aims of tonifying the kidney, dispersing stagnated liver qi, regulating blood, clearing dampness and resolving phlegm accumulation. Common herbs used in formulations include *Cimicifuga racemosa*, *Cinnamomum cassia*, *Curcuma longa*, *Glycyrrhiza glabra*, *Matricaria chamomilla*, *Mentha piperita*, *Paeonia lactiflora*, *Silybum marianum* and *Tribulus terrestris*. NP encompasses nutrition and lifestyle behaviours, herbal medicine, massage and other modalities. Treatment goals include dietary counselling, exercise recommendations, herbal medicines (*C. verum*, *P. lactiflora*, *C. racemosa*, *G. glabra*, *H. perforatum*) and supplementation (chromium picolinate, omega-3-fatty acids, alpha Lipoic acid, zinc, chromium, and inositol). UT manages PCOS based on regimental therapy (diet, exercise, massage, electuaries, sleep), pharmacotherapy (*Abhal*, *Neem*, *Zanjabeel*, *Shatavari*, *Darchini Aşl al-Sūs*, *Alsi*, *Pudina*, *Elwa*, *Methi*, *Khar-khasak*, *Kalonji*) and physical therapy (wet cupping).

The researcher has not found any documented studies regarding the management protocol for PCOS by the above-mentioned modalities in the eThekweni municipality.

Chapter Three: Research Methodology

3.1 Study outline

3.1.1 Study design

A typical qualitative research study was conducted since the research was exploratory and sought to gain an understanding of perceptions, investigations and protocols used by selected CAM practitioners in the treatment of PCOS.

3.1.2 Study location

The study was confined to the eThekweni Municipality which includes Durban and its surrounding towns and was conducted at the premises of the practitioner. The contact details of practitioners were obtained from the Allied Health Professions Council of South Africa (AHCSA) website and participants were emailed directly to participate in the study.

3.1.3 Study population

The population for this study was all registered ayurvedic, homoeopathic, Traditional Chinese Medicine, Unani Tibb and naturopathic practitioners in the eThekweni Municipality. The sample was 12 CAM practitioners who were registered with the AHCSA and had been in private practice for a minimum of five years and who, at the time of the study, practiced in the eThekweni Municipality geographical area. The participants were selected through purposive stratified sampling.

3.2 Pilot study

A small-scale preliminary study was conducted prior to the commencement of the full-scale study. The purpose of conducting a pilot study is to assess whether the research protocol is feasible enough to gather relevant data for the study. The pilot study assisted the researcher in evaluating the interview questions in order to determine whether the questions were practical, relevant or required modification. A focus group comprising three homoeopathic practitioners were selected for the pilot study and these participants were excluded from the main study. All participants were satisfied

that the interview questions were adequate to procure the necessary information needed to answer the research question. One participant suggested the addition of an interview question regarding contributing factors to the development of PCOS, which was duly included in the interview guide (Appendix D). Overall, the pilot study did not require amendments and was approved to proceed into the full-scale study.

3.3 Recruitment of participants and the sampling process

Twelve CAM practitioners were selected for the qualitative study. Stratified purposive sampling was implemented in order to select two CAM practitioners per modality/discipline in the eThekweni Municipality. The scarcity of naturopaths proved difficult when sourcing practitioners for interviewing and only one naturopath in the eThekweni area responded and participated in the study. Five out of 11 CAM modalities were included in the study, namely: homoeopathy, Unani Tibb, Traditional Chinese Medicine, Ayurveda and naturopathy. The rationale for selecting these modalities is that they are directly involved in diagnosing and managing the PCOS whilst the remaining modalities (including reflexology, chiropractic medicine and acupuncture) are less likely to have extensive first-hand experience in this regard. Furthermore, these CAM systems are able to prescribe specific medication for PCOS. To gain the relevant contact details, the researcher accessed the register of the AHCSA on their website in order to select a sample frame for CAM practitioners in the eThekweni municipality. Thereafter the researcher selected 10 practitioners from each discipline to accommodate for the possibility of declined participation or withdrawals. Prospective participants were then emailed directly using the information provided on the AHCSA website inviting them to participate in the study. The stipulated sample per discipline was two, however, there was only one N participant who responded and was willing to participate in the study in the eThekweni area. Furthermore, four participants represented the homoeopathic discipline because there were a larger number of H participants who responded to the researchers e-mails and were both available and willing to participate in the study

3.3.1 Inclusion criteria

- Each participant was registered with the AHCSA.

- Each participant practiced in the eThekweni municipal area.
- Each participant had already practiced for a minimum of five years in private practice.
- Each participant had experience with treating PCOS.

3.3.2 Exclusion criteria

- Participants who did not sign the letter of information nor the letter of informed consent.
- Participants who were not registered with the AHCSA and did not possess a valid practice number.
- Participants who practiced out of the eThekweni area.
- Participants who had practiced for less than 5 years in private practice.

3.4 Ethical considerations and conduct

The Institutional Research Ethics Committee at the Durban University of Technology (DUT) issued an approval letter (Appendix E) and a reference number which permitted the researcher to proceed with a full-scale research study. Details of the study were explained extensively in an information letter (Appendix A) which included a brief introduction and purpose of the study, outline of procedures and contact information. The informed consent form further declared that participants were given complete free will in choosing to participate in the research and could withdraw from the study at any time during the study without any adverse effects, thus ensuring that no coercion was used to influence their decision. Each participant, upon confirmation, was supplied with an informed consent form (Appendix B) which ensured full disclosure of information and competency of the participant to make a voluntary decision. Participants names were identified from the AHCSA website and selected randomly, thus preventing bias. Furthermore, in order to limit participant bias, the researcher posed indirect, open-ended questions whilst maintaining a neutral stance. Three basic ethical principles adapted from the Belmont Report (United States, National Commission for the Protection of Human Subjects of Biomedical and Behavioural

Research 1978), were adhered to consistently throughout the study, namely: respect for persons, beneficence and justice.

‘Respect for persons’ refers to acknowledging the autonomy of each participant and should their autonomy be compromised, acknowledging their right to protection. Respect for persons also recognises the right and capacity of each participant to make their own decision without any coercion. This was emphasised in the Letter of Information (Appendix A). Overall, respecting a person ensures that their dignity is valued and protected at all costs.

‘Beneficence’ is a concept in research ethics which encompasses the welfare of the research participant. Beneficent (or benevolent) actions or behaviours are those that actively protect from harm (Cassell 2000). Beneficence in a research context can be ensured by fully considering the potential risks or harms that the individual may encounter as a result of the study and thereafter trying to minimise or eliminate these risks.

The principle of ‘justice’ requires a fair distribution of rewards, benefits and burdens and penalties. Justice ultimately conveys the researcher’s responsibility to treat each participant equitably (Lebacqz 1980) and ensure that no favourable treatment is offered to a single participant over another.

3.5 Research rigour

Trustworthiness can be based on the 1985 model of Lincoln and Guba. This model demonstrates four criteria necessary to establish trustworthiness within a qualitative research study, namely: credibility (internal validity), dependability (reliability), confirmability and transferability (external validity) (Schwandt, Lincoln and Guba 2007: 12).

3.5.1 Credibility

Credibility, by definition, refers to the “truth value” represented by the research and the degree to which the research represents the intended words of participants (Moon *et*

al. 2016:18). Credibility of the study was ensured by maintaining communication with the research supervisor through-out the process of data collection and updating the supervisor accordingly. The research supervisor overseeing the study was highly competent and had overseen over 30 Masters dissertations, gaining expertise in various topics including CAM, which provided valuable insight when planning and executing the study. The researcher recorded interviews via a tape recorder and simultaneously wrote descriptive field notes where the researcher deemed appropriate in order to aid the understanding of the research topic. These notes were read back to the participants once the researcher was satisfied with the information, which gave participants the opportunity to verify their statements and fill in any gaps in the interview. This process ensured that participants were satisfied that the way information was being transcribed was accurate.

3.5.2 Dependability

Dependability refers to the consistency and reliability of research findings as well as the extent to which research procedures were documented (Moon *et al.* 2016: 18). An audit trail of the original data was maintained through storage of the raw data, which included audio recordings, written notes and transcriptions of each interview on a word document. The transcribed document was stored separately to the analytical document to prevent any distortion of the original information.

3.5.3 Confirmability

Confirmability refers to the researcher's ability to demonstrate that the research findings correlate with the conclusion in a process that can be replicated (Moon *et al.* 2016: 18). The researcher recorded the interviews in order to capture and record information verbatim. These audio recordings further served as a direct reference when transcribing information. A few practitioners preferred hand-written notes as opposed to audio recordings, which were complied with to accommodate these participants. Following the transcription of the interviews, each participant was given an opportunity to review the field notes to verify whether the information recorded was an accurate representation of their views and approach to disease management.

3.5.4 Transferability

Transferability is a type of external validity which refers to the degree in which research findings described in one study can be applied to future studies (Moon *et al.* 2016: 19). Purposive sampling, a form of nonprobability sampling, was used to maximise specific data relative to the context in which it was collected. To facilitate transferability, the researcher supplied a clear and distinct description of the research context, selection of participants, data collection as well as the process of data analysis extensively. Interviewing several participants within each modality until data saturation was reached, ensured a further degree of transferability.

3.6 Data collection process

Once the sample was selected, each CAM practitioner was approached via email or telephonically and requested to participate in the study. Once the practitioner consented, a letter of information (Appendix A) was sent out informing each participant of the study. Thereafter a consent letter (Appendix B) was mailed in order to obtain informed consent and a signature from each participating practitioner. Herein it also stated the confidentiality of the study. Following consent, the researcher set up a convenient time to meet with the participating practitioner. A dictaphone was used to record interviews in order to collect and store raw data. Upon commencement of the interview, the grand tour question was posed, thereafter sub-questions were asked to guide the participants responses and to assist the researcher to attain specific information. The questions presented to participants during the interview process are listed in the Interview Guide (Appendix D). Once data saturation was reached, all information was transcribed from the dictaphone storage and documented chronologically in separate word files – as per each participant.

3.7 Data analysis tools

In order to identify emerging themes and subthemes from the data, the researcher analysed data under the guidance of the supervisor who is an expert in qualitative research. The researcher implemented “Creswell’s (2014) approach” and “Tesch’s (1990) Eight Steps to Data Analysis” in order to interpret the data. The steps include the following:

- Interviews were transcribed verbatim from audio-recordings or hand-written (with the exception of one practitioner) and then transferred onto an encrypted word document.
- The researcher then read the transcripts and compared them to the audio-recordings.
- Each interview was categorised according to modality. Each participant was assigned an alphanumeric code to help the researcher identify the number of any given research participant (RP) according to the sequence of interviews. For example RP1 represents research participant 1 and so forth. Furthermore, each code was assigned a suffix which helped the researcher identify which modality the participant represented. H represents homoeopathy, UT represents Unani Tibb, N represents naturopathy, A represents Ayurveda, TCM represents Traditional Chinese Medicine. The participants unique codes were then used consistently as an identification. The researcher went back and included these codes in the appropriate transcriptions, tables and in the thesis itself.
- The researcher analysed the data meticulously and identified broad themes and sub-themes which were guided by the interview questions, namely, Philosophy, Contributing Factors, Diagnosis, Management, Modalities used. The researcher kept the research question in mind through-out data analysis.
- The researcher tabulated these broad themes, one column per theme, placing all the columns on the same sheet in order to compare all the topics pertaining to each interview. Thereafter the researcher inserted sub-themes as bold headings under the relevant columns.
- For each interview transcription, the researcher extracted and inserted the appropriate information pertaining to each heading and sub-heading in the table. Thereafter, the researcher summarised the data to reflect only the relevant information. This was repeated for all interview transcriptions.
- After completing this procedure for several documents, the researcher combined all tables in a separate encrypted word document and grouped them according to practitioners and modalities to look for common and uncommon information among each group.

- The researcher then used the structure of these tables to present the data analysis as a discussion in the thesis, drawing mainly on the summarised information whilst frequently going back to the interview transcriptions to check for any missing information.
- Finally, literature was reviewed to verify and support findings.

3.8 Data management and storage

Data was collected and stored in a manner that ensured strict confidentiality and anonymity of the participant. The personal details of the participants were not recorded on the audio recordings, field notes or transcriptions of interviews. A record of the participants' names and assigned codes was in the possession of the researcher exclusively. Only the researcher and supervisor had access to the information collected which was electronically saved and password protected. Files were stored in a locked cupboard at the Department of Homoeopathy at DUT and can only be accessed by the research supervisor. The data collected will be stored at the Department of Homoeopathy for a maximum of five years. Thereafter any data remaining will be shredded or destroyed.

3.9 Summary

This chapter presented the methodology of the research study as a qualitative method paradigm which implemented purposive stratified sampling of participants and indicated the data collection instruments and data analysis tools. The design of the study indicated a sample population of 12 participants which represented five modalities, namely: homoeopathy, Unani Tibb, Traditional Chinese Medicine, ayurveda and naturopathy. The study specified a minimum of two participants per modality. Data was collected by means of personalised, semi-structured interviews and analysed using "Tesch's (1990) Eight Steps to Qualitative Data Analysis" and "Creswell's (2014)" approach which was detailed extensively.

Chapter Four: Results and Discussion

This chapter presents the outcome of the data collection process, conveys the results obtained and discusses the findings from the semi-structured interviews with 12 CAM participants. Four broad themes and sub-themes were derived from the data analysis so as to answer the main research question: How, given your chosen modality, do you manage PCOS from diagnosis to management? The identified themes following data analysis are summarised in Table 4.

Table 4: Themes and sub-themes

Themes	Sub-themes
1. Philosophy of PCOS according to CAM modality.	-
2. Contributing factors to the development of PCOS.	-
3. Diagnosis of PCOS	a) Clinical diagnosis b) CAM-specific diagnosis
4. Management of PCOS	a) Treatment (medication and/or therapeutic techniques) according to specific CAM modality. b) Use of other modalities (medication and/or therapeutic techniques). c) The use of Adjunctive Therapies. d) Lifestyle interventions.

This chapter presents the themes and elaborates on each theme extensively and includes relevant quotes from participants drawn from the interview transcripts. To ensure strict anonymity of research participants, names have been excluded and codes have been assigned to represent each participant and their specific modality.

4.1 Demographic profile of participants

Table 5 shows the demographic information of the sample. Males constituted 42% of the sample and females 58%. Therefore, the ratio of female to male participants is 2:2.4. The majority of participants were within the 21-60 years old age group. The highest represented modality was H and the lowest was NP. Area demographics have been excluded as all participants reside within the eThekweni area.

Table 5: Age, gender and CAM practitioner distribution of research participants (n = 12)

Variable	Group	Frequency	Percentage
Age (years)	21-40	4	33%
	41-60	5	42%
	> 60	3	25%
Gender	Male	5	42%
	Female	7	58%
CAM Practitioner	Homoeopathy	4	33%
	Naturopathy	1	8%
	Unani Tibb	2	17%
	Ayurveda	2	17%
	Chinese Medicine	2	17%

4.2 Thematic analysis of data

4.2.1 Theme One: Philosophy of PCOS according to CAM modality

Each CAM modality is based on a unique philosophy that supports the understanding of disease phenomena. These philosophies were described briefly by participants and are provided as excerpts below according to each modality.

4.2.1.1 Ayurveda

Ayurvedic philosophy is based on basic principles known as dosha's of which there are three: vata, pitta and kapha. Both participants viewed PCOS as a predominantly vata and pitta imbalance.

[PCOS is caused by] imbalance in the dosha's. Dosha's are the basic principles of Ayurveda – there are 3 dosha's and when they are in balance, the human psychosomatic constitution is in balance and if they are imbalances it leads to all kinds of internal and external diseases. In PCOS Ayurveda approaches it scientifically. An imbalance mainly in the pitta dosha and also the other dosha's, pitta and kapha dosha imbalance will mainly result in PCOS. Pitta and kapha imbalance is the basic pathophysiology. PCOS is due to artuba "irregular menstruation or bleeding" – when there is menstrual cycle imbalance, because there is a doshic imbalance, it will lead into improper menstrual cycle which will lead into PCOS which is in a nutshell. In Ayurveda we understand the

nature of the body (Prakriti). It's a unique psychosomatic nature of the body. Every person is different. That girl who comes to me with PCOS is different to another girl with PCOS. [RP9-A]

Specific combinations of the elements are called dosha's and categorised as vata, a combination of air and space, pitta – water and fire, and kapha, earth and water. The aim is to maintain a balance of the dosha's to create good health. According to Ayurveda, PCOS, can be likened to vata – kaphaja granthi. Granthi means a cyst or cystic swelling. The cyst can be filled with fluid, gas or pus. When vitiated vata contaminates muscle, blood and fat, thus elevating kapha which causes vata – kaphaja granthi. However, treatment can be prescribed based on the individual signs and symptoms which they can be sub-categorised as: Menstrual irregularities as artava vyapaths, infertility as vandhya, obesity as sthaulya, acne and baldness as mukhadoosha and khalithya and hyperinsulinemia as prameha. [RP12-A]

4.2.1.2 Homoeopathy

Homoeopathic practitioners view PCOS as the manifestation of a weakened miasm, which Hatherly (2016) describes as a profound level of derangement of the body's vitality characterised by the individual's "totality of symptoms". There are more than eight types of miasms, however, most practitioners were unanimous about their choice of miasmatic diagnosis in their PCOS patients.

PCOS falls under the cancerinic or sycotic miasm. The cancerinic miasm because there may a long history of suppression, depression, instability and imbalance – all these factors lead to an unhappy state characteristic of this particular miasm. Sycotic miasm because it is characterised by an excess of everything: androgens, cysts, facial hair, acne etc. [RP1-H]

I always tend to find some form of abuse: physical or emotional ... it may not be blatant abuse, but you realise that a woman can't live up to her full potential ... She thus develops an inferiority complex. This patient

thus develops a very cancerinic constitutional nature. In younger girls I also look at the mothers' pregnancy and I look at the relationship between the parents around the time of conception. I usually find some form of abuse associated around this time period. [RP4-H]

When you look at PCOS from a homoeopathic understanding, I see it very much as sycotic and cancerinic miasm. There is a lot of excess: excess consumption of inflammatory foods, excess sweat, inflammation, suppression leading to acne, oily skin, cysts on the ovaries, heavy painful bleeding or in later stages suppressed bleeding. Pedantic, perfectionist patients who overwork and have a history of abuse tend to fall more on the cancerinic miasm. PCOS is a syndrome which is very often stress related, which causes an increased release of cortisol which causes a pregnenolone steal which means that you have low progesterone which has a domino effect on hormones. Women end up with oestrogen dominance. There is also a problem with blood-sugar metabolism and insulin resistance as well as cysts on the ovaries. [RP5-H]

From a homoeopathic perspective: constitutionally the skinny type will be cancerinic – Nat mur, Sepia, snakes. Overweight patients would fall under the sycotic miasm. Whilst the skinny patients tend to be pedantic, disciplined, will read-up on their diets and eat correctly, do a lot of exercise. Their impaired reproductive function is based on their stress levels. The obese types have no control over their diet or activity levels, much less disciplined. [RP6-H]

In my opinion, the patient doesn't fall under one particular miasm constitutionally. There is definitely a lot more of the cancerinic miasm and sycotic miasm. If you look at it from a tissue perspective, there is an overgrowth which forms cysts – so there is definitely an aspect of sycosis. I generally find a spread of miasms. PCOS is quite murky, it is

tricky to pin it down as a particular miasm because it has so many different presentations. [RP10-H]

4.2.1.3 Naturopathy

The naturopathic “philosophy” investigates the effects of a patient’s lifestyle and diet in the pathogenesis of PCOS and adheres closely to the mainstream pathophysiology and philosophy. RP7-N described PCOS as:

A combination of a few physiological factors and drivers. Essentially, we are always trying to treat the root cause and not the label we treat the person. When a woman comes into my practice, I try to understand for myself what has led to this syndrome manifesting in my patient. Most of which start with a poor lifestyle and high stress – inactivity, poor diet choices etc. On ultrasound there are cysts on the ovaries, usually multiple. Studies show that about 1/3 have cysts and with ageing will actually outgrow the cysts. There is a hormonal imbalance. Clinically, insulin resistance with hyperinsulinaemia and unwanted weight gain. There is also unwanted facial hair/hirsutism, irregular ovulation and periods, female pattern balding and acne. [RP7-N]

4.2.1.4 Traditional Chinese Medicine

TCM philosophy is by far the most complex modality in its perception of disease and uses the theory of qi, yin and yang and wuxing as a philosophy to guide its practices (Qiu 2015). TCM philosophy on PCOS varies based on the judgement of the practitioner.

The philosophy is that the human body is governed by qi which continuously circulates along the acupuncture channels. Qi is made up of two dynamically opposite, yet harmonising energies known as yin and yang. Yin represents the female and negative energy whilst yang represents male and positive energy ... When we look at diseases associated with infertility, we suppose that there could be various

philosophies. One is uterine abnormality: weakened musculature and ligaments. Insufficiency of qi in the middle warmer, due to a weak constitution, early physical labour before delivery, exhaustion, overstrain due to constipation – all of which causes a sinking qi and thus a sinking sensation in the lower abdomen, weakness, frequent urination, pale tongue and weak pulse often accompany PCOS symptoms. Two, is liver stagnation caused by stagnant blood – emotional upset may cause retardation of the liver qi – resulting in PMS, delayed periods. Three, is heat in the lower jiao and four, is phlegm stagnation – leading to obesity and an imbalance of circulation of fluids – delayed, clotted, dark menses, white vaginal discharge also concomitantly. The Chinese art of healing proposes that there are 12 main pathways in each half of the body and 2 along the midline, and along these channels are more than 1000 acupressure points. To treat a given case the acupuncturist chooses 8-12 of these pressure points. Through needling, acupuncture balances energies. Research now suggests that a needle at an acupressure point releases chemical substances and endorphins which pass nerve impulses to the brain which stimulate a desired effect. [RP2-TCM]

PCOS is a condition characterised by chronic damp heat – which is caused by toxins that build up in the body, particularly hormonal medications. It is due to the prolonged period and amenorrhea as main complaints, so TCM recognise and differentiate PCOS to be the patterns of qi and yang deficiencies, accumulation of phlegm-fluid and blood stasis. Yang deficiency of the kidney affects the spleen yang energy as it is not supported by the kidney yang. Qi is a yang substance; therefore, spleen qi deficiency develops resulting in internal dampness. Chronic dampness combined with heat due to liver qi stagnation forms phlegm in lower jiao of women and affects the reproductive system as the liver controls menstrual blood. If liver qi stagnation is allowed to worsen without proper treatment, the liver will heat up and combine with the internal dampness creating damp-heat. PCOS with vaginal discharges,

marked with blood, or having a strong odour would be indications of damp-heat. [RP8-TCM]

From a Chinese philosophy, when looking at fertility, you look at qi force. Particularly the liver, spleen and kidney channel. The skinny polycystic patients are often deficient along those channels, poor blood nutrients – they often have a poor spleen function and get the flu very easily. The kidney energy is also largely depleted by stress. The overweight PCOS patients tend to have a lot of stagnation, poor circulation, oestrogen dominance – long cycles with congestive headaches, engorged breasts. They usually feel relieved by discharges and menstrual flow. [RP6-H]

In PCOS, usually there's a damp pattern in terms of CHM. This is from a blood and liver chi stagnation. [RP10-H]

4.2.1.5 Unani Tibb

UT practitioners base their philosophy on the constitutional temperament of the patient.

I tend to see a sanguineous, melancholic temperament in most PCOS patients. There is an overabundance of heat and moisture in the body. Depending on the severity, different PCOS people have different parts of the syndrome. Generally, there is a build-up of moisture and heat in the body, or too much heat and moisture being the less dominant humour in the body. [RP3-UT]

Another UT practitioner did not offer a philosophical approach to treating PCOS but rather an in-depth clinical understanding which is congruent with most aspects of the mainstream pathophysiology and philosophy. This practitioner found stress to be a strong aetiological factor and described her understanding of PCOS as the manifestation of hormone levels being too high or too low:

In Tibb we treat the patient and not the disease. I use a very clinical approach to PCOS, having been in practice for many years, I don't tend to use philosophical approaches to PCOS. I look at stress as an aetiology, high cortisol levels raise insulin levels which results in the formation of DHT from testosterone. DHT leads to severe PCOS symptoms seen clinically. High LH levels cause an increased level of androgens. There are two types of PCOS patients: (I) PCOS with low hormone levels (II) PCOS with high hormone levels. Firstly, PCOS with low hormone levels is characterised by low oestrogen production. FSH which stimulates follicles, but they grow beyond a certain point. Insulin resistance may play a role in preventing oestrogen formation from progesterone therefore only causing DHT to be produced. A rise in cortisol steals progesterone and raises insulin levels. A drop in T4 prevents follicles from growing. Ovulation may occur only after 3-9 months and results in progesterone rise and fall. Periods are generally light and short. Secondly, PCOS with high hormone levels. These cycles are very irregular due to constant fluctuation of hormone levels. There are high oestrogen levels and LH levels allow for many follicles to grow. Ovulation can occur more than once a month which may cause early menses. Bleeding in most cases is heavy and can last 1-3 weeks.

[RP11-UT]

4.2.2 Theme Two: Contributing factors to the development of PCOS

Most modalities have congruent opinions on what they believe to contribute to/exacerbate the symptoms of PCOS. RP3-UT summarised the most common factors which can play a role in any disease:

... this condition looks at five governing factors: diet, sleep patterns, stress in their body, activity, elimination processes in the body. There is always an imbalance in one or more of these factors and each factor may contribute to the other. From a genetic point of view: they might have a history of obesity or diabetes in their family. [RP3-UT]

The most widely mentioned factor was stress, which has been found to exacerbate PCOS symptoms and has been associated particularly with abuse and perfectionism.

High stress can contribute to this syndrome (PCOS). [RP7-N]

They have a lot of stress: marital, financial, work, fertility, stress and what's happening psychologically with their self-esteem which feeds into various aspects of their life. You may have a couple who is trying to fall pregnant, and the stress of being unable to fall pregnant. They might have a lot of stress leading to comfort eating which will lead to being overweight and sedentary which in turn can feed into loss of sleep and further stress. In PCOS my patients are usually a personality A type, perfectionists who tend to want things in a certain way and get angry if it isn't. [RP3-UT]

There is a lot of abuse, overwork, stress, which I tend to see in my PCOS patients. [RP4-H]

Stress causes an increased release of cortisol which causes a pregnenolone steal which means that you have low progesterone which has a domino effect on hormones. [RP5-H]

The skinny ones tend to be stressed and A type personalities, they tend to worry and stress and don't have enough energy to put into reproduction which is a lesser priority to stress. They are more likely to burn out. [RP6-H]

I look at stress as an aetiology, high cortisol levels raise insulin levels which results in the formation of DHT from testosterone. DHT leads to severe PCOS symptoms seen clinically. [RP11-UT]

Most PCOS patients with whom I have consulted, have unresolved issues with abuse, mainly sexual abuse and have elevated stress levels.

[RP12-A]

Another factor highlighted was a poor self-esteem and image, leading to unhappiness and depression. Practitioners drew attention to the significance of motivating and counselling the patient during the consult in lieu of the above.

They experience depression, from a mental perspective, especially homoeopathically, I'd say majority of the patients are depressed and there is always some sort of instability and an imbalance. They are not the happiest of patients. [RP1-H]

This patient has a low self-esteem and needs motivation. When you treat someone, you become involved and you become empathetic from a healing point of view and they must feel that energy coming out you. The moment any patient feels disconnected from their doctor; they don't want to heal. You must be able to influence them positively. [RP3-UT]

For me the main thing is the consult itself because I believe most of the cure happens in the consult with the patient. You have to help build up their self-confidence which is key in PCOS treatment. I always tend to focus my consults around the abuse component because she develops an inferiority complex. [RP4-H]

Poor dietary choices was another prominent factor which was mentioned consistently by practitioners.

They eat an excess of foods or are getting inadequate nutrition. [RP4-H]

Excess consumption of inflammatory foods. [RP5-H]

The obese (PCOS) types have lack of control or discipline with their diet and poor nutrition. [RP6-H]

Ayurveda describes it as too much kapha – earth and water, more carbohydrates from poor lifestyle becomes sugar which then breaks down into water – and not H₂O water, the food that causes more weight gain. This is one aspect. Ayurveda said long ago, more kapha leads to insulin resistance and PCOS. It's not true in every case but a strong contributing factor. All is due to kapha lifestyle which leads to PCOS. [RP9-A]

Poor diet. Elevated stress levels are linked to over – indulgence in highly processed food, foods that contain high levels of sugar and carbohydrates. This results in insulin resistance which in turn raises androgens resulting in the exhibition of PCOS symptoms. [RP12-A]

Whilst a TCM practitioner described the poor dietary choice discretely as a:

Pathogenic cold or intake of cold drinks during menses (which) may cause stagnation in the uterus. [RP2-TCM]

Two practitioners recognised toxicity in the body as a possible aetiology in the development and worsening of PCOS. This was described according to the TCM practitioner as:

Toxins that build up in the body, particularly from hormonal medications such as the pill. [RP8-TCM]

Whilst described by Ayurvedic principles as Ama:

Ama has been described as a toxic, heavy, sticky, foul smelling substance in the body. Ama can also be formed by bacterial invasion.

Bacteria emit toxic substances into the system which can be compared to Ama. [RP12-A]

Two unique contributing factors mentioned by a TCM was profuse menses and a weak body constitution:

Weak body constitution/chronic illness may cause deficiency of qi and blood. Menses exhausts the blood depriving the uterus from nutrition and pain results. [RP2-TCM]

4.2.3 Theme Three: Diagnosis of PCOS

PCOS is considered a diagnostic challenge because of its various presentations in females (Azziz 2004). The diagnosis of PCOS can also vary at different stages of growth which make it almost indiscernible for diagnostic purposes (Welt and Carmina 2013). There are three sets of available criteria which are used to diagnose PCOS conventionally: Rotterdam ESHRE/ASRM (2003), NIH (1990) and AE-PCOS (2006) . It is the prerogative of the practitioner to ensure that the appropriate diagnostic tests and criteria are applied according to the patients' requirements. PCOS is a diagnosis of exclusion and therefore requires prior exclusion of differential disorders such as: non-classic congenital adrenal hyperplasia, hyperprolactinaemia, thyroid dysfunction, hypercortisolism and androgen secreting tumours (Makaya, Basu and Poole 2019). It is important to get the diagnosis correct in order to administer the correct treatment. CAM practitioners are likewise required to base their diagnosis of PCOS on established criteria which is generally integrated with their unique diagnostic approach.

4.2.3.1 Subtheme: Clinical diagnosis of PCOS

Practitioners recognise PCOS on clinical signs and symptoms which manifest as a result of hyperandrogenaemia and hyperinsulinaemia paired with IR. These signs and symptoms are elicited from the case history and physical examination and form the preliminary diagnosis of PCOS. These clinical features include:

Irregular menses, excessive hair growth, pigmentation will tell me that I need to suspect PCOS based on the case history and the physical exam. [RP1-H]

Firstly, I will take a case history and physical examination and ask a whole lot of questions about their condition, trying to find: hirsutism, acne, menstrual irregularities, velvety skin, issues with weight, incorrect diet, sleep irregularities most of the time too little sleep which is very broken and waking up very often at night. [RP3-UT]

Profuse/irregular menses, hirsutism, acne, weight gain etc. Signs and symptoms of PCOS will help make my diagnosis. [RP5-H]

PCOS has two distinct manifestations in patients: you get the overweight PCOS type and the skinny-type patient. The overweight female has a classic tyre of fat around the waist and struggles to lose weight. [RP6-H]

I look for signs of any facial hair, acne, female pattern weight gain. [RP7-N]

You can judge that with practice. With a proper background and knowledge, you can see your PCOS patients. Look at the cycle, weight gain, they usually come diagnosed with PCOS previously. [RP9-A]

Essentially on observation: you look at the menstrual cycle history and find irregular cycles, body type – can be overweight, acne and facial hair. In thinner patients you find profound amenorrhea from the start. [RP10-H]

I diagnose based on clinical signs and symptoms: acne, abnormal hair growth, deepening of the voice, scalp hair-loss, weight gain. [RP12-UT]

The second aspect of clinical diagnosis is diagnostic procedures which includes blood and imaging tests. The following excerpts describe various diagnostic approaches used by participants:

I would refer them to a gynae to perform an ultrasound and confirm that cysts are there. [RP1-H]

We will also refer them for blood test. We have access to blood tests. Send for an androgen test, PCOS screen, FBC, CSR, CRP, thyroid and parathyroid. I normally do a vitamin D test; I find many cases of PCOS tend to have a very low vitamin D levels. If an ultrasound is required or additional gynaecological evaluation, I will send them for investigations.” [RP3-UT]

I will send for blood tests: A PCOS/ Hirsutism screen. If the patient is in excruciating pain, I will send for an ultrasound to check for cysts. DHEA levels, cortisol levels and insulin resistance. [RP4-H]

On Day 3 of the menstrual cycle I test for LH, FSH: in obese PCOS patients I find a significantly high LH level. In skinny PCOS patients I usually find flat hormones with an LH that is quite low. [RP6-H]

Tests I send for: blood sugar levels, fasting insulin (can't eat or drink for 8-12 hours) – test for insulin resistance. I also use the DUTCH Plus® test which analyses hormones using saliva and urine. Patients take kits home and it is done over a 24-hour period – day 19, 20 or 21 of their cycle. This analyses their male and female hormone levels and how are they being metabolised. Check for testosterone levels which are metabolised via two pathways: the 5 alpha and 5 beta which can be determined via the DUTCH test. If I see that testosterone is being metabolised down the 5 alpha pathways, then that will confirm an androgenic picture. Looks at all stress hormones. It is very comprehensive. If I need to investigate further, I will do a blood test. I will

also check for Vitamin D; people are usually deficient in Vit D which should be optimal when dealing with any hormonal condition. So therefore, by testing for these various things I try to determine what type of PCOS picture I am looking at for my specific patient. [RP7-N]

I give my client a chance to go to the gynae to get a diagnosis and how many cysts etc. So that the client has a confirmation of the diagnosis and they have to believe it and have a second opinion and then return to me for management. I respect modern science ... The second thing I look for is masculine features because of the hormone imbalance and weight gain and one more important point is the conceiving ability of the patient. [RP9-A]

I send for a hirsutism screen and fasting insulin levels to confirm PCOS and also to benchmark the beginning of the treatment to see whether your treatment is working even if it isn't so apparent on the outside. [RP10-H]

Blood tests: mainly testing LH and testosterone. Ultrasound of the ovaries. Like I mentioned, I diagnosed 2 kinds of PCOS. For PCOS with low hormone levels: low oestrogen, low FSH, insulin resistance, increased DHT, high cortisol, low T4, periods are generally light and short. For PCOS with high hormone levels: irregular cycles, high oestrogen levels and LH, heavy bleeding. [RP11-UT]

The diagnosis of PCOS is mainly based upon clinical presentation together with ultra-sonography findings and hormonal profile associated to the mode of presentation. [RP12-A]

4.2.3.2 Subtheme: CAM-Specific Diagnosis of PCOS

Homoeopathic practitioners

You look at their miasmatic background and constitution: are they overweight, do they eat an excess of foods, do they have oily skin, do they suffer from acne or pigmentation, what is their emotional background? These are a few deciding factors when selecting the correct constitution of the patient. [RP4-H]

The signs and symptoms in the case history will help determine the miasm: so profuse menses (sycotic miasm of excess), cysts, acne and oily skin all fall under excessive. [RP1-H]

Signs and symptoms of PCOS and sycotic miasm will help make my (miasmatic) diagnosis. [RP5-H]

PCOS has two distinct manifestations in patients: you get the overweight PCOS type and the skinny-type patient. The overweight female has marked insulin resistance, has a classic tyre of fat around the waist and struggles to lose weight (sycotic). The skinny ones tend to be stressed and A type personalities, they tend to worry and stress and don't have enough energy to put into reproduction which is a lesser priority to stress. They are more likely to burn out (cancerinic). The overweight PCOS patients tend to have poor circulation and oestrogen dominance – long cycles with congestive headaches, engorged breasts. They usually feel relieved by discharges and menstrual flow which helps guide to the Homoeopathic remedy selection, often snake remedies are well suited. [RP6-H]

Traditional Chinese Medicine practitioners

I begin by palpating the various pressure points on their hands and feet to see if it causes any pain and to relieve energy imbalance. Using acupressure points helps determine where there are imbalances and aims to strengthen the uterus, stimulate the ovaries and stimulate lymphatic drainage. On the foot: we palpate the uterus and ovaries which

is a point on the medial aspect of the foot just inferior to the medial malleolus and basically you press your thumb around the medial malleolus – and ask if the patient feels pain or discomfort. On the wrist: we palpate the ovaries at the styloid process of the ulnar to elicit any discomfort or pain which would indicate a problem in the ovaries. [RP2-TCM]

One may experience facial acne and a feeling of breast distension and tenderness, especially the week before menstruation. Headaches, red eyes, and hypochondriac tenderness under the rib cage would be common. Her tongue body would be red or have a reddish tip and sides with a thin and dry coating or thin and yellow coating. The pulse would feel tense, thin and fast. These all signify a damp heat in the body characteristic of PCOS. [RP8-TCM]

From a CHM perspective, you know your patient has a damp tendency because they are heavier. They are also profoundly insulin resistant with a metabolic syndrome presentation. We diagnose using the tongue diagnosis – I will always look at the tongue, you can get a broad look at it and get a lot of information from it. Usually there is a flabbiness to the tongue, often issues with the liver signified by bare patches over these areas and the gallbladder area, a lot of cracking through the spleen. All this indicates a yang deficiency. [RP10-H]

Unani Tibb practitioners

I assess their temperament based on the predominant humour. There's a chart/diagram which has the four humours and you can be a combination of them. In an individual there are various characteristics to consider when diagnosing the temperament of a patient to assess their base without the disease. You will take into consideration their height, their complexion, their eye colour, whether you can see the veins in their body, how they walk, their personality, the main pathologies or

tendencies they have. In PCOS my patients are usually a personality A type, perfectionists who tend to want things in a certain way and get angry if it isn't, chubby in nature. You take all this into account to come up with a persons' temperament. A lot of times, peoples' conditions are related to what their base temperament is. If a person has a hot and moist temperament, one can be more dominant, they will suffer from conditions that fit this category. The accumulation of heat and moisture manifests as PCOS in this case. [RP3-UT]

Ayurvedic practitioners

I diagnose most diseases using pulse diagnosis. This is an ancient practice which helps diagnose the dosha. Another part of this is that Ayurveda is very scientifically involved. [RP9-A]

4.2.4 Theme Four: Management of PCOS

The goals of PCOS management will vary according to individual clinical presentation. It is important to educate the patient regarding the possible complications of their condition and help reduce these risks later (Makaya, Basu and Poole 2019). The goals of PCOS management were aptly summarised by a H as:

One, to re-establish ovulation and menstruation. Two, to reduce excessive androgen levels. Three, to correct hyperinsulinaemia and sugar metabolism and lastly, to normalise weight. [RP5-H]

4.2.4.1 Subtheme: Treatment according to specific CAM modality

Each CAM modality has a unique approach to therapeutic intervention which distinguishes it from other modalities, although there are aspects of each modality that overlap. The following excerpts describe various therapeutic approaches in the treatment of PCOS:

Homoeopathy

I first prescribe a constitutional homoeopathic remedy. I would say my biggest remedy is Nat mur because of a whole lot of suppression. And then there's the Calc carb patient who overextends themselves and is overwhelmed that are very plump and easily put on weight. [RP1-H]

I first give a constitutional remedy. The remedy Carcinosin comes up miasmatically and I usually start off my treatment with this remedy – it has a lot of abuse, overwork, stress and low self-esteem which I tend to see in my PCOS patients. Other remedies I use frequently are Lac caninum, Staphysagria, Thuja, Chocolate, Nat mur, Sepia. A lot of patients are given Lac can, dogs milk, because they are controlled and owned by someone and they are abused by their "owner". Chocolate is dealing with menopausal women mainly. [RP4-H]

Constitutional remedy: Thuja is a good anti-sycotic remedy which can be used as a herb and remedy. Progesterone in a low potency. Nat mur. Sepia most often. I often use the Homoeopathic Female complex which can be compounded by CoMed - The formula contains remedies such as Oestrogen, Calc carb, Sepia, Kali carb, Graphites, Lachesis, Fallopian tube, Apis among many others and basically contains all the female remedies in low potency. [RP5-H]

Homoeopathically, I treat with a constitutional remedy. [For] my skinny PCOS patients, I'll usually give something like Carcinosin or Nat mur. The overweight types will usually get Sepia, Calc carb or Lachesis. I also like to clinically prescribe Folliculinum. [RP6-H]

A relatively new therapy which has been integrated into homoeopathic treatment is biopuncture, a term used to describe the injection of biotherapeutics into specific areas, generally subcutaneously or into muscles, tendons or ligaments. Biotherapeutics such as *Traumeel*, *Lymphomyosot*, *Spascupreel* and *Zeel* contain low

doses of homoeopathic ingredients, and the ampoule forms are specially designed for injections (Kersschot 2007:20). -Heel pharmaceuticals have developed a protocol for the use of biotherapeutics in the management of fertility related issues including PCOS (-Heel 2000). Three homoeopathic practitioners performed biopuncture on their PCOS patients:

I do biopuncture. I inject with testosterone for biopuncture just over the ovaries. [RP4-H]

I use the biopuncture injectable Ovarium compositum which is a -Heel product. [RP6-H]

Homoeopathically I use the -Heel complex Ovarium compositum to broadly cover endocrine conditions. [RP10-H]

Naturopathy

The naturopathic practitioner will first thoroughly investigate the patients' diet:

I will spend a considerable amount of time with patients addressing their diet and trying to determine what foods might be driving their insulin resistance. IR also delays ovulation and testosterone production as well as weight gain issues particularly around the waist-line. [RP7-N]

Thereafter the patient will be subjected to blood and imaging tests to identify specific hormonal imbalances:

I always try to find the root cause. So, after I've tested the patient, if I find imbalances, I will treat accordingly. [RP7-N]

Having a complete picture of what is going wrong physiologically in the body and the patients' diet and lifestyle, the NP will then provide appropriate dietary and lifestyle counselling to correct any imbalances:

We try to remove sources of carbohydrates and fructose depending on the severity. Ensure they're eating pesticide free vegetables and produce, especially broccoli, cauliflower, brussel sprouts – helps to detox the liver and remove any excess estrogens. Good quality proteins and healthy fats, good quality omega three, avocado, olive oil, complex carbs with a low glycaemic index (depending on the glucose levels). Movement and sleep are also important and encouraged. Walking 15 minutes a day, anything that is enjoyable is encouraged. [RP7-N]

Traditional Chinese Medicine

TCM is the second most used modality after phytotherapy, with its practice of acupuncture and herbal medicine. Eight out of 12 participants (67%) in this study used some form of Chinese Medicine. TCM practitioners implement a dual approach to treating the PCOS patient, the first being acupuncture:

I manage using acupuncture (using needle pricks). To treat a given case the acupuncturist chooses 8-12 of these pressure points. Through needling, acupuncture balances energies. If the patient falls under "excess syndrome" we prescribe the following points: Baihu, Qugu, Zhongli, Lianqiu, Hegu, Xuehai, Diji, Taichong, Shuidao, Guilai. If under "deficiency syndrome": Qihai, Guanyuan, pishu, shenshu, sanyinjiao. [RP2-TCM]

Acupuncture points along the spleen meridian, stomach meridian and conception vessel are chosen frequently which are most located on the abdomen and the lower limbs. This is repeated once a week for 10 sessions. [RP8-TCM]

Three other practitioners referred their patients for traditional acupuncture therapy whilst two prescribed cupping therapy, a form of acupuncture:

For Chinese therapy, I use needles and heat application along the kidney and spleen channels. [RP6-H]

I also use acupuncture once or twice a week, targeting areas specific to hormonal imbalances, digestion and the liver. [RP7-N]

I sometimes prescribe acupuncture or cupping therapy. [RP11-UT]

I do cupping, particularly wet cupping over certain points corresponding to gynaecological areas, such as the posterior superior iliac spine, over the buttock and pelvic area to remove excess heat and moisture from the body. [RP3-UT]

The second aspect to TCM treatment is administering CHM:

For medication, we prescribed on what pattern the PCOS is seen to associate with. So, if Kidney deficiency I prescribe Yu ling shu or Wu Ji Bai Feng Wan. If Liver stagnation: Merry Life formula (CF35), Relaxed Wanderer (CF40). If Blood stagnation: Si Wu Tang (CF51) plus Expel Uterus stagnation (CF21), purge heat and Si Wu Tang. If Phlegm accumulation then Er Chen Tang + Si Wu Tang. [RP2-TCM]

Expel stasis Chinese herbs move qi and blood, remove blood stasis, relieve pain. Clinical indications include: endometriosis, dysmenorrhoea, irregular menstruation, chronic headache. [RP8-TCM]

CHM was additionally prescribed by 4 other practitioners:

I love using Chinese medicines. I tend to use Expel Stasis in very stressed out PCOS patient [in] high doses, 4 tablets a day. [RP1-H]

I do use Chinese herbal support, the protocol by Mediherb which uses a Female Reproductive Tonic Formula that combines Paeonia (a

traditional Chinese medicine) and Shatavari (Ayurvedic medicine). [RP5-H]

The China Herb formula: Way to Right alternating with Yu Lin Zhu. I also nourish the patient with Tonic Yang to address the yang deficiency. [RP10-H]

For Chinese herbs: Maxitone, Relaxed Wanderer, Merrylife, Expel stasis. [RP6-H]

Unani Tibb

UT management consists of regimental therapy (discussed under lifestyle intervention) and pharmacotherapy. UT formulations contain herbal medicines that have been used by UT practitioners:

For Tibb medication I prescribe: Tibb Herbals – Gynaecare. This formulation regulates the menstrual cycle, corrects hormonal imbalance and improves ovary function. [RP3-UT]

Ayurveda

In Ayurveda, single or multiple herbs (polyherbal) are used for treatment and are combined in a particular ratio to enhance efficacy:

Ayurveda has a vast range of pharmaceutical products to treat PCOS, it is 100% herbal with no side-effects which makes the patients happy also. I usually prescribe a combination of Shatavari, Guduchi, Ashwaganda and Triphala. [RP9-A]

Another Ayurvedic practitioner devised a dual strategy to combat PCOS consisting of a complete detox prior to herbal treatment, known as *Panchakarma* therapy (PKT):

Step 1: The elimination of Ama. It's performed by administering herbal powders which enhance digestion and improve bowel excretion. Step 2: Consumption of medicated ghee and after a few days administering oil massage. The ghee administered in this could be Guggulutiktaka Ghritha. Virechana: Virechana is the administration of purgative substances for the cleansing of pitta through the lower pathways. Basti: Enemas are administered based on the dosha of the patient and the current dosha vitiation. [RP12-A]

PKT was also followed by a regulatory protocol:

Nasya: Errhines to regulate the hypothalamic-pituitary ovarian axis. Shatavari Ghritha can be used as an errhine to regulate hormones. Correcting hormonal imbalance: herbs useful in correcting hormonal imbalances are – Ashoka, Dashamoola (10 essential roots), Shatavari, Ashwagandha, Eranda. Other classical preparations are Sukumara Kashayam, Kumari Asavam, Ashoka arishta, etc. Treatment for obesity can be achieved via Ayurveda medications, diet and lifestyle. Compound medicines such as Amrutha Guggulu, Navaka Guggulu, Varanadi Kashayam and Lauha Rasayam, etc. Treatment of insulin resistance: compound medicines such as Ayskriti, Guggulutiktaka Kashaya, Kathakakhadiradi Kashayam, etc. [RP12-A]

Four other CAM practitioners used Ayurvedic herbal formulations:

I use Ashwagandha regularly to support the adrenal glands which make the building blocks of your sex hormones. And so, if we replenish the adrenals, we will produce a better quality of oestrogen. [RP1-H]

Himalaya Range: Evecare, as a general female herb to maintain female and gynaecological health and regulating menstrual cycle. This is an Ayurvedic range and assists with premenstrual syndrome, cramps,

menstrual problems, dysfunctional uterine bleeding and fertility. [RP3-UT]

I support with Ashwaghandha. Either Himalaya or Solal, 250 mg will be 2 tablets at night. Solal is 500mg so 1 tablet. [RP4-H]

I prescribe Evecare by Himalaya and Shatavari is probably the best in my opinion. [RP6-H]

4.2.4.2 Sub-theme: The use of other CAM modalities

Almost all CAM practitioners use herbs and therapies belonging to other modalities. Several medical traditions use plant-based medicine (phytotherapy) including NP, H, TCM, AV and Allopathic medicine. Phytotherapy was evidently common in most CAM settings, this type of treatment is derived from whole plant extracts. Practitioners may use either single-herb or multiple herb treatments (thought to have complementary properties) or mixtures with non-herbal substances (Falzon and Balanova 2017). Ingredients used in herbal formulae overlap with those of TCM and AV, however, phytotherapy generally makes use of whole plant extracts (Falzon and Balanova 2017) whilst CHM and Ayurveda use milder, isolated extracts to reduce the risk of adverse effects. The most mentioned herbal medicines were *Vitex agnus castus* (Chasteberry) and *Withania somnifera* (Ashwagandha):

I prescribe a few clinical complexes. Chasteberry to regulate the hormones, Ashwagandha to support the adrenal glands which make the building blocks of your sex hormones. And so, if we replenish the adrenals, we will produce a better quality of oestrogen. I get quite good results with the Chaste berry by the 2nd month my patients notice a difference in their periods. I start off my phytotherapy dosage at a high dose (60 drops a day, 30 drops in the morning and evening) so that its most effective and at the most cost effective for the patient. Patients' want results and won't wait 6 months. I rather start high and then go down to maintenance dose. I prescribe both in capsules and tablets, depending on affordability for the patient. The quality and quantity might

differ according to cost. With the capsule the absorption is better than the drops. Clinical trials with the tablets/capsules produce better results. If you want to push therapeutic results you have to push high dosage. I also give Berberine for 2 months in high dose helps for PCOS and to increase metabolism to lose weight. [RP1-H]

Agnus castus to support the adrenal system because it produces cortisol which increases testosterone. I support with Withania. Either Himalaya or Solal, 250 mg will be 2 tablets at night. Solal is 500mg so 1 tablet. [RP4-H]

Western herbal: Chasteberry to regulate the cycle. [RP11-UT]

Another practitioner used a protocol which consisted of herbal complexes beneficial for treating PCOS:

I use the Mediherb protocol for PCOS. 1) Polyfem tablets, prescribed as 1 tablet 3-4 times daily. It contains Liquorice, Paeonia, Black cohosh and Thuja. 2) Chaste tree tablets – 1 tablet daily pre-ovulation and 2 tablets post-ovulation. 3) Glucobalance tablets, prescribed as 1 tablet 2-3 times daily. This combines Gymnema and chromium to balance blood sugar and aid weight loss. 4) Tribulus Forte tablets, prescribed as 1 tablet 2-3 times daily on day 5-14 of the menstrual cycle. It has been found to normalise ovulation. [RP5-H]

Another popular herbal medicine *Berberine* has also been used in TCM widely for its anti-diabetic qualities and has similar effects to metformin. Studies have positively evaluated the effect of berberine on IR in women with PCOS (Wei *et al.* 2012).

Berberine for 2 months in high doses helps for PCOS and to increase metabolism to lose weight. [RP1-H]

I prescribe Berberine for insulin resistance. [RP7-H]

4.2.4.3 Sub-theme: The use of adjunctive therapies

The National Cancer Institute (NCI) defines adjunctive therapy as a secondary treatment used together with the primary treatment to enhance therapy (NIH 2019). Various such therapies have been mentioned by participants such as:

Vitamin D supplementation and inositol to help with the insulin. [RP1-H]

I prescribe an immune tonic: Liv52. [RP3-]

I supplement with chromium, inositol and macca. Zinc for high androgens to shift from a 5 alpha to a 5 beta pathway. [RP7-N]

4.2.4.4 Sub-theme: Lifestyle Intervention

Lifestyle intervention is a fundamental aspect of holistic healing. CAM acknowledges the need to address all aspects of a patient's lifestyle both emotionally and physically. Most practitioners stressed the importance of ensuring that patients are enlightened about how their current lifestyle choices are exacerbating their PCOS. Furthermore, practitioners mentioned the value in motivating patients towards modifying their lifestyle:

A significant lifestyle change starts off in the mind – this patient needs motivation. When you treat someone, you become involved and you become empathetic from a healing point of view and they must feel that energy coming out you. The moment any patient feels disconnected from their doctor they don't want to heal. You must be able to influence them positively and set out a programme for them and I tell them, you've had this problem and you need to do several things to change. You can't just take medication and correct it: you need to change the way you eat, change your activity levels and your mindset. [RP3-UT]

For me the main thing is the consult itself because I believe most of the cure happens in the consult with the patient. You have to help build up their self-confidence which is key in PCOS treatment. [RP4-H]

My treatment is behavioural – helping them become aware of the tools they have available. PCOS is one of the most difficult diseases in terms of infertility, to treat. So much depends on the patient. They need to make massive changes to their diet and behaviour, and this is the biggest struggle, to make them realise the power that they have to change helping to mitigate against their genetic terrain. I help them to reduce their stress and motivate them. [RP10-H]

Counselling – most PCOS patients with whom I have consulted, have unresolved issues with abuse, mainly sexual abuse. Working on releasing the anger, starting a forgiveness programme and implementing gratitude journaling has helped many of these patients to come to a state of peace. [RP12-A]

A few practitioners stressed the importance of addressing the psychological condition of their PCOS patients by encouraging stress-relieving strategies:

I use a de-stress approach and encourage yoga, pilates, meditation, breathing exercises. [RP6-H]

Yoga and meditation to relieve stress. Certain yoga postures aid in managing insulin resistance, hypothyroidism and stimulate the hypothalamic – pituitary ovarian axis. [RP12-A]

Addressing the diet of the patient was a common lifestyle intervention emphasised by all participants. Diet and exercise interventions are implemented to facilitate weight-loss, reduce IR and androgen levels.

Cut out sugar because their sugar cravings are always the most prominent feature. [RP1-H]

The weight-loss has to be healthy and steady, not ultra-rapid, crash diet types of weight loss and together with that increasing the activity levels will result in weight loss. The diet must be balanced, significantly cutting down on carbohydrates and sugars. If a person loses a significant amount of excess weight and their BMI moves toward a normal range, they will start to notice a positive change. [RP3-UT]

I advise them usually to do intermittent fasting. Stop bread, rice, sugar and milk. I will send them recipes of what to eat. [RP4-H]

Reduce dairy, sugar, wheat. [RP5-H]

Drastically cut-out sugar, carbohydrates and starches. [RP6-H]

We try to remove sources of carbohydrates and fructose depending on the severity. Ensure they're eating pesticide free vegetables and produce, especially broccoli, cauliflower, brussel sprouts – helps to detox the liver and remove any excess estrogens. Good quality proteins and healthy fats, good quality omega three, avocado, olive oil, complex carbs with a low glycaemic index (depending on the glucose levels). [RP7-N]

A low carb, high-fat, high-protein diet is most preferable to manage their insulin resistance and change their body composition. If they improve their weight even marginally, they can alleviate many of their symptoms. It's their biggest struggle. [RP10-H]

Diet is very important, no caffeine. [RP11-UT]

Dietary counselling – completely changing the dietary lifestyle of patients makes a huge difference. [RP12-A]

IR is the hallmark of PCOS and endurance exercise also known as cardio, may improve insulin sensitivity (Aye *et al.* 2018) thus reducing the effects of IR. Exercise was encouraged by three participants:

Exercise: At least 30 minutes a day. A combination of cardio and high-intensity training is recommended. [RP4-H]

Aim to reduce the amount of cortisol by doing meditation, taking up a hobby, walking, socialising. [RP5-H]

Movement and good sleep are also important and encouraged, walking 15 minutes a day, anything that is enjoyable is encouraged. [RP7-N]

I look at their exercise regime and make sure that they are motivated to become fit and tone themselves. I encourage them to do weight-training. We want to improve their circulation. [RP10-H]

4.3 Conclusion

Thematic analysis of various CAM approaches to diagnosing and managing PCOS revealed that most philosophies are underpinned by the principle of a life force and conform to the idea that the body has an innate healing ability which must be augmented by therapy. Most CAM philosophies share the idea of an individual constitution, identified according to characteristics which guide the practitioner towards a certain management style. According to AV, PCOS is perceived as the manifestation of excessive kapha (earth and water). H practitioners generally classified as belonging to the sycotic and/or cancerinic miasm. TCM practitioners proposed that PCOS is the accumulation of chronic, damp heat. UT practitioners regarded the PCOS patient as having a combination of a sanguineous and melancholic temperament characterised by an overabundance of heat and moisture.

Common contributing factors recognised by participants were stress, genetics, poor dietary choices and inactivity. The main form of stress was reported to be caused by psychological abuse or trauma, lack of fertility and a pedantic temperament.

Most practitioners diagnose PCOS clinically, based on the case history and physical examination, and then opt for the necessary blood and imaging tests to confirm their preliminary diagnosis. This clinical diagnosis differs from a CAM-specific diagnosis, which helps predict the patient's susceptibility to certain pathologies and guide to a therapy selection. H practitioners analyse the miasmatic tendency of the patient. UT practitioners identify the temperament and humour of the patient. AV practitioners identify the doshic imbalance. TCM practitioners determine whether there is a yin or yang deficiency, and which channels these deficiencies lie along. Finally, NP practitioners investigate the lifestyle and dietary errors made by the patient.

Almost all participants adopt a multi-faceted approach when managing PCOS which consists of: CAM-specific medication and therapy, adjunctive therapies (phytotherapy, supplementation, integration of other modalities etc.), dietary counselling and lifestyle interventions.

Chapter 5: Discussion

5.1 Introduction

The aim of the research study was to explore and document the approach to managing PCOS from diagnosis to treatment by selected CAM practitioners in the eThekweni area. In the previous chapter, thematic content analysis was implemented in order to capture the philosophies, diagnostic approaches and therapeutic protocols of selected CAM practitioners in the management of PCOS. The current chapter provides a detailed discussion based on the findings obtained from the thematic analysis of the captured data. The discussion was carefully guided by the research question, namely: How, given your chosen modality, do you manage PCOS from diagnosis to treatment? This is discussed in relation to the identified themes which were presented in Chapter 4.

5.2 Demographic profile of participants

5.2.1 Gender

Interactions between a researcher and participants are shaped by their social context and are influenced by structural factors such as gender, class and age. Gender is a key factor which influences the quality and content of qualitative research data, particularly on interpretation. The participants gender can influence the emotional expressivity, conversation style, manner of discourse and the intent of their vernacular speech (Manderson, Bennett and Andajani-Sutjahjo 2006). As presented in Table 5, from the sample of 12 participants, males constituted 42% and females contributed 58%. This was based on the coincidental availability of more female participants and not the lack of male participants in the eThekweni area. The ratio of female to male participants was 2:2.4 with a very slight skewing of data. It should also be noted that female representation is noteworthy as female underrepresentation in research systems is common (Abramo and D'Angelo 2015).

5.2.2 Age

Age is an important demographic factor which influences research output. Participant ages were categorised into three ranges. The first group ranged from 21 years to 40 years, the second group ranged from 41 to 60 years and the third group included aged 60 and above. As presented in Table 5, participants within the age groups of 41-60 years old were the best represented (42%); this age group was ideal for the research study because these practitioners had sufficient clinical experience and extensive clinical knowledge to offer. Relatively younger practitioners between the age of 21-40 were represented second highest (33%) whilst the older practitioners' above the age of 60 years were the lowest represented (25%), this could be due to practitioners' retiring or passing away. Fair representation of all age groups was crucial in ensuring that different generations of CAM practitioners were included with different lengths of clinical experience. Both younger and older practitioners produced advantages which ultimately benefitted the quality of the research data. Older practitioners have more clinical experience, it is also likely that they have been exposed to a wider scope of pathologies and, in the case of PCOS, to various presentations of the syndrome. Older practitioners, however, may not be as technologically confident as the younger generations of practitioners who have the advantage of technology and up-to-date knowledge to aid their diagnostic and management skills.

5.2.3 CAM practitioners

As shown in Table 5, H had the highest representation of 33%, whilst UT, AV and TCM had an equal representation of approximately 17%. The modality with the lowest representation was NP which reflected a percentage of 8%. Evidently, there is an unequal representation of the five CAM modalities. The researcher, being a homoeopathic student, had greater access to Hs who were willing to participate in the study. Two of the four H practitioners were qualified and registered as homoeopaths but contributed extensive knowledge about TCM. RP10-H was qualified and registered as an acupuncturist and therefore had a good understanding of TCM. The study stipulated a minimum of two practitioners per modality which was adhered to for the remaining modalities, excluding NP, since it is offered as a degree course the University of Western Cape and not within the eThekweni area. Therefore, there were

limited NP practitioners who qualified with the AHCSA that could be sourced.

5.3 Philosophy of PCOS according to CAM modalities

In order to fully address the research question “How, given your chosen modality, do you manage PCOS from diagnosis to treatment?”, a list of probing sub-questions was posed to interviewees in order to document information categorically. The first sub-question addressed in the discussion was “Describe your understanding of PCOS based on the philosophical foundation of your specific medical system”. This question aimed to study the knowledge, theories, principles and attitudes regarding PCOS as a pathology guided by the philosophy of each CAM modality.

5.3.1 Homoeopathic philosophy

The homoeopathic philosophy of PCOS is predominantly constitutional, thus taking into consideration the individuals presenting somatic symptoms with their characteristics, psychological changes, temperament, reactivity and even peculiar symptoms such as cravings and aversions. All four H practitioners analysed the constitution and active miasm in their patient, thereafter analysing their clinical features. Although the PCOS itself was the focal point of the consultation, every PCOS patient was not viewed, advised or managed the same way.

Whilst investigating the patient’s constitution, a miasmatic background emerged from the case history and observation. The miasmatic theory is a fundamental principle of homoeopathy which denotes susceptibility to certain diseases and helps practitioners discern between acute and chronic prescribing (Croce 2000). Miasms are not an isolated affliction and most people usually have several miasms which can be active or dormant. The dominant miasm will correspond with the totality of the patient’s symptoms (Croce 2000). RP1-H identified the sycotic miasm because PCOS is “*characterised by an excess of everything: androgens, cysts, facial hair and acne*”. A similar statement was recorded by RP5-H who described the sycotic nature as “*a lot of excess*” and went on to list the types of “excess” commonly found in PCOS patients as excessive inflammation, perspiration and suppression which leads to acne, ovarian cysts and excessive menstrual bleeding. RP4-H ascribed the excessive tendency of

the patient to their overindulgent dietary habits resulting in acne, oily skin, pigmentation and poor self-esteem. These participants statements were confirmed by Owen (2015: 226-227) who described sycosis, according to Hahnemann, as being an “excess” of the mind and emotions reflecting in multiple physical manifestations.

All four H practitioners determined that the presence of ovarian cysts alone guided to the miasmatic diagnosis of sycosis. Interestingly, the sycotic miasm manifests mainly in the genitourinary tract, particularly affecting fluid metabolism in the pelvic organs. There is a proliferation and induration of tissues manifesting as cysts and growths which supports the H practitioners’ philosophies linking PCOS, an overgrowth of ovarian follicles with an overproduction of hormones, to sycosis. There are also affections of the skin and mucous membranes manifesting as recurrent lesions (such as acne), inflammation, perspiration with a musty odour which does not relieve the patient, and excessive discharges. There is frequent indigestion and stomach cramps accompanying menstruation. The patient has a ravenous appetite and is sensitive to damp weather (Paterson 1978). These characteristic symptoms reflected in established materia medica supports the general consensus of PCOS having a sycotic element due to the overgrowth of ovarian tissue, the overproduction of androgens and the excessive production of oil leading to inflammation and acne.

In line with the statement of sycosis being an excess of the mind reflected in physical manifestations, practitioners highlighted the role of emotional stress and abuse as an aetiology in the development of PCOS, which is also an aetiology and keynote of the sycotic miasm. Owen (2015: 225) states that sycosis is largely a venereal disease believed to be contracted either through sexual intercourse, saliva or hereditary transmission and is thus infectious in nature. Sexual and emotional abuse was reiterated by RP4-H who noted that the abuse is not always blatant, and leads to suppression of the female’s full potential, thus creating an inferiority complex. RP5-H and RP12-A also mentioned the history of sexual abuse noted in their PCOS patients. The sycotic patient withdraws with a sense of shame, described by Owen (2015: 226) aptly as feeling “soiled, blemished, unclean and may experience self-loathing”. Most practitioners correlated the abuse, dominance and inferiority complex to a dominant cancerinic miasm rather than sycotic. This can be explained by the fact that the

cancerinic miasm is situated between the sycotic and syphilitic miasm which is why there is an overlap in characteristics. There is the fixed nature of sycosis together with the destructive nature of the syphilitic miasm (Sankaran 2005: 278) and the sycotic element can be more dominant in the cancerinic miasm (Owen 2015). The extent of psychological damage and the picture of dysfunctional relationships and abuse is more marked in the cancerinic miasm. Physical and emotional abuse, domination and a low self-esteem were mentioned by a few practitioners. RP4-H noted that all her PCOS patients presented with some form of abuse, whether emotional or physical. The woman is usually dominated by her partner and suppresses her emotions to the extent that she is unaware of how abused she has been – this statement reflects the description of the nosode *Carcinosin* precisely, which treats the cancerinic miasm, as it is particularly used for patients who have a history of dysfunctional or abusive parenting or relationships, emotional trauma, abuse and continued domination by others (Owen 2015).

Three CAM practitioners described the personality of PCOS as being perfectionist. RP3-UT noted a Type A personality trend in patients who were meticulous about having things a certain way, easily aggravating if they are not. The cancerinic miasm is characterised by the idea of “perfectionism” and is closely associated with patients with a Type A personality (Drew 2004). RP5-H and RP6-H described the patient as being pedantic and perfectionistic. Supporting literature from renowned homoeopath Phahamane (2014:16) corroborated these findings, in his commentary on the theme of “perfection” in cancerinic patients. They set unrealistic goals whilst lacking the resources and capacity, they are extremely active and in control in order to achieve these goals. The physical and mental demands required by their body to fulfil these goals exceed their capacity and thus the concept of “superhuman strength” is created. RP6-H went further, describing their need for control in relation to PCOS viz extreme discipline, scouring for information on their condition and how to treat it. They become obsessive over the food they eat and engage in a lot of exercise. These patients lead a highly stressed out lifestyle as a result of overexertion to overcome their circumstances. Owen (2015: 232) described the sycotic personality in a description that matched participant responses as being “Proper and conservative, always conforming to norms, lack assertiveness ... They are conscientious, fastidious,

meticulous perfectionists and workaholics who have a heavy sense of duty and responsibility, are self-critical, and easily take on blame and guilt”.

It was evident that the principal identification of the sycotic miasm is based on physical symptomatology of excessive androgens, overgrowth and the tendency to pelvic disease. The sycotic miasm can also present with a background of sexual abuse and excessive stress, emotions, overindulgence and other factors depicting an “excess of everything” and ultimately morph into a cancerinic state, which becomes debilitated, exhausted and depressed. It was thus evident that the principal identification of the cancerinic miasm is based on psychological grounds with a strong indication of instability, depression, abuse and overwork.

5.3.2 Traditional Chinese Medicine philosophy

TCM uses the theory of qi, yin and yang and wuxing as a philosophy to guide its practices (Qiu 2015). RP2-TCM described the qi force as comprising two dynamically opposite yet harmonising energies known as yin (female and negative energy) and yang (male and positive energy). All TCM practitioners, as well as practitioners with a knowledge of TCM, described the philosophy of PCOS as being a deficient qi force with stagnation, dampness, heat and poor splenic function. RP2-TCM and RP6-H described PCOS as a qi deficiency to the liver, spleen and kidney channels. According to Jiang (2017: 2), PCOS is mainly a qi deficiency of the spleen and kidney which causes inadequate circulation, obstructing blood flow to the uterus which causes menstrual irregularities. RP8-TCM regarded PCOS as a qi deficiency of the spleen, affecting circulation to the liver and causing stagnation and a qi excess therein. This view is consistent with Jiang (2017:2) who described liver qi as stagnation and influenced by stress which slows down liver circulation, hormone production and blood to the uterus thus causing irregular menstrual cycles. Another study also associated fertility-related issues as a liver qi stagnation (Ried and Stuart 2011: 326).

RP8-TCM described PCOS as a predominant yang deficiency which affects the spleen, creating chronic internal dampness which then causes liver stagnation and phlegm formation. Liver stagnation then affects hormone production and the menstrual cycle. RP10-H also described PCOS as a yang deficiency, based on tongue diagnosis

(bare patches over the gallbladder and liver areas with cracking through the spleen) which indicates liver stagnation, affections of the spleen and gallbladder. These philosophies are consistent with Fu *et al.* (2014: 45) who associated the pathogenesis of PCOS with spleen-yang deficiency and also a kidney-yang deficiency. Another study supporting this common pattern proposed that fertility-related issues are associated with kidney-yang (or yin) deficiency, spleen-yang deficiency with liver *qi* stagnation and inadequate circulation (Ried and Stuart 2011:326).

The elements thought to be dynamic in PCOS, based on the analysis of all TCM interviews are fire, wood and water. Fire (heat) is associated with blood circulation, hormones and digestion involving the small intestine (Kim 2011) and, since PCOS can cause blood stasis, poor circulation, stagnation in the uterus and hormone imbalance, according to RP2-TCM, RP8-TCM, RP6-H, it can be deduced that PCOS has a heat element. Wood is associated with the liver and described as liver stagnation by RP2-TCM and RP8-TCM. According to RP8-TCM, liver stagnation heats up the liver causing “fire” and internal dampness (water); ultimately resulting in a damp-heat syndrome. Water is associated with the kidney, bladder and fluid (Kim 2011). RP10-H described PCOS patients as having a “damp” tendency with fluid retention causing them to be heavier whilst RP8-H described it as phlegm and fluid accumulation with internal dampness. According to Ried and Stuart (2011: 326), fertility-related diseases involve blood stasis, heat, and dampness – this aligns with the above philosophies.

According to RP2-TCM, PCOS is not identified as a condition in ancient TCM literature and is regarded rather as a pattern of pathologies which lead to infertility. Therefore, the philosophy of PCOS considers various organs involved in this syndrome. RP2-TCM mentioned the involvement of the uterus, liver, kidney and reproductive organs (ovaries, uterus, vagina) in PCOS. RP2-TCM further classified PCOS according to infertility and dysmenorrhoea, where infertility could potentially occur as the result of uterine abnormality, liver stagnation, phlegm stagnation and excessive heat whilst dysmenorrhoea could be the manifestation of an excess syndrome or a deficiency syndrome. PCOS was defined as “*prolonged periods and amenorrhea*” by RP8-TCM, which is synonymous with dysmenorrhoea, since dysmenorrhoea often accompanies “long, irregular cycles” with heavy bleeds (Singh *et al.* 2008: 395). Furthermore,

amenorrhea is also synonymous with infertility since 25% of infertility caused by PCOS is due to amenorrhea (Hull 1987: 236). RP2-TCM further elucidated that liver stagnation causes retardation of the liver qi. The philosophies reported by participants were congruent with many research studies. One such study was introduced by Professor Hou Li-hui who theorised that PCOS was the result of stagnation of phlegm and blood in the uterus and based on his clinical experience found that the main pathogenesis in PCOS was a deficient spleen and kidney deficiency, phlegm, dampness, stagnation of qi and stasis (Liu *et al.* 2009). Furthermore, a study by Zhou and Qu (2009) described PCOS as a disharmony of the liver, spleen and kidneys – a concept elaborated on by all practitioners. RP2-H classified dysmenorrhoea as the manifestation of qi “excess” or “deficiency” which was described as an excess or deficiency syndrome and was substantiated by a brief pathogenesis:

- *Excess Syndrome*: liver stagnation impedes circulation through-out the body which causes disharmony and stagnation of blood in the uterus. RP8-TCM’s classification of PCOS corroborated with the concept of an excess syndrome which was described as accumulation of phlegm and fluid resulting in blood stasis. RP6-H found that overweight PCOS patients tended to have stagnation, poor circulation and oestrogen dominance. Thus, it can be assumed that overweight PCOS patients are more likely to be classified as belonging to the “excess syndrome”.
- *Deficiency Syndrome*: this manifests in a weak body constitution which causes deficiency of qi and blood. Furthermore, menses can exhaust the blood depriving the uterus from nutrition. RP8-TCM additionally described the deficiency syndrome in PCOS as being yang in nature. RP6-H distinguished that the normal-weight PCOS patients were often “deficient” in blood nutrients along the liver, spleen and kidney channel – resulting in poor splenic function, this patient often experienced the flu. Thus, it can be assumed that underweight/normal weight PCOS patients are more likely to be classified as belonging to the “deficiency syndrome”.

Stagnation with excessive heat was identified by various symptomatology which were listed collectively as: delayed and dark, clotted menses, pain, obesity, delayed periods, dysmenorrhoea (RP2-TCM), congestive headaches and engorged breasts (RP6-H).

This was supported by a study by Zhou and Qu (2009) which described the symptoms associated with stagnation that lead to excessive heat accumulation in the body. These symptoms included early menarche, heavy menstrual bleeding, dysmenorrhoea with symptoms such as anxiety, feverish feeling, dry mouth, purple clots in menses, breast distention, hypochondriac pain or abdominal distention. Internal dampness was determined by an increased moisture, perspiration and vaginal discharges marked with strong odours.

The study on PCOS by Zhou and Qu (2009) proposed that any syndrome linked to reduced fertility can be the consequence of several types of impairments according to Chinese philosophy. These impairments have been listed below and provide both a substantiation and summarisation of the information above provided by participants:

- A deficiency spleen and kidney which ultimately disrupts the entire endocrine system and has a domino effect on hormones, disturbing sexual reproduction.
- Stagnant qi and blood, the result of poor circulation, can impair fertility even when hormone levels are relatively normal.
- A damp-heat syndrome which is similar to inflammation and causes impaired flow through reproductive systems, it must be relieved in order to restore fertility.

5.3.3 Unani Tibb philosophy

PCOS, according to RP3-UT, is a syndrome characterised by an overabundance in male hormones and imbalance in female hormones which feeds into a range of gynaecological issues. Disease in UT is classified according to (1) Four humours (blood, phlegm, yellow bile and black bile) which can be described as an “excess” or “deficiency”, (2) Four complexions (hot, cold, dry and moist) and (3) Four fundamental personality types (sanguine, choleric, melancholic, phlegmatic). Humours, temperaments and complexions can interrelate and appear together (Israili 1981).

RP3-UT reported the predominant temperaments of PCOS patients to be a combination of sanguineous and melancholic. RP3-UT further described the melancholic aspect as a Type A personality in PCOS patients who “*want things a certain way and get angry if it isn’t*”, these patients were described as high-strung with

various stressors such as marital, financial, work-related or fertility-related. The sanguineous aspect can be attributed to low self-esteem which occurs psychologically in most PCOS patients. The sanguineous-melancholic temperament, according to Ekstrand (2012), can be described as highly emotional and volatile with rapid fluctuations in moods allowing a pedantic, perfectionistic, critical nature to become apparent.

RP3-UT reported the predominant humour to be blood, related to menstruation being too profuse or insufficient as well as hormone imbalances. Blood accompanies heat and moisture, which RP3-UT reported as predominant complexions that manifest as acne, hypertension and a diabetic nature (seen in PCOS). All affections of PCOS involve blood: high blood sugar, high blood insulin levels, abnormal hormone levels, excessive/absent menstrual blood flow. The combination of a sanguineous, melancholic temperament with heat and moisture, according to RP3-UT manifests as gynaecological issues such as menstrual irregularity, hirsutism, acne, loss of sleep, obesity, overeating etc. This was substantiated by Hoosen (2017) who described in extensive detail, the features of a patient belonging to both sanguineous and melancholic temperaments. According to Hoosen (2017), the patient with a dominant sanguineous temperament is described as having either a large appetite with excessive thirst, skin that is moist, red and warm to touch, painful menstruation and a tendency to “leucorrhoea, dysmenorrhoea, inflammation of the ovaries and fallopian tubes, endometriosis, genitourinary disorders and capillary congestion.” Furthermore, the melancholic temperament is reported to present with a poor appetite, oversleeping or difficulty initiating sleep, irregular menses with a low quantity and clots. The melancholic temperament is predisposed to pathologies such as “Insomnia, hyperacidity, poor appetite, colon and gas related ailments and anxiety amongst others”. Keeping in mind that RP3-UT viewed PCOS patients as a combination of these two temperaments and personalities, an overlap and interrelation in symptoms can occur. The reported temperaments, humours and complexions reported by RP3-UT were substantiated by Hoosen (2017) who described a patient with a sanguineous and melancholic temperament as encompassing a combination of heat, moisture and blood.

5.3.4 Naturopathy philosophy

PCOS was described by RP7-N as being a combination of physiological factors and drivers. According to RP7-N, naturopathy aims to identify the root cause of PCOS which involves treating the person “*not the label*” (RP7-N). Thus, treatment was reported to focus on removing the source and correcting the aetiological imbalance rather than merely on treating the presenting symptoms. Hence, identifying the sources of derangement in PCOS and removing or correcting any imbalances with the correct medication and advice, would thus allow the body to heal and reinstate homeostasis. This was further substantiated and described as a basic principle of Naturopathy by Arentz *et al.* (2017) who states that “Naturopathic medicine recognises the body’s natural innate healing ability if given the proper stimulus and tools”. RP7-N found PCOS to be the manifestation of poor lifestyle choices such as inactivity and poor dietary choices, as well as a highly stressful lifestyle, and further described the syndrome clinically as ovarian cysts, irregular ovulation, hormonal imbalance, IR, weight gain, hirsutism, androgenic alopecia and irregular menses. This was substantiated by Arentz *et al.* (2017) who described naturopathy as focussing mainly on lifestyle behaviours that result in the expression of PCOS. Naturopathy is therefore driven by physiology and lifestyle analysis rather than philosophy which distinguishes it from all other modalities. The starting point for many NP practitioners is IR, which often correlates with PCOS, and is often the result of poor lifestyle and dietary choices made by the patient.

As part of the diagnostic process, RP7-N mentioned spending a “*considerable amount of time*” investigating their diet, lifestyle (physical activity, sleep, QoL) thoroughly in order to identify driving factors and advise them accordingly. This correlates with the principle of naturopathy which states that “NPs should educate their patients, involve them in the healing process, and emphasise the importance of the doctor-patient relationship” (Arentz *et al.* 2017). NP treatment starts with finding imbalances in the patient’s current diet and lifestyle and addressing them, which can be described as a basic or minimal intervention. Thereafter, depending on the severity, the NP can prescribe supplements, herbal medications, therapeutic procedures (such as acupuncture, infrared sauna, meditation) or refer the patient for further treatment. This

is in line with the NP principle which states that “NPs begin with minimal interventions and proceed to higher level interventions only as necessary” (Arentz *et al.* 2017).

5.3.5 Ayurvedic philosophy

Ayurvedic philosophy, according to the RP9-A, views every individual as having a unique psychosomatic nature (*Prakriti*) which is based on basic elements known as dosha's of which there are three: vata, pitta and kapha. A doshic imbalance results in internal and external manifestations. RP12-A reported that the aim of Ayurvedic management is to maintain doshic balance. RP9-A defined PCOS as a condition known as artuba which means “irregular menstruation or bleeding” and found PCOS to be the manifestation of a pitta and kapha imbalance. RP9-A explained that when the menstrual cycle is out of sync, it is a direct manifestation of a doshic imbalance. A study on an Ayurvedic perspective on PCOS, supporting RP9-A, stated that Ayurveda refers to hormones as fire elements (pitta) which is a transformative energy in the body responsible for all female reproductive processes. The transformation in each stage of the menstrual cycle is imputed to pitta itself, and in the case of PCOS, there is a pitta dominance which results in acne, hair loss, painful menses and in later stages can progress into heart problems. Kapha has heavy, cool effects on the tissues that support the female reproductive system, including supporting the growth of the ovarian follicle. A dominance of kapha in the body manifests as increased weight, subfertility, hirsutism, diabetes and coldness. The combination of pitta and kapha leads to reduced digestive fire which interferes with enzymatic reactions leading to incomplete metabolism and hormonal imbalance. This in turn triggers hyperinsulinaemia and hyperandrogenism which causes anovulation, menstrual irregularities and the classic picture of PCOS (Patel and Prajapati 2017). Conversely, RP12-A described PCOS as a vata imbalance with the presence of cysts which vitiate into muscle and fat, thus elevating kapha. According to Nehra (2019:10), Ayurveda describes vata as the main cause of vaginal disturbances in women, therefore vata must be taken into consideration before pitta and kapha. Another alternative pathogenesis of PCOS described kapha blocking the vata and pitta dosha's which causes obstruction of channels and suppression of the transformation process, this results in cystic swelling. When the flow of vata and pitta is impeded, there is reduced stimulation to the ovaries

resulting in irregularities such as anovulation, dysmenorrhoea and PCOS (Sawant *et al.* 2017).

Literature consulted confirmed that PCOS does not in fact correlate with a single disease in Ayurveda but, rather, many closely related conditions which were listed by RP10-A and then substantiated by Deepthika and Waratenne (2019: 3) as:

- *Kaphaja Granthi*: a cyst or cystic swelling which can be filled with fluid, gas or pus which vitiates the muscle, blood and fat tissues and produce a round, bulged and hard swelling which is called *Granthi*.
- Menstrual irregularities as *Artava Vyapaths*: this gives scanty and irregular menstrual cycles which tend to be very light.
- Infertility as *Vandhya*: also termed *Vandya yoni*, a condition in which the woman does not ovulate and has amenorrhea.
- Obesity as *Sthaulya*.
- Acne and Baldness as *Mukhadoosha* and *Khalithya*.
- Hyperinsulinemia as *Prameha*

Deepthika and Waratenne (2019: 3) mentioned an additional condition known as *PushHagni revati*, a woman with corpulent, hairy cheeks (evident hyperandrogenism).

5.3.6 Exception

RP11-H was an exception to all modalities because the practitioner did not report a CAM-specific philosophy but rather, a scientific philosophy of PCOS. RP11-H adopted a strict clinical approach to understanding, diagnosing and managing PCOS and like other practitioners, emphasised stress as a strong aetiology. RP11-H described how the impact of stress on the body raises cortisol levels which, in turn, raise insulin levels and result in the formation of DHT (dihydrotestosterone) from testosterone in a domino effect. Furthermore, the practitioner found PCOS to manifest in two major patterns: (1) PCOS with low hormone levels and (2) PCOS with high hormone levels. The former was clinically defined by low levels of oestrogen and LH. IR is believed to play a role in preventing the formation of oestrogen from progesterone and causing only DHT to be produced. Furthermore, cortisol is believed to “steal” progesterone, thus raising insulin levels. A further drop in thyroxine (T4) is believed to prevent the growth

of follicles and ovulation resulting in a shorter menstrual period with scanty bleeding. In PCOS with high oestrogen and LH levels, follicles were significantly larger than normal and secreted high levels of progesterone and oestrogen. This results in a constant hormone fluctuation, leading to more frequent ovulation and heavy bleeding.

5.4 Contributing factors to the development of PCOS

PCOS is a syndrome whose precise aetiology remains unclear; however, it has been ascertained that the interplay of certain genetic and environmental factors contribute to its development (De Leo *et al.* 2016). Common, established contributing factors were reported by participants such as: genetics, lifestyle, inactivity and obesity caused by a poorly controlled diet. Stress was mentioned as the most significant factor impairing reproductive health. Nine participants (75%) emphasised the role of stress in exacerbating PCOS in different contexts, these have been concisely summarised as three broad types:

1. Stress linked to emotional or physical abuse (RP4-H, RP5-H, RP12-A).
2. Emotional stress with a deep-rooted sense of dissatisfaction and unhappiness, particularly regarding self-image, common in obese patients (RP2-TCM, RP4-H, RP1-H).
3. Stress associated with perfectionism and overwork in Type A personality patients, most common in normal weight patients (RP3-UT, RP4-H, RP5-H).

These categories of stress do not exist in isolation. Low self-esteem, a form of emotional stress, can feed into a cycle of unhappiness and depression which could potentially lead to comfort eating, sleep disturbances, lack of motivation and ultimately worsening of all aspects of PCOS (RP3-UT). Therefore, it is evident that factors can interrelate and compound, negatively affecting the QoL of the patient. The effect of stress on the body was reported to increase adrenal gland stimulation and cortisol production (RP4-H, RP5-H, RP11-H). RP11-H described how the impact of stress on the body, in turn, raised cortisol levels which raised insulin levels and resulted in the formation of DHT from testosterone in a domino effect. DHT was described to worsen PCOS symptoms. RP5-H similarly described stress as a stimulus for excess cortisol release resulting in a “*pregnenolone steal*”, thus depleting progesterone and causing hormone dysregulation, inadequate blood sugar metabolism and IR. According

Nichols (2017), the body shunts pregnenolone away from DHEA and shifts it towards the cortisol pathway which inhibits the release of sex hormones. This theory provides an explanation for how our body prioritises survival over reproduction. A study on the effects of acute stress on ovarian hormones (Shors *et al.* 1999) further supports the participants' statements, reporting that stress causes elevated basal levels of glucocorticoids exhibited by the adrenals. The study also observed that plasma estradiol levels were elevated immediately after stressor cessation. This suggests that even the after-effects of a stressful situation can dysregulate hormones resulting in ovarian dysfunction.

PCOS is a lifelong disease and stressor, potentially beginning in utero and persisting throughout a female's reproductive life. Stress, when relating to PCOS, encompasses inflammatory, oxidative and metabolic stress; the resulting emotional stress can exacerbate the PCOS symptoms. Although the culprit of emotional impairment has not been identified, there are various emotional stressors that play a role in the development of PCOS (Papalou and Diamanti-Kandarakis 2017). PCOS often manifests at an age when finding a partner, sexual activity and cosmetic appearances become important. Obesity, acne, hirsutism and impaired fertility have profound psychological implications such as depression and mood disorders. A study examining the relationship between psychiatric depression and the biochemical characteristics of women concluded that emotional stress and depression were significantly higher in patients with PCOS and that psychological symptoms should be evaluated with the same thoroughness as clinical symptoms (Adali *et al.* 2008). It is unclear whether the psychological effects of PCOS are the result of the biochemical effects, or whether the biochemical effects are the result of psychological stress – either way, a link between the two is indisputable.

Poor dietary choices were mentioned by eight participants (66%) as a common contributing factor, particularly diets consisting of high sugar and carbohydrate intake. A high glycaemic index diet spikes insulin levels. RP3-UT mentioned "*incorrect diet*" as a governing factor in the development of PCOS. Furthermore, participants regarded crash diets and rapid diets as improper. RP4-H and RP5-H found that bread, rice, sugar, wheat and milk products were major dietary culprits exacerbating PCOS and

eliminated them from the PCOS diet. RP7-N advised patients to remove all sources of glucose and fructose. RP6-H found that overweight PCOS patients lacked control and discipline over their food consumption resulting in overindulgence in unhealthy foods whilst “*skinny-type*” PCOS patients were obsessed with their diets and tended to stress about the foods they ate, causing a tendency to inadequate nutrition. RP-11 emphasised the importance of following the correct diet, specifically mentioning caffeine as a culprit in poor dietary choices. RP12-A linked overindulgence in highly processed foods to IR which in turn raises androgen resulting in the exhibition of PCOS symptoms. Carbohydrate cravings are common in PCOS patients, defined by Morrell (2015: 73) as a perceived desire to consume sweet and starchy foods which can cause temporary mood improvement in the craver due to a spike in serotonin levels. Serotonin aids other functions such as sleep onset, mood control and emotional pain sensitivity. Therefore, consuming carbohydrates becomes a learnt behaviour which cravers use to comfort themselves when psychologically stressed (Morrell 2015: 74). A study that followed 35 females with PCOS found that 51.7% consumed high sugar content items for breakfast, 97.1% consumed supper significantly later compared to controls, snacking between meals was more common in females with PCOS, 58.7% ingested at least one caffeinated drink per day and reported consuming their meals whilst watching TV, and 73% reported eating out of pleasure more than hunger. Conclusively, females with PCOS had a far higher average daily intake of calories than the non-PCOS group (Eleftheriadou *et al.* 2015). Hyperglycaemia after meals has also been shown to increase inflammation and oxidative stress in the body and gradually worsens IR over time. Hyperglycaemia, hyperinsulinaemia and increased oxidative stress are all contributing factors to PCOS, although the precise mechanism of insulin dysregulation is unknown (Bailey *et al.* 2019).

A unique perspective on the effect of “*earth*” and “*water*” contributing to PCOS was illustrated by an RP9-A as follows: a poor diet consists predominantly of foods containing a high carbohydrate index. Carbohydrates break down into glucose which causes retention and weight gain. IR, a central defect in PCOS, promotes glucose intolerance and can limit post-prandial thermogenesis which results in the retention of weight. This explanation is supported by Barber *et al.* (2018).

Another distinctive explanation communicated by RP2-TCM was the intake of excessively “cold foods” and “cold drinks”, resulting in stagnation in the uterus which weakens the qi and blood. RP8-TCM mentioned “toxins” as the main source of reproductive derangement, particularly hormonal medications. IR, a central defect in PCOS, promotes glucose intolerance and can limit post-prandial thermogenesis (Barber *et al.* 2018), this indicates a lack of heat which is necessary in digestion, supporting the idea of “coldness” created through an improper diet.

Other established contributing factors mentioned by participants and found extensively in the literature discussed in Chapter 2 are:

- Genetics (mentioned by RP3-UT, RP5-H, RP10-H): PCOS is regarded as hereditary due to the common occurrence of PCOS within families and its genetic basis is thought to involve multiple, complex gene mutations (Arentz 2015). Most studies suggest a dominantly inherited trait of low penetrance and variable expressivity (Amato and Simpson 2004). The aetiology of PCOS has been associated with genes linked to gonadotropin and neuroendocrine action, ovarian androgen biosynthesis and the action of insulin (Azziz 2016).
- Obesity (mentioned by RP2-TCM, RP3-UT, RP4-H, RP6-H, RP12-A): The phenotype of PCOS is aggravated by the presence of excessive adiposity which further exacerbates the risk of developing complications such as metabolic syndrome, T2D and CVD (Dumesic *et al.* 2015). Obesity is linked to the inhibition of sex hormone binding globulin (SHBG) which counteractively promotes hyperandrogenaemia and extends follicular phases which results in a prolonged, irregular menstrual cycle (Diamanti-Kandarakis, Christakou and Marinakis 2012).
- Androgen excess (mentioned by RP1-H, RP7-N, RP11-UT, RP12-A): Hyperandrogenaemia causes intraovarian paracrine effects and neuroendocrine effects on the HA, both of which are associated with anovulation (Diamanti-Kandarakis, Christakou and Marinakis 2012). Peripherally, hyperandrogenaemia may exacerbate the metabolic effects of PCOS such as IR and increased visceral fat.
- Environmental factors (mentioned by RP3-UT, RP5-H): Environmental endocrine disrupting chemicals may also interfere with ovarian and metabolic

function, causing PCOS-like alterations (Goodarzi *et al.* 2011). Higher levels of BPA have been discovered in women with PCOS and have been associated with androgens. This is due to the decreased hepatic clearance that arises from androgen excess which has caused suspicion that BPA may exaggerate the severity of PCOS (Kandaraki *et al.* 2011).

5.5 Diagnosis of PCOS

PCOS is regarded as a diagnostic challenge because there are many variations in the presentation of PCOS in females (Azziz 2004). The diagnosis of PCOS can also vary at different stages of growth which make it almost indiscernible for diagnostic purposes (Welt and Carmina 2013). There are three sets of available diagnostic criteria which are used predominantly in the diagnosis of PCOS in conventional medicine: The Rotterdam ESHRE/ASRM (2003) criteria, NIH (1990) and the AE-PCOS criteria (see Chapter 2). There are major philosophical differences between complementary and conventional medicine with regards to diagnostics. CAM practitioners generally make constitutional diagnoses separately to their clinical diagnosis, which is referred to by some as “pre-pathology” (Lewith and Robinson 2016).

5.5.1 Sub-theme: Clinical diagnosis

All CAM practitioners adhere to the standard PCOS diagnostic criteria to determine a clinical diagnosis. The Rotterdam ESHRE/ASRM (2003) criteria is commonly used to make a diagnosis and requires confirmation of two out of three of the following:

- 1) Polycystic (multi-follicular) ovaries on ultrasound (≥ 12 small follicles in an ovary).
- 2) Clinical and bio-chemical signs of hyperandrogenism such as hirsutism or elevated serum androgen levels (testosterone, androstenedione or hydroepiandrosterone)
- 3) Oligomenorrhea as manifested by cycle length ≥ 35 days.

The first diagnostic step is to elucidate clinical signs and symptoms which are determined through the case history and physical examination. These signs and symptoms were documented collectively from all 12 participants. If suspecting signs

and symptoms are discovered, a preliminary diagnosis of PCOS can be made and a pelvic ultrasound will confirm the diagnosis. Approximately 95% of women with hirsutism and oligomenorrhea have multi-follicular ovaries on ultrasound (Barbieri 2014). A common statement was that patients usually came in pre-diagnosed with PCOS by their gynaecologist, disillusioned by conventional medicine, seeking alternative therapy.

5.5.1.1 The case history

During the consultation, the practitioner will meticulously record all presenting signs and symptoms and probe further to elucidate any suspecting symptoms. The following clinical signs and symptoms were mentioned by participants:

- Irregular menses/ Dysmenorrhoea (RP1-H, RP3-UT, RP6-H, RP7-N, RP8-TCM, RP9-A, RP10-H, RP11-UT, RP12-A).
- Hormonal patterns of stubborn acne (RP1-H, RP3-UT, RP4-H, RP5-H, RP6-H, RP7-N, RP8-TCM, RP10-H, RP11-UT, RP12- A).
- Weight complaints: overweight, inability to lose stubborn fat. (RP1-H, RP3-UT, RP4-H, RP6-H, RP7-N, RP9-A, RP10-H, RP11-UT, RP12-A).
- Fertility complaints: difficulty conceiving (RP1-H, RP2-TCM, RP3-UT, RP10-H, RP12-A).
- Hirsutism (RP1-H, RP3-UT, RP4-H, RP6-H, RP7-N, RP10-H, RP11-UT).
- Amenorrhea (RP8-TCM, RP10-H).
- Female pattern balding (alopecia) (RP7-N).
- A family history of PCOS or diabetes (RP3-UT).
- Severe PMS symptoms: headaches, cramps, breast tenderness (RP2-TCM).

5.5.1.2 The physical examination

A general cursory examination and keen observation generally revealed:

- Acne on the face/neck/back, particularly along the jawline.
- Male-pattern hair growth along the chin, face, chest, abdomen and back.
- A band/tyre of fat around the lower abdominal region.
- An overweight body shape.
- Pigmentation (Acanthosis nigricans).

5.5.1.3 Blood tests

A PCOS screen is beneficial in evaluating biochemical evidence of hyperandrogenism and hormonal dysfunction. The central defect in PCOS is IR and tests helpful in evaluating IR are listed below. The simplest test is a fasting glucose-to-insulin ratio. However, it should be noted that none of the tests are extremely specific or sensitive. In fact, a 2-hour OGTT test may be more effective in evaluating IR. Furthermore, a fasting lipid profile is useful in predicting the patients' risk of T2D and CVD.

PCOS/hirsutism screen:

- Follicle stimulating hormone (FSH) – will be normal or low in PCOS.
- Lutenising hormone (LH) – will be elevated.
- LH/FSH ratio: a ratio > 2.0 may suggest PCOS.
- Testosterone – usually elevated, most testosterone values in PCOS will be ≤ 150 ng/dL (≤ 5.2 nmol/L).
- Estrogens – normal or elevated.
- Sex hormone binding globulin (SBGH) – may be reduced.
- Androstenedione – usually elevated.
- Human chorionic gonadotrophin (HCG) – negative, checks for pregnancy.
- Anti-mullerian hormone (AMH) – usually elevated.

Other blood tests:

- Fasting insulin: insulin resistance: usually elevated.
- Random blood glucose or A1c: elevated in pre-diabetes/ diabetes.
- Lipid profile: determine risk of developing type 2 diabetes and cardiovascular disease.

Biochemical evaluation should be implemented in order to rule out other disorders that can mimic PCOS such as hyperthyroidism, hyperprolactinaemia, Cushing's syndrome, congenital adrenal hyperplasia.

Tests to rule out other disorders:

- Thyroid function test: rule out thyroid dysfunction.

- Vitamin D: usually low, rule out a deficiency.
- DHEA levels: levels will be normal or slightly elevated in PCOS, used to rule out an adrenal tumour.
- Cortisol levels: rule out Cushing's syndrome.

Unmentioned tests that should be included:

- 21-hydroxylase deficiency – most common form of congenital adrenal hyperplasia, to rule this out.

5.5.1.4 Non-laboratory tests

- DUTCH Plus® test: a self-administering kit which analyses saliva and urine in order to determine male and female hormone levels and how well these hormones are being metabolised.
- Pelvic ultrasound (referral).
- 24-hour urine free cortisol: mild elevations in PCOS but > 2 times the upper limit in Cushing's.

5.5.1.5 Referral

- Gynaecologist
- Endocrinologist

Considering the various clinical diagnostic approaches collectively, the researcher has proposed and drafted a PCOS diagnostic summary based on the information provided and evidence obtained.

5.5.1.6 Summary of clinical diagnostic approach

- **Case history** – Take a thorough case history and identify: menstrual irregularities, fertility complaints, hirsutism, stubborn acne, alopecia, weight complaints, PMS symptoms, acanthosis nigricans.
- **General cursory examination** – Perform a general cursory examination, carefully examining the skin, hairline and abdomen to identify: hormonal acne

along the jawline and back especially, male-pattern hair growth or balding, a band of fat around the lower abdominal region, obesity and pigmentation.

- **Blood tests** – Refer the patient for blood tests, particularly: PCOS screen, fasting insulin, random blood glucose and (if severe PCOS) a lipid profile. Rule out other disorders by testing: TFT, DHEA, cortisol, vitamin D and 21-hydroxylase.
- **Referral** – Refer to a gynaecologist for a pelvic ultrasound and second opinion.

5.5.2 Sub-theme: CAM-specific diagnosis

5.5.2.1 Homoeopathy

As described under the subheading “Homoeopathic Philosophy”, all PCOS patients were found to have an active and dominant sycotic and/or cancerinic miasm. All four H practitioners first extracted the patients’ constitution through the case history and observation, to distinguish the characteristics of the patient. Thereafter, the miasmatic background of the patient was determined. This has been summarised to show the collective characteristics used to arrive at the correct miasmatic identification (see also Table 6):

Sycotic miasm characteristics

- A theme of “excess” manifesting on physical and emotional levels (RP1-H, RP4-H, RP5-H).
- Affections of pelvic area, i.e. ovaries, uterus and vagina (RP1-H, RP5-H, RP10-H).
- Background of sexual abuse (RP4-H).
- Overindulgence in refined carbohydrates and sugary foods (RP4-H) “No control or discipline over their diet” (RP6-H). Loss of control is a key feature of sycosis.
- Overgrowth of cellular tissue: ovarian cysts (RP1-H, RP5-H, RP10-H).
- Overproduction of hormones: excessive androgens, excessive hair growth and acne (RP5-H, RP1-H).
- Overproduction of oil: inflammation and acne exacerbation (RP1-H, RP5-H).
- Overproduction of fluids: hyperhidrosis, menorrhagia, discharges (RP5-H).

- Hyperpigmentation (RP4-H).

The characteristics of the sycotic miasm corresponded with ones reported by Lilley (2006: 226-227) who described sycosis as being an “excess” of the mind and emotions reflecting in an “excess” of physical manifestations. All four H participants determined that the presence of ovarian cysts alone guided to the miasmatic diagnosis of sycosis. The sycotic miasm manifests mainly in the genitourinary tract, particularly affecting fluid metabolism in the pelvic organs. There is a proliferation and induration of tissues manifesting as cysts and growths which supports the H participants’ philosophies linking PCOS, with an overgrowth of ovarian follicles with an overproduction of hormones, to sycosis. There are also affections of the skin and mucous membranes manifesting as recurrent lesions (such as acne), inflammation, perspiration with a musty odour which does not relieve the patient, and excessive discharges. There is often suppressed menses, initially, leading to profuse menstrual flow. The patient also has a ravenous appetite (Paterson 1978).

Cancerinic miasm characteristics

- History of sexual or emotional abuse (RP4-H, RP5-H).
- Dysfunctional relationship with partner: domination (RP4-H).
- Inferiority complex and low self-esteem (RP4-H).
- Suppressed emotions (RP4-H).
- Perfectionistic, pedantic, controlling (RP5-H, RP6-H).
- Depression, instability (RP1-H).

Physical and emotional abuse, domination and a low self-esteem was mentioned by RP4-H. The picture of physical or emotional abuse in a patient reflects the description of the nosode *Carcinosin* precisely, which treats the cancerinic miasm, as it is particularly used to treat patients who have a history of dysfunctional or abusive parenting or relationships, emotional trauma, abuse and long continued domination by others (Lilley 2006). The idea of “perfectionism” was supported by Sankaran (2005). In his commentary on cancerinic patients he described them as setting unattainable goals and bearing unnecessary burdens. In order to achieve these goals, they

exercise control over every aspect of their lives and are constantly overworking, active, and try to keep things in perfect order. The physical and mental demands required by their body to fulfil these goals exceed their capacity and thus the concept of “superhuman strength” is created.

Following miasmatic and constitution identification, H participants endeavoured to select a constitutional, miasmatic and/or keynote prescription. A brief overview of the CAM-specific diagnostic approach used by practitioners as follows:

- Case taking includes the totality of symptoms, family history and past medical history.
- Keen observation and physical examination helps to identify the constitution and predominant active miasm/s.
- Analysis and evaluation of symptoms of the case followed by repertorisation using either online repertorising software or Complete, Kent or Phatak’s repertories. Often the practitioner knows the remedy/remedies and uses these tools as a reference or confirmation.
- Practitioners first make a constitutional prescription, thereafter a miasmatic prescription and finally a keynote prescription.

It was evident that the principal identification of the sycotic miasm is based on physical symptomatology of excessive androgens, overgrowth and the tendency to pelvic disease. The sycotic miasm can also present with a background of sexual abuse and excessive stress, emotions, overindulgence and other factors depicting an “*excess of everything*” and ultimately morph into a cancerinic state, which becomes debilitated, exhausted and depressed. It was also evident that the principal identification of the cancerinic miasm is based on psychological grounds with a strong indication of instability, depression, abuse and overwork.

Table 6: Characteristics of the sycotic and cancerinic miasms

Miasm	Physicals	Generals	Mentals
Sycotic	<ul style="list-style-type: none"> • Skin: acne, overgrowths, warts, pigmentation • Complexion: oily, sallow 	<ul style="list-style-type: none"> • Frequent perspiration – musty odour • Appetite – ravenous • Chilly 	<ul style="list-style-type: none"> • Nervous emotional irritable • Anxious • Confusion • Forgetfulness

	<ul style="list-style-type: none"> • Abdomen: frequent indigestion and stomach cramps • Pelvic cavity: inflammation, overgrowth of tissue, dysmenorrhoea, cysts • Menses: dark and stringy clots with an unpleasant fishy odour • Skin is prone to moles, psoriasis, dryness 	<ul style="list-style-type: none"> • Sensitive to damp weather • Relieved by discharges and menstrual flow 	
Cancerinic	<ul style="list-style-type: none"> • Sclera: blue • Insomnia • Foetal sleeping position • Craving chocolate and butter 	<ul style="list-style-type: none"> • History of cancer • Family history of diabetes or cancer. 	<ul style="list-style-type: none"> • Conscientious, dutiful, responsible, caring, hardworking • Bears the weight of other people's burdens • People pleasing constantly • Strained or detached relationship with parents • Abused physically or emotionally • Internalises emotions: anger, resentment and/or hostility • Overworked and highly stressed • Poor resolution of child-hood conflicts

Source: Paterson (1978), Drew (2004), Owen (2015).

5.5.2.2 Traditional Chinese Medicine

TCM pattern diagnosis refers to body systems as meridians and involves the kidneys, liver, spleen, heart, and lung systems. Diagnostics according to TCM is described as excess or deficiency patterns, heat or cold patterns (Ried 2015). In order to elicit a qi imbalance, RP2-TCM palpated various pressure points on the hands and feet corresponding with the female reproductive system to elicit pain which could indicate poor lymphatic drainage and circulation to the uterus and ovaries. According to Chinese philosophy, palpating these pressure points not only helps discern pathology in a certain organ, it also stimulates blood flow and lymphatic drainage to those areas. RP2-TCM palpated over the styloid process of the ulnar in order to assess the ovaries. On the foot, the practitioner palpated inferiorly to the medial malleolus, which is

believed to correspond with the uterus and ovaries. All three practitioners who shared their diagnostic approach according to TCM were in tandem with the theory that PCOS was the manifestation of a damp and hot temperament. This temperament/constitution was based on some of the following symptoms: Breast distension and tenderness, facial acne, headaches, red eyes and hypochondriacal tenderness beneath the rib cage (RP8-TCM). Common TCM patterns in women with fertility problems such as PCOS include kidney Jing deficiency, spleen qi deficiency, liver qi stagnation, phlegm-dampness, or blood deficiency (Ried 2015).

Three special diagnostic techniques used by TCM practitioners are the tongue, pulse diagnosis and assessment of the menstrual cycle quality.

In TCM, tongue diagnosis is an important diagnostic technique which involves inspection of the tongue body for coat, cracks and changes in features, such as colour, which can provide significant information for differential diagnoses (Kim *et al.* 2008). The tongue diagnosis usually reveals a body with a red hue, a reddish tip and an overlying yellow coating which is thin and dry (RP8-TCM). Another practitioner described the tongue as being flabby, with bare patches over the areas representing the liver and gallbladder as well as cracking through areas of the spleen – all of which indicates a yang deficiency (RP10-H). The third practitioner described the tongue as having a purple discoloration, indicating stagnation, with the indentation of the teeth on the tongue which indicates low qi (RP6-H).

Both TCM practitioners also diagnose the patient by palpating the radial pulse. RP2-TCM often found a weak pulse accompanying PCOS symptoms as well as frequent urination, a pale tongue, weakness and a sinking sensation in the lower abdomen. Palpation of the radial pulse generally revealed a tense, thin and fast pulse in PCOS according to RP8-TCM. Traditional pulse diagnosis requires a high level of competency but is also vague and subjective in quantitative criteria of diagnosis. Generally, the pulse types that often appear in the clinic can be classified according to seven factors, viz. depth, width, length, frequency, rhythm and strength (Wang and Cheng 2006). There are also various pulse types in TCM, such as: a floating pulse which is palpable on light touch and grows faint on hard pressure, a sinking pulse

which can only be felt on pressing hard, and a full or empty pulse and a large or small pulse (Yoon *et al.* 2000).

Finally, the quality of the menstrual cycle is also assessed; in literature reviews on fertility, according to RP2-TCM philosophy the menstrual cycle is assessed by the appearance (colour, clots) the flow of the menstrual blood, the basal body temperature curve, and the length and frequency of the menstrual cycle (Ried and Stuart 2011). Furthermore, vaginal discharges marked with blood or having a strong odour would be indicative of liver qi stagnation and damp heat (RP8-TCM). This indicates that the quality, quantity and appearance of the menstrual cycle can assist in diagnosing the correct temperament.

5.5.2.3 Unani Tibb

RP3-UT described the diagnostic process in the following order: (1) A case history: to determine all clinical features of PCOS, to evaluate the five governing factors contributing to disease (2) Physical examination (3) Assess the temperament (4) Determine the predominant humour.

RP3-UT UT described the first aspect of diagnostics, namely, the case history, as a series of questions which first aim to accumulate factual information on PCOS itself. The clinical questions elicit symptoms such as “*hirsutism, acne, menstrual irregularities, velvety skin and issues with weight.*” Furthermore, the analysis of five governing factors (in disease) according to UT philosophy, helps the practitioner determine where imbalance lies and helps evaluate the Mizaj of the patient. These five factors were reported as: “*diet, type of sleep, stress, activity and elimination processes*”. The questions put forth to elicit symptoms related to the five governing factors included: incorrect diet, sleep irregularities, described as “*too little sleep which is very broken, and waking up very often at night*”, stress, associated with “*marital, financial, work and fertility*” issues and low self-esteem. Sheehan and Hussain (2002: 125-126) describe disease to be the consequence of an imbalance of the humours and the external environment (governing factors), any excess or deficiency in exercise or rest, food or fasting, sleep or wakefulness, sound or silent, heat or cold, can affect the homeostasis of the body, creating stress and hence disease. Furthermore, RP3-

UT found an interrelation between these factors, implying that they did not occur in isolation, and provided an example “*Each factor may contribute to the other. They (the PCOS patient) might have a lot of stress, leading to comfort eating which will lead to being overweight and leading a sedentary life which, in turn, can feed into loss of sleep and further stress.*” These governing factors were found in a study by Sheehan and Hussain (2002: 125) with the addition of certain unmentioned factors such as sexual activity, type of work and location in which the individual lives. These factors, together with the description of the illness, help develop a specific disease picture which guides the UT practitioner to diagnose the humour of the patient.

The UT practitioner then assesses the patient’s temperament based on their predominant humour. *RP3-UT* described an initial diagnosis which was referred to as base temperament, which is “*the temperament of the patient without the disease*”, and thereafter a temperament with the disease, thus illustrating a that patient can be a combination of temperaments at a given time. The temperament is diagnosed according to various characteristics that are considered such as the “*height, complexion, eye colour, patency and colour of veins, gait, personality and clinical history of the patient.*” The practitioner found that most PCOS patients belonged to a Type A personality, as mentioned by a H practitioner previously, and usually presented with an overweight body type and symptoms which indicated their temperament was the accumulation of heat and moisture.

RP3-UT, taking into consideration the totality of symptoms, the physical examination, and characteristics of the patient, arrived commonly at the diagnosis of PCOS involving a melancholic personality and a sanguineous temperament. This correlated with a study on the management of PCOS by Iqbal *et al.* (2018) who described PCOS as a sanguineous and phlegmatic disease, the latter which encompasses the melancholic temperament. Hoosen (2017) listed the pathologies commonly associated with a sanguineous temperament as “leucorrhoea, dysmenorrhoea, inflammation of the ovaries and fallopian tubes, endometriosis, genitourinary disorders, hypersensitivity and capillary congestion.” This suggests that patients belonging to a sanguineous temperament have a tendency to affections of the reproductive system including the ovaries and uterus lining. Furthermore, the concept

of “heat” can be associated with capillary congestion as increased blood to an area creates heat. Hoosen (2017) then expounded the melancholic patients’ personality (which corroborates with RP3-UT), as: “Pedantic, always looking for details and authority in knowledge. They have difficulty in falling asleep and tend towards insomnia. They are analytical, detail oriented, their retentive faculty of mind is well developed; they tend to be perfectionists, they are practically efficient and dependable. They are thoughtful, logical, analytical, tendency to be fearful, insecure, anxious, introverts with a restless, philosophical and enquiring mind”. The common pathology associated with this temperament, which can be related to PCOS, is irregular menstruation which is low in quantity with clots. The melancholic patient has a predisposition to the other pathologies which can accompany the main complaint such as: headaches, insomnia, hyperacidity, constipation, piles, flatulence, colic pain, poor appetite, colon and gas related ailments and anxiety, among others.

5.5.2.4 Ayurveda

RP9-A highlighted four preferential diagnostic approaches to a pathology: (1) Clinical history and examination (2) Pulse diagnosis contributing to (3) Doshic imbalance (4) Scientific diagnosis (blood and imaging tests). Clinical history and examination, according to RP9-A, involves keen observation with adequate knowledge of PCOS. When evaluating clinical symptoms, RP9-A paid attention to the menstrual cycle and the physique of the patient to identify any weight issues, masculine features and other signs of hormonal imbalance. Thereafter, RP9-A performed a pulse diagnosis which was described as an ancient practice to help identify the doshic imbalance. The pulse diagnosis, also referred to as a “pulse waveform” is obtained on the wrist with the index, middle and ring fingers to extract the doshic imbalance and identify locations of disorders in the body (Joshi *et al.* 2007:2207). Scientific diagnostic tests are fully utilised by RP9-A to diagnose diseases, including ultrasound as well as referral to a gynaecologist to get a confirmed diagnosis and second opinion. RP12-A offered a very brief diagnostic outline which included analysing contributing factors such as stress and diet in order to elicit the root cause of the exhibiting symptoms, and thereafter analysing the *“clinical presentation of the patient together with ultra-sonography findings and a hormonal profile associated with the mode of presentation”*. This shows that the practitioner was strictly clinical and only elicited relevant information to PCOS.

RP9-A found that PCOS patients presented with a predominant kapha and pitta imbalance. The elements of “earth and water”, represented by kapha, were thought to be excessive, and imputed to poor dietary habits such as the regular consumption of cold drinks, cold and refined foods etcetera. A high kapha lifestyle leads to weight gain which exacerbates PCOS and IR. This was further substantiated by a study which illustrated that continued indulgence in an improper diet and lifestyle causes kapha-*dosha vruddhi* (aggravation of kapha) or *jatharagni mandya* (weak digestive fire) which leads to PCOS (Ramugade. 2018). A 2017 study on PCOS, in congruence with RP9-A, stated that Ayurveda refers to hormones as fire elements (pitta) which are a transformative energy in the body responsible for all female reproductive processes. The transformation in each stage of the menstrual cycle is imputed to pitta itself, and in the case of PCOS, there is a pitta dominance which results in acne, hair loss, painful menses and in later stages can progress to heart problems. Kapha has heavy, cool effects on the tissues that support the female reproductive system, including supporting the growth of the ovarian follicle. A dominance of kapha in the body manifests as increased weight, subfertility, hirsutism, diabetes and coldness. The combination of pitta and kapha leads to reduces digestive fire which interferes with enzymatic reactions, leading to incomplete metabolism and hormonal imbalance. This in turn triggers hyperinsulinaemia and hyperandrogenism which causes anovulation, menstrual irregularities and the classic picture of PCOS (Patel and Prajapati 2017). RP12-A described PCOS as the formation of cysts which contaminates muscle, blood and fat elevating kapha in the body (congruent with the previous practitioner) and leading to a vata imbalance.

5.2.2.5 Naturopathy

The first aspect of NP diagnostics, reported by RP7-N, is determining the root cause of PCOS. This involves investigating the patient’s current lifestyle and dietary choices. RP7-N guides the patient to identify causative or aggravating foods such as high-starches, foods with a high glycaemic index, processed foods, sugary foods. Furthermore, the NP will also investigate the activity levels of the patient and assess their psychological position. The second aspect is testing clinical signs and symptoms which involves a case history that generally reveals irregular periods, difficulty in falling

pregnant, hirsutism, acne and tell-tale signs of IR such as female pattern weight gain. Thereafter, physical examination generally reveals weight gain indicative of IR, unwanted facial hair, female pattern balding and acne. Thereafter, RP7-N performs or sends the patient for a series of tests to determine precisely where imbalances in the patient lie. These tests include:

- Ultrasonography.
- The DUTCH Plus® test which analyses hormones using saliva and urine. Patients take kits home and it is done over a 24-hour period around day 19, 20 or 21 of their cycle. This test analyses male and female hormone levels and how they are being metabolised. The test particularly determines whether testosterone, which is metabolised via two pathways (the 5 alpha and 5 beta) is being metabolised correctly. According to RP7-N, if testosterone is being metabolised down the 5 alpha pathway then that will confirm an androgenic picture. The DPT also shows a profile of all stress hormones which helps to confirm an adrenergic picture.
- Blood tests: Blood glucose test (random and fasting), fasting insulin to test for IR, cortisol levels, vitamin D levels (which should be optimal when dealing with any hormonal condition).

5.6 Management of PCOS

Each CAM modality has a specific approach to therapeutic intervention, as discussed below. Most modalities follow a similar pattern of management:

1. CAM-specific medicine.
2. CAM-specific therapeutic procedure.
3. Adjunctive medicine and/or therapy.
4. Lifestyle interventions (diet, physical activity, counselling and stress-relief).

5.6.1. Homoeopathic management

Based on responses from H practitioners: a distinct pattern of prescribing emerged: (1) Constitutional prescription (2) Miasmatic prescription (3) Keynote/Clinical prescription. These prescriptions have been described by Das (2015) as follows:

- 1) Constitutional prescription: Also called classical prescribing. This is based on the patient's physical, mental, temperamental and emotional symptoms. This is

holistic and often indicated for chronic conditions, the aim is not to relieve symptoms but rather to cure the condition and prevent any future reoccurrences.

- 2) Miasmatic prescription: If a miasm is diagnosed, the correct anti-miasmatic remedy can be used to treat or open up the case and provide a clearer disease picture which can help find the constitutional prescription.
- 3) Keynote prescription: Experienced practitioners identify a few important symptoms exhibited by the patient, generally considering the most crucial mental and physical symptoms and find a similar remedy backed by the *materia medica*.

Common constitutional remedies that were prescribed by participants *Nat mur*, predominantly based on emotional and physical suppression, *Calc carb* based on poor assimilation leading to weight gain and sluggishness, and *Sepia*, based on exhaustion and all sorts of uterine problems.

- *Natrum Muriaticum*

Nat mur was recommended by five H practitioners as a good constitutional remedy. RP1-H described *Nat mur* as the “*biggest remedy for PCOS because there is a whole lot of emotional suppression*”. *Nat mur* is a gradual, deep acting remedy which acts to eradicate years of suppression and emotional damage (Kent 1905). *Nat mur*, from a foundational view, dwells in the past, and its key mental theme revolves around betrayal and loss of trust. The theme of suppression is pronounced in *Nat mur*, as outlined by Korentayer (2012). The *Nat mur* person is described as internally sensitive but puts up a barrier to suppress their emotions. RP4-H linked suppression to a history of physical and/or emotional abuse, either from her father or partner. The female is usually dominated and belittled in the relationship causing her to become docile. This was confirmed by Korentayer (2012), who states that the patient tends to have a history of abuse and will constantly replay their experiences, allowing them to affect her deeply. RP10-H prescribed *Nat mur* mainly based on the irregular menstrual cycle, amenorrhea from a young age in thinner patients, and infertility. The theme of suppression follows through in the presentation of PCOS in the patient with suppressed menses and ovulation causing suppressed reproductive function and

infertility (Korentayer 2012). The theme of imbalance (RP1-H) is reflected by a hormonal imbalance such as hyperthyroidism, Addison's disease and diabetes.

Nat mur patients also appear chronically depressed (RP1-H), which Kent described as “melancholic, no matter how joyful an incident they may experience”. The *Nat mur* patient tends to prefer solitude but feels worse when confined to their homes (Kent 1905). Aetiologically, there is strong evidence of chronic grief and disappointment. This patient is often tearful but does not like consolation, they tend to dwell on their problems which can produce a throbbing headache, worse for mental exertion (Phatak 1990: 498-503).

RP6-H prescribed *Nat mur* as one of the main remedies for normal weight PCOS patients who presented with Type A personalities on the premise that their permanent stress debilitates them causing them to “burn out”. Kent's (1905) physical description of *Nat mur* attests to the practitioners reasoning, describing the patient as being emaciated with marked prostration and exhaustion. The patient tends to be thin and poorly nourished, with dry mucous membranes and clear, watery discharges. There is periodicity of most symptoms and almost always, anaemia accompanying these symptoms (Phatak 1990: 498-503).

Other keynote complaints typical of the *Nat mur* patient are: congestive headaches described as throbbing and hammering on waking, sinus infections, strong salt cravings, insomnia and interestingly, fluid retention such as cysts (Korentayer 2012). Specific gynaecological indications for *Nat mur* further include facial acne, cysts, thick albumin-like leucorrhoea and severe PMS (Korentayer 2012).

- *Calcarea carbonica*

Calc carb, according to RP1-H, was prescribed based on keynote symptoms such as the overweight physique of the patient. RP6-H also identified a *Calc carb* constitution in obese PCOS patients, particularly with excessive abdominal adiposity which was described as “a classic band”. This is affirmed by Phatak's (1990: 151) materia medica which describes the *Calc carb* constitution as “fat, flabby, fair, forty, perspiring and damp”. Phatak also writes that improper assimilation of nutrients is responsible for the

muscles and skin become lax and flabby so the patient grows fat, but not strong. This was also affirmed by Tsan (2019) who associates PCOS in the *Calc carb* constitution with weight gain and obesity. Furthermore, the *Calc carb* female experiences cutting uterine pains during menstruation, menses too early and profuse, milky leucorrhoea and swollen breasts. There is also an increased sexual desire (Boericke 1901).

The mental basis for prescription, according to RP1-H, was that these patients tend to overextend themselves and become overwhelmed whilst RP2-H based it on a lack of discipline and control which Phatak (1990: 152) described as “unable to apply herself”. The former statement was substantiated by Phatak as “borrows trouble then cries about trifles”, this can be interpreted as taking on burdens beyond that which they can bear and dwelling on matters which causes the patient to become overwhelmed. One of the key themes of *Calc carb* is sluggishness which manifests both physically and emotionally. Physically, poor assimilation of nutrients contributes to retention which causes weight gain, laxity of muscles and skin. Emotionally, the patient is apathetic and dull, often forgetful and confused (Phatak 1990: 152).

Depression, which was not specifically attributed to *Calc carb* by participants, is another major keynote of the remedy. Depression and sadness, however, was mentioned frequently as contributing factors to miasmatic imbalances and exacerbation of PCOS symptoms. *Calc carb* patients are constantly melancholic, especially when ruminating over the prospect of disease, misery, disaster or insanity (Phatak 1990: 152), which amounts to nothing except increasing their stress levels.

- *Sepia officinalis*

Sepia was mentioned by three H participants as a constitutional or miasmatic (anti-Sycotic) prescription (RP5-H). RP1-H often prescribed *Sepia* because of the picture of overwork, stress and exhaustion which surrounds this remedy. The patient becomes mentally exhausted and feels the need to escape from responsibility. This patient is also sensitive, angry and miserable and becomes averse and indifferent to her loved ones. Her main complaints are generally regarding health and domestic affairs, which are a major source of stress (Phatak 1999 :640). *Sepia* is known to be a powerful female reproductive remedy with broad indications such as prolapse, uterine troubles,

prostration and dragging abdominal sensations (Phatak 1999: 639). Phatak (1999 642-643) also describes the discerning features of *Sepia* relating to PCOS as scanty, delayed periods especially at puberty or profuse menses, amenorrhea, sterility, pigmentation, acne which is worse before menses and hormonal and a voracious appetite for sweet and acidic foods, all of which are common features in PCOS.

- *Lachesis muta*

Lachesis as a major snake remedy which, according to RP6-H, is well suited to PCOS because it is associated with a lot of stagnation caused by poor circulation. *Lachesis* is a remedy with the leading theme “ill effects from suppressed discharges” and acts mainly on circulation, causing blueness of affected parts, which substantiates the participants claim of congestion and poor circulation (Phatak 1990: 410). RP6-H further elaborated on congestive headaches being common in these patients, which are described in the materia medica as severe migraines that extend to the neck and shoulders with the most pain concentrated on the vertex. The headache feels worse on exposure to sunlight, closing the eyes and walking in open air (Phatak 1990: 413). A participant also mentioned engorged breasts which was substantiated as marked inflammation of the mammae which become swollen, erect and painful to touch. Furthermore, menstrual cycles were described as long as a result of oestrogen dominance. Phatak also describes delayed menstrual cycles with black, scanty, lumpy blood which relieve the patient. Therefore, *Lachesis* can be indicated in PCOS patients with suppressed menses that become aggravated by suppression. The *Lachesis* female experiences hot flushes, palpitations and climacteric troubles. PCOS tends to affect the left ovary more, causing pain and swelling. This remedy acts well at the beginning and ending of menses. Her skin tends to be hot and prone to boils, carbuncles and blisters. Symptoms tend to aggravate with sleep or constriction but ameliorate with discharges and warm applications. The mental symptoms of *Lachesis* are marked by loquacity, jealousy and suspicion. There is also an aspect of religious insanity, either being obsessively spiritual or sinful (Boericke 1901).

Other remedies which were mentioned briefly during H interviews but not elaborated on due to time constraints, have been listed below and correlated to PCOS extensively in the literature review.

- *Lycopodium clavatum*

Lycopodium is associated with genitourinary or digestive disturbances. Some characteristics of *Lycopodium* include malnutrition, catarrhal tendencies, intolerance of cold drinks. The patient lacks vital heat and has poor circulation. This patient is thin, withered and full of gas and corresponds with a normal or thin PCOS patient. The female *Lycopodium* patient is prone to menses that come on too late, a dry vagina, painful coitus, ovarian pain and acrid leucorrhoea. There is also a tendency to acne and skin pigmentation. The mind of the *Lycopodium* patient is melancholic, sensitive and averse to change (Boericke 1901).

- *Staphysagria*

This remedy has marked nervous affections of the genitourinary system and skin. There is a great sensitivity of the female with leucorrhoea and a prolapsing sensation in the abdomen. The mental characteristics are caused by the ill effects of anger and insult. The *Staphysagria* female is impetuous, passionate, hypochondriacal and sensitive to the opinion of others. She also dwells on sexual matters (Boericke 1901).

- *Apis mellifica*

Apis is a well-known polycryst remedy that acts on cellular tissues, inducing oedema of the skin and mucous membranes, particularly on the eyes, face, throat and most importantly, the ovaries. The main sensations of this remedy are burning, stinging, smarting and prickling (Phatak 1990:61-62). *Apis* is indicated for ovarian cysts with stinging pains and tenderness over the abdomen region. Other indications for *Apis* include congestion and numbness in the ovaries from suppressed menses, amenorrhea, dysmenorrhoea with scanty discharge of slimy blood, profuse, green leukorrhea and swelling of the labia (Phatak 1990:65). Cysts are worse on the right side accompanied by dysmenorrhoea, profuse menorrhagia and a bearing down sensation. The *Apis* patient aggravates with heat and is better with cold applications. A few mental symptoms present as apathy, indifference, fright and difficulty concentrating (Boericke 1901).

The miasmatic prescriptions for PCOS patients were: *Carcinosin*, a nosode used to treat the cancerinic miasm, and *Thuja occidentalis*, a popular anti-sycotic remedy. These have been explained in detail in the literature review section.

- *Carcinosin*

RP4-H always initiated treatment with a high potency of *Carcinosin* to correct the cancerinic imbalance. The first criterion was “*a history of long-standing abuse*” which the participant described as being physical or emotional, obvious or subtle, often the patient was unaware that they were being abused because it had become a norm. The abuse of the patient, according to the practitioner, was commonly in the form of domination and control from the partner or father. Literature by Smits (1998) further elucidated the *Carcinosin* picture, confirming a history of sexual abuse and dominance, with individuals feeling as if they are being controlled and have become doormats. This was also stated by Lilley (2006: 233) who listed one of the major characteristics of *Carcinosin* as a “...history of dysfunctional parenting, emotional trauma and abuse”. The compensation for their abuse and dominance is perfection, in turn they try to control every other aspect of their lives. This brings about the second and third aspects of *Carcinosin*: “*overwork and stress*” (RP4-H). They seek approval by being brilliant and striving for perfectionism. The patient goes through a stage of excitability, overwork, setting unrealistic goals for themselves. They begin overreacting and throwing themselves into new ventures with vitality and concurrently experience symptoms such as sleep talking and insomnia (Gruber 1996).

RP4-H specifically mentioned “*dysfunctional parenting, control and abuse by the father*”, which was illustrated as the “father principle” by Tinus Smits (1998). In this case, the father is the symbol of social position and realisation of the possibilities of the child. The basis for the *Carcinosin* problems lies in their childhood wherein the child has been overwhelmed with unusual responsibility, punished severely as a consequence of wrong-doing, or made to feel inadequate. The *Carcinosin* child becomes afraid of reprimand and compensates by becoming perfectionistic, avoiding criticism at all costs. The crux of this principle is that the child’s self-esteem begins withering from a tender age and they carry with them a sense of inadequacy, low

confidence and a desire to please throughout their adulthood. This brings about the fourth aspect of *Carcinosin*: “an inferiority complex and low self-esteem” (RP4-H).

The physical signs of *Carcinosin*, some of which can be correlated to PCOS symptomatology as described by Smits (1998) are: blue sclera, moles, café-au-lait spots, acne, cysts, sinusitis, coryza, swollen and painful breasts before the menses, painful menses.

- *Thuja occidentalis*

Thuja was mentioned by two participants as an anti-sycotic remedy which, according to RP4-H, “can be used as a remedy and a herb”. This was proposed initially by Hahnemann who found *Thuja* to be an antidote to the sycotic miasm (Phatak 1990: 708). Participants did not extensively justify the rationale for prescribing *Thuja* beyond the fact that it counteracts the sycotic miasm, which is believed to be active in PCOS. The researcher thus provided a short literature review on the anti-sycotic effects of *Thuja* in relation to PCOS. *Thuja* has the innate ability to dissolve growths in the body and is thus a good anti-sycotic which can shrink or dissolve multiple cysts in the ovaries, particularly the left ovary (Bhatia 2018). *Thuja* addresses a retarded menstrual flow wherein the menstrual cycle is too short (Phatak 1990: 711). The patient’s lower abdomen protrudes outward, whilst the upper part is drawn in (Phatak 1990: 711) this is a classic feature of IR in PCOS. Furthermore, *Thuja* patients generally aggravate from cold weather and perspire often. Mentally, *Thuja* patients are secretive and suffer from a low self-esteem (Bhatia 2018), a trait almost always seen in PCOS patients which most often relates to their weight, skin or lack of fertility. RP4-H reported that every case of PCOS she had encountered was associated with low self-esteem and an inferiority complex. The *Thuja* temperament is described as sad and averse to life which correlates with RP1-H who described the PCOS patient’s demeanour as fundamentally unhappy and depressed with a poor QoL. They have domestic issues and quarrel often with their partner, another common finding by practitioners, who described it as emotional or physical abuse. This patient can also experience mental depression after birth. Interestingly, RP4-H found that females with PCOS could be affected by abuse that ensued to the mother around the time of conception.

The two “clinical” or “keynote” remedies mentioned by RP6-H and RP4-H were *Folliculinum* and *Chocolate*. These remedies were expanded on based on available literature.

- *Folliculinum*

This remedy is prescribed as a low potency “clinical” or “keynote” remedy. It is derived from the hormone oestrone which is secreted by the ovaries. This remedy is primarily indicated in female pathologies associated with a hormonal imbalance. Nine participants reported that hormonal imbalance is central to PCOS pathophysiology, thus prescribing this remedy would aim to correct it on a physiological level. Clinically, *Folliculinum* is indicated in case of functional and organically manifested female diseases, which can be attributed to an impaired ovulation cycle, such as PCOS and ovarian cysts as well as other physical or mental manifested disorders resulting from it. The essence of this remedy is based on the idea of “being lost in devotion” *Folliculinum* conforms perfectly to the general picture of PCOS from an emotional perspective with depression and a history of abuse as well as the physical picture of cysts, irregular menses, impaired fertility and cravings for wheat and sugary foods. This remedy, very much like PCOS patients, is relieved with exercise, commendation and appreciation Ari (n.d).

- *Chocolate*

Chocolate is a remedy mentioned by RP4-H, who prescribed it based patients who craved chocolate excessively and did not respond to other clinical remedies. There is very little information on the materia medica of the remedy. It is however, specifically indicated for PCOS, dysmenorrhoea and appetite disorders. The remedy has an affinity to the circulation and the endocrine system and particularly to the sexual hormones. The menstrual cycle is often affected, menses are heavier and longer, or symptoms are tied to the cycle and aggravated at menses. Symptoms are worse for sex and there can be an increased desire for sex, or more usually an aversion or complete indifference to sexual activity (Sherr 1990). It is therefore evident that this remedy is prescribed to address specific symptomatology and is not holistic, it should therefore be prescribed in conjunction with other remedies and only when there is a very strong and distinct craving for chocolate.

Complexes

One practitioner prescribed a complex containing multiherb formulations known as the Female Complex, developed by Dr Colin Le Grange. The female complex can be compounded by Comed. The formula contains a homoeopathic concoction of remedies which address various aspects of female issues. Some remedies included are: *Apis Mellifica*, *Helonias Dioica*, *Agnus Castus*, *Cimicifuga Racemosa*, *Sabina*, *Sepia*, *Oestrogen*, *Progesterone*, *Syzygium*, *Thyroidinum*, *Oophorinum*, *Pituitary*, *Adrenal Gland*, *Uterus*, *Hypothalamus 5C*, *Lachesis*, *Fallopian Tube* (RP5-H).

Therapeutic procedures

Biopuncture is a relatively new therapy consisting of injecting biological homoeopathic products into target areas. These injections are mainly administered under the skin or into the muscle. The aim is to stimulate the body's immune system and locally to stimulate blood circulation or detoxification (-Heel 2000). *Ovarium compositum* is an injectable product mentioned by three practitioners and is indicated for disorders of the ovarian cycle, infertility and ovarian cysts. It can be administered in the form of intramuscular, hypodermic, intradermal, and if necessary – intravenous injections 1-2 times a week. One ampoule of 5 ml contains ingredients such as: *Ovarium suis*, *Placenta*; *Uterus*, *Salpinx*, *Hypophysis suis*, *Lilium tigrinum*, *Pulsatilla pratensis*, *Mercurius solubilis Hahnemanni*, *Hydrastis canadensis*, *Magnesium phosphoricum* (RP6-H, RP10-H).

5.6.2 Traditional Chinese Medicine management

TCM has a long history of treating infertility. The earliest records of treating infertility with TCM date back to 200 A.D. (Zhou and Qu 2009). In TCM, the major therapeutic principles of PCOS include tonifying the kidney, dispersing stagnated liver qi, regulating blood, and clearing damp and resolving phlegm (Lin *et al.* 2019: 3). TCM practitioners implement a dual approach to treating the PCOS patient: acupuncture and CHM.

RP2-TCM's approach to PCOS management begins with a ten minute deep-breathing exercise which aims to relax the patient fully and allows them to become comfortable

with the practitioner: *“I start by making them (the patient) exhale fully, inhale deeply and then hold the breath for a few seconds and releasing. This improves oxygenation to the brain which helps calm and relax the patient before starting therapy.”* Pal *et al.* (2004: 115) reported that deep breathing helps to improve cardiovascular and respiratory functions by increasing oxygenation, decreasing the effect of stress on the body and improving mental and physical health overall.

Thereafter, RP2-TCM performs acupuncture, selecting 8-12 acupuncture points based on whether the pattern of PCOS falls under an ‘excess’ or ‘deficiency’ syndrome. RP8-TCM performs acupuncture along spleen, stomach, abdomen and lower limb meridians which is repeated once a week for at least 10 sessions. Three other practitioners implemented the practice of acupuncture therapy in their treatment of PCOS: RP10-H, a registered acupuncturist, performed it regularly over the liver and spleen channels and the NP practitioner performed it once or twice a week targeting “*hormonal areas*”. The points commonly targeted for an ‘excess syndrome’ according to RP2-TCM were substantiated by Dupius (2020) as follows:

- *Bai-hui*: a point corresponding with the crown of the head, known as the point of 100 convergences which can treat “100 diseases” (including PCOS).
- *Qugu*: located on top of the notch in the centre of superior border of the pubic symphysis. This is the main point for feminine discharges, sexual and menstrual issues.
- *Zhong ji*: located just above the pubic symphysis, it is the main point for damp-heat in the genital area as well as for masses in the lower abdomen. Another clinical usage is that this point is a moving and cooling point for gynaecological disorders such as dysmenorrhoea, amenorrhea and leukorrhea.
- *Liang Qui*: located above the patella and indicated to relieve pain in the gastric area and breasts.
- *Hegu*: a point between the thumb and index finger which is stimulated to relieve stress.
- *Xuehai*: a point on the bulge of the medial aspect of quadriceps femoris, it is known as the “sea of blood” and is indicated to dispel blood stasis, regulate menstruation, cool the blood and benefit the skin.
- *Diji*: located on the spleen meridian of the foot is clinically used to treat acute

and painful menstrual issues imputed to blood stagnation resulting in menstrual irregularities.

- *Taichong*: located on the metatarsal bone of the dorsum of the foot, is used to for stress, anxiety, insomnia and menstrual cramps.
- *Shuidao*: is used clinically for gynaecological issues of an excessive nature, such as cysts.
- *Guilai*: located on the lower abdomen below the umbilicus and is used to regulate menstruation and remove blood stagnation.

The following points are prescribed for 'deficiency syndrome':

- *Qihai*: located on the anterior midline, acts to strengthen kidney yang, regulate qi, harmonising blood and eliminating dampness.
- *Guanyuan*: also located on the anterior midline and acts to tonify qi, strengthen kidneys and blood and eliminate cold and dampness.
- *Pishu*: a point at the level of the lower border of the spinous process of the 11th thoracic vertebra – acts to tone the spleen qi and strength spleen yang.
- *Shenshu*: located on the level of the lower border of the spinous process of the 2nd lumbar vertebra (L2). Acts to strengthens the kidneys, tonify the kidney qi and yang, nourish the kidney yin and benefit the uterus.
- *Sanyinjiao*: located above the medial aspect of the ankle and used for pelvic disorders, menstrual cramps and insomnia.

Acupuncture is an ancient therapeutic practice in TCM and the theory behind it is that thin needles inserted into the skin stimulate specific points on the body surface serving to remove any obstruction to qi flow. Some research articles have postulated theories to explain the acupuncture effect on female sex hormones through actions on the HA axis as its mechanism of action (Lim and Wong 2010:473). Other scientific studies have investigated the acupuncture meridians and their neuro-endocrinological attributes and proposed that acupuncture may stimulate the production of endorphins which thus provides an analgesic effect. It has been reported that acupuncture may help regulate menstrual cycles by improving ovulation, however there is insufficient evidence to support its effects on live births (Lin *et al.* 2019:8). There remains a lack

of evidence-based clinical trials to conclusively define the role of acupuncture in the treatment of patients with PCOS (Lim and Wong 2010:476-477).

The second aspect of management is CHM which is widely administered across various modalities. CHM involves the use of several herbs in a formula to ameliorate a set of problems, or a syndrome (Ling *et al.* 2015:1) and is widely prescribed for endocrinological disorders such as PCOS (Zhang *et al.* 2010). One of the main aims of CHM is to enhance pregnancy rates and fertility. A systematic review on the efficacy of CHM in the management of female infertility suggested that infertility can be improved using CHM by increasing the pregnancy rate two-fold within a four-month period (Ried and Stuart 2011:236). The treatment strategy for PCOS generally involves: (1) One formula with a sovereign medicinal action throughout the menstrual cycle (2) An assistant medicinal formula to relieve secondary symptoms or tempers the action of the sovereign ingredient (Zhang *et al.* 2010:3). RP2-TCM prescribed CHM depending on the pattern seen in the patients PCOS such as: kidney deficiency, liver deficiency, blood stagnation or phlegm accumulation. A patient could have a combination of a few patterns. RP8-TCM, having mainly found PCOS to be an issue of stagnation, tended to use one formula: *Expel stasis* which worked to move qi, blood stasis and relieve pain.

If the PCOS is associated with a particular pattern, according to RP2-TCM, common formulae are prescribed to address this pattern, the information and formulae supplied by RP2-TCM are based on a practitioner reference manual by Van der Horst (1994: 23) for pathologies associated with fertility as follows:

1. Kidney deficiency:

- *Yu Lin Zhu*: known as fertility pearls, is a decoction that treats infertility with spleen-stomach cold deficiency pattern and tonifying the heart and kidney. It is indicated mainly for female infertility and menstrual disorders
- *Wu Ji Bai Feng Wan*: used to regulate menstruation and arrest excessive leukorrhea.

2. Liver stagnation:

- *Merry Life formula*: Acts to soothe liver qi and strengthen the spleen and is indicated for premenstrual tension, irregular menstruation and mood

disturbances.

- *Relaxed Wanderer*: Acts to harmonise liver qi, nourish the blood, clear heat and regulate menstruation.

3. Blood stagnation:

- *Si Wu Tang*: indicated for irregular menses with scanty flow, dysmenorrhoea, amenorrhea, lower abdominal pain and PMS.
- *Expel stasis*: Indicated for dysmenorrhoea and irregular menstruation in clots or clotty, dark menses
- *Purge heat*: indicated for excessive heat in the liver and gallbladder as well as damp heat in the lower warmer.
- *Expel uterus stagnation*: Indicated for blood stagnation in the uterus and resolution of masses.

4. Phlegm accumulation:

- *Er Chen Tang*: indicated to clear damp, phlegm conditions.

Four H practitioners used CHM in their management of PCOS. RP1-H prescribed *Expel stasis* in high doses (4 tablets daily). RP6-H prescribed *Maxitone*, *Relaxed Wanderer*, *Merrylife formula* and *Expel stasis*. RP5-H prescribed a female reproductive tonic containing the Chinese herb *Paeonia lactiflora*. RP10-H prescribed *Way to Right* alternating with *Yu Lin Zhu* formulae. CHM formulae are extensive and thus all formulae cannot be elucidated extensively as they contain multiple herbs. The most common formula extracted from data analysis was *Expel stasis*: Four practitioners used *Expel stasis* (*Xue Fu Zhu Yu Tang*) in their treatment of PCOS (RP2-TCM, RP8-TCM, RP1-H and RP6-H) to treat blood stasis in the reproductive and abdominal region. Blood stasis is regarded a pathogenic factor which lies at the root of many diseases and does not occur independently. Blood stasis is usually the consequence of qi stagnation/deficiency, heat, and/or phlegm accumulation, therefore, blood is related to qi and body fluids. Prolonged stasis of blood in TCM shows characteristic symptoms such as fixed pain, varicosities sublingually, superficial blood spots or an astringent pulse (Park *et al.* 2015). *Expel stasis* contains eleven herbs: *Prunus persica*, *Batsch*, *Aurantii fructus*, *Angelicae sinensis*, *Diels*, *Ligusticum chuanxiong* Hort., *Carthamus tinctorius*, *Paeonia lactiflora* Pall., *Rehmannia glutinosa* Libosch, *Citrus aurantium* L, *Bupleurum chinense* DC., *Platycodon grandiflorum*,

Achyranthes bidentata Bl. and *Glycyrrhiza* (Zhang *et al.* 2012: 203). The bioactive constituents in this concoction, to name a few, include flavonoids contained in *Aurantii Fructus* such as naringin and neohesperidin, which are known to have cholesterol-lowering and anti-inflammatory activities. *Total Paeony Glycoside* (TGP) including oxypaeoniflorin and paeoniflorin, a kind of monoterpene glucosides, are the main constituents of *Paeoniae radix* and have been reported to improve microcirculation and to have anticoagulation effects. *Ligusticum chuanxiong* which contains ferric acid that can lower cholesterol (Luan *et al.* 2006). *Expel stasis* has a wide array of indications, those pertaining to PCOS and its associated features are: depression, headaches, pelvic inflammation, amenorrhea, acne vulgaris, dysmenorrhoea, irregular menstruation, PMS, obesity, infertility and complications such as CVD and T2D (Penner2017).

Overall, five of the twelve participants (41,6%) use some form of acupuncture therapy in their management regimen of PCOS. Six of the twelve participants (50%) prescribed Chinese Herbs for the treatment of PCOS. In total, eight participants (66,6%) use some form of TCM in their treatment of PCOS.

5.6.3 Unani Tibb management

According to RP3-UT, PCOS is a combination of the sanguineous and melancholic temperaments and is characterised by excessive heat and moisture, therefore treatment aims to counteract these temperaments. According to Iqbal *et al.* (2018: 498-499) PCOS is managed in three ways: regimental therapy, pharmacotherapy and therapeutic procedures.

With respect to *Ilaj Bit Tadbeer* (*Regimental Therapy*), RP3-UT initiated treatment with the introduction of a significant lifestyle change which involved motivating the patient to be motivated to change the way that they eat, their activity levels and their mindset. The most important aspect of lifestyle management was encouraging physical activity in order to facilitate weight loss and shift towards a normal BMI range. Other aspects of approaching a melancholic and sanguineous temperament have been described by Hoosen (2017: 490-492) from a lifestyle perspective. A patient belonging to the sanguineous temperament would be advised to consume “cooling” foods such as

water, fruit and vegetables and avoid “hot” foods such as sugary, fatty foods and meat consumption. A patient belonging to the melancholic temperament should adhere to the above recommendations with a few additions to avoid foods that cause a phlegm/mucous build-up such as frozen foods, rancid fats, flour and gluten, excessive caffeine and artificially flavoured drinks. These are foods commonly eliminated in the PCOS diet as they contribute to high glucose levels and exacerbate IR.

1. *Ilaj Bid Dawa* (Pharmacotherapy)

- *Gynaecare*: a Tibb formula which contains well-known herbal compounds such as *Withania somnifera*, *Saraca indica*, *Cuminum cyminum*, and *Asparagus racemosus*. Clinical studies show that *Withania* improves the functioning of the thyroid gland that is responsible for regulating reproductive hormones. Thus, by promoting relaxation and decreasing stress, *Withania* can balance the hormones and improve fertility (D’Souza 2016). Extracts of *Withania* have been shown to improve the symptoms of PCOS by lowering blood testosterone, glucose and cholesterol levels whilst decreasing the weight of the ovaries and improving insulin sensitivity (Saiyed *et al.* 2016) which are all essential aspects in treating PCOS. *Saraca indica* is an endometrial stimulant commonly used to treat disorders related to the menstrual cycle such as menorrhagia and menstrual pain (Pradhan *et al.* 2009:68). The fruits of *Cuminum cyminum* (*Cumin*) in UT is used as an astringent, carminative and anti-inflammatory for boils and cysts. Furthermore, *Cuminum cyminum* reduces blood glucose levels and body weight via insulinotrophic constituents known as cuminaldehyde and cuminol (Al-Snafi 2016). *Asparagus* is a versatile female tonic which acts to rejuvenate and subdue inflammation of sexual organs, enhance folliculogenesis and ovulation, prepare the womb for conception, normalise the uterus and hormones and is also beneficial for the treatment of leucorrhoea and menorrhagia. Furthermore, *Asparagus* helps improve insulin sensitivity in IR PCOS patients. Another important effect of *Asparagus* is on stress levels, extracts have been shown to inhibit pro-inflammatory cytokines which increase serum corticosterone levels (Alok *et al* 2013).

- *Evecare* (U-3107): *Evecare* is an Ayurvedic formulation by the the Himalaya Drug Company. It contains various plant extracts which, according to RP3-UT, is effective in maintaining female gynaecological health and regulating the menstrual cycle. Further evaluation of *Evecare* by Mitra *et al.* (1999) showed that *Evecare* contains *Saraca indica* (10%), *Symplocos racemosa* (6.6%), *Adhatoda vasika* (4%), *Aloe vera* (5%), *Asparagus racemosus* (6.4%), *Boerhaavia diffusa* (6.4%), *Bombax malabaricum* (2.4%), *Cocos nucifera* (6.4%) and *Tinospora cordifolia* (6.6%) as its main constituents. *Saraca indica* is a stimulant to the endometrium and ovarian tissue. It is also largely used as a remedy in various affections of the uterus especially as an uterine haemostatic. *Aloe vera* is beneficial in cases of functional sterility and disturbed menstrual function. The saponin glycoside obtained from *Asparagus racemosus* exhibits anti-oxytotic activity. *Symplocos racemosa* has been reported to be useful in treating uterine disorders. *Boerhaavia diffusa* is known for its potent anti-inflammatory properties. Together, these herbs work synergistically to improve and balance female reproductive health.
- *Liv.52*: an immune tonic meant to strengthen the body overall (RP3-UT). *Liv.52* is described by Huseini *et al.* (2005:619) as a liver tonic involved mainly in detoxification, and lists the main ingredients as *Himsra* (*Capparis spinosa*), *Kasani* (*Cichorium intybus*), *Mandura bhasma*, *Kakamachi* (*Solanum nigrum*), *Arjuna* (*Terminalia arjuna*), *Kasamarda* (*Cassia occidentalis*), *Biranjaisipha* (*Achillea millefolium*), *Jhavuka* (*Tamarix gallica*). *Himsra* contains p-methoxy benzoic acid, which is a potent hepatoprotective. It prevents the elevation of malondialdehyde (biomarker for oxidative stress) levels in plasma and hepatic cells. *C. spinosa* inhibits certain liver enzyme levels and improves the functional efficiency of the liver and spleen. Flavonoids present in *C. spinosa* exhibit significant antioxidant properties. *C. intybus* protects the liver against alcohol toxicity, and is also a potent antioxidant, which can be seen by its free radical scavenging properties. The hepatoprotective property of *C. intybus* suppresses the oxidative degradation of DNA in tissue debris. Since the liver is involved in the production of hormones and enzymes, as well as detoxification of the blood, a liver tonic could be a beneficial supplement to therapy.

2. *Hijamat* (Cupping)

The UT practitioner used a procedure known as wet cupping over gynaecological areas such as the posterior superior iliac spine, buttocks and pelvic area to remove excess heat and moisture from the body. *Hijamat* is the use of glass cups that act as a vacuum on a localised area to draw out blood along with toxins in certain areas (Tham *et al.* 2006). Cupping causes ecchymosis of superficial blood vessels, swelling and temporary bruising but has no serious side-effects (Akhtar and Siddiqui 2008: 573). Cupping has been widely used for female issues such as amenorrhea, menstrual disturbances and acne (Akhtar and Siddiqui 2008: 573).

5.6.4 Ayurvedic management

Six out of 12 participants (50%) used Ayurvedic herbal formulations. Prior to the commencement of palliative treatment, RP12-A commenced with *Panchakarma Therapy* (PKT), a fundamental physical therapy of Ayurveda which aims to cleanse the body of toxins and prepare it for palliative therapy. RP12-A stated that PKT is based on two steps and three stages as follows:

- Step 1: *Amapachaka*(*Ama*) has been described as a toxic, heavy substance in the body which can be formed by bacterial invasion. Bacteria emit toxins into the system which can be compared to *Ama*. The elimination of *Ama*, is performed by administering herbal powders which enhance digestion and improve bowel excretion.
- Step 2: Main cleansing procedures – these consist of four procedures.
 1. *Guggulutiktaka Ghritha* which is the consumption of medicated ghee and after a few days administering oil massage.
 2. *Virechana* which is the administration of purgative substances for the cleansing of pitta through the lower pathways.
 3. *Basti* which are enemas and are administered based on the dosha of the patient and the current dosha vitiation.
 4. *Nasya* which refers to errhines to regulate the hypothalamic-pituitary ovarian axis. *Shatavari Ghritha* can be used as an errhine to regulate hormones.

According to Singh (2012: 3), PKT is believed to deeply cleanse the body through emesis, purgation, enema, errhines and bloodletting. Classical PKT is conducted in three stages which helps substantiate and explain the above PKT protocol by RP12-A:

1. Preparatory procedures (PREP) (*purvakarma*): These procedures are conducted to prepare the body to undergo a proper and thorough cleansing. They involve applying as well as ingesting oils and fats, sweating, and also advising which herbs to use to improve the digestion and metabolism in tissues.
2. Main cleansing procedures (MCP) (*pradhana karma*): These procedures consist of five purification procedures especially designed to eliminate toxic materials from the imbalanced dosas of the body. They are emesis, purgation, enema, errhines, and bloodletting.
3. Post procedures (*pashchatya karma*): These procedures consist mainly of recuperative measures in the form of diet, lifestyle changes, and rejuvenating herbs.

RP9-A prescribed a combination of *Shatavari*, *Guduchi*, *Ashwaganda* and *Triphala* to PCOS patients. The herb *Ashwaganda* was prescribed by two other practitioners. This was usually prescribed in tablet form with the following dosage: 2 tablets at night in 250mg, or 1 tablet at night in 500mg. *Ashwagandha*, also known as Indian ginseng and winter cherry, has been a vital herb in Ayurvedic medical systems for over 3000 years. Historically, the plant was used as an antioxidant, adaptogen, liver tonic, anti-inflammatory, anti-bacterial agent among many other clinical indications (Gupta and Rana 2007). Stress, hormonal imbalance, nutrient deficiencies and illnesses can contribute to impaired fertility in females. Clinical studies show that *Ashwagandha* improves the functioning of the thyroid gland that is responsible for regulating reproductive hormones. Thus, by promoting relaxation and decreasing stress, *Ashwagandha* can balance the hormones and improve fertility (D'Souza 2016).

The herb *Shatavari* (*Asparagus racemosus*) was prescribed by RP6-H who described it as “*the best in my opinion*” for PCOS. In Ayurveda, *Shatavari* is a sovereign herb commonly prescribed to nourish the ovaries, promote the production of reproductive hormones and maintain the female libido (Alok *et al.* 2013). When administered to test

mice with PCOS, *Shatavari* improved ovarian physiology and increased oestrogen levels (Sharma and Bhatnagar 2010). It is used to correct the pitta and vata dosha of patients. *Shatavari* has bioactive ingredients that have been proposed to improve stress-mediated reproductive health problems via its antioxidant effects (Pandey *et al.* 2018).

The other herbs mentioned by the RP9-A were: *Guduchi* and *Triphala*. *Guduchi* is also known as *Tinospora cordifolia* and is widely recognised for its hypoglycaemic effects. *T. Cordifolia* is also a powerful anti-inflammatory which counteracts inflammation caused by IR and ovarian cysts (Pachiappan, Matheswaran and Pushkalai 2017). On the other hand, *Triphala* is a polyherbal Ayurvedic formulation which is composed of equal proportions of *Terminalia chebula*, *Terminalia belarica* and *Embolica officinalis*. *Triphala* acts as a cleansing tonic of the blood, liver and other organs, supporting organ detoxification and has also been suggested to be useful in weight management, since *Triphala* can stimulate the release of the satiety hormone while boosting digestion and GIT function (Mukherjee *et al.* 2006).

An Ayurvedic formulation called *Evecare* manufactured by Himalaya Healthcare was prescribe by two practitioners. *Evecare* is a general female complex to maintain female and gynaecological health and regulating the menstrual cycle. It assists with premenstrual syndrome (PMS), cramps, menstrual problems, dysfunctional uterine bleeding and fertility. The principal herbal ingredients of *Evecare* syrup are: *Saraca indica*, *Symplocos racemosa*, *Cyperus rotundus*, *Tinospora cordifolia*, and *Aloe vera*. All these herbs are known to possess various beneficial properties in the treatment of PCOS. *S. indica* has a stimulatory effect on the ovarian tissue, which may produce an oestrogen-like activity that enhances repair of the endometrium and minimises bleeding, thus proving effective for menorrhagia and dysmenorrhoea. *S. racemosa* has an antispasmodic effect on the uterine muscle and acts favourably in dysmenorrhoea. *C. rotundus* contains a high iron content which replenishes the blood to treat general weakness and anaemia which could be associated with heavy bleeding. *T. cordifolia* has an overall immunomodulatory effect on the body and is indicated for general well-being. *A. vera* helps to regulate female hormones and improve fertility. The synergistic actions of these herbs are beneficial to regulate

ovulation and improve overall fertility. There is currently only one study evaluating the efficacy and safety of *Evecare* in infertility due to PCOS. This study showed a significant improvement in the clinical presentation of PCOS when treated with *Evecare*, following which 18 of the 50 cases conceived. Therefore, it was concluded that *Evecare* is safe and effective in women suffering from infertility due to PCOS (Sharma and Sharma 2010).

5.6.5 Naturopathy management

Naturopathic therapy is a comprehensive process which involves dietary counselling, physical activity recommendations, nutritional/herbal supplementation and often includes CHM (Arentz 2015). Studies have shown that BMI is a primary commonality between PCOS and health-related QoL reduction and any intervention which reduces central obesity will improve hyperinsulinaemia, ovulatory and menstrual irregularities, lipid and androgen profiles – which are all pathognomonic features of PCOS. This is known as a ‘global solution’ (Stankiewicz and Norman 2006). The management protocol adopted by the NP modality essentially combines diet, lifestyle and adjunctive therapies such as phytotherapy and supplementation which is implemented in some form by all other modalities - thus they have been included adjunctive management below.

5.7 Adjunctive management

5.7.1 Phytotherapy

All participants used some form of herbal medicine or herbal complex which falls under the modality phytotherapy. Phytotherapy is defined as the study of the use of herbal extracts of natural origin containing numerous phytochemicals to treat their patients (Rooney and Pendry 2014: 169). Phytochemists, pharmacists and pharmacologists are trained to consider the properties and actions of isolated medicinal principles via plant chemistry (Meuss 2000: 4). Herbal medicine features prominently in most healing systems; Traditional Chinese Medicine, Ayurvedic medicine, Unani Tibb medicine and other ethnic traditions, as well as in the practices of naturopaths, herbalists and increasingly, pharmacists and physicians as they respond to public demand. Herbal medicine can also be used alongside pharmaceuticals (Hirschhorn 2005: 13). The

global increase in consumer demands for herbal medicine has grown proportionately to the increased pharmacological publications and clinical research papers (Bones and Mill 2013:9). CHM has benefitted most from scientific interest, particularly for PCOS-related infertility. Some of the herbs used in CHM, are incorporated into Western herbal medicine but often in very different formulae so limited information may be extrapolated (Rooney and Pendry 2014: 169) and the same can be said of other modalities.

The most commonly prescribed herbal medicine was *Vitex agnus Castus* (*Chasteberry*) (RP1-H, RP4-H, RP5-H, RP11-UT). RP1-H prescribed *Chasteberry* because of its effects on the adrenals which help reduce cortisol and testosterone levels. RP1-H and RP11-UT prescribed *Chasteberry* to help regular the menstrual cycle, RP1-H found a difference in menstrual regularity by the 2nd month. *Chasteberry* has many well-documented effects such as counteracting hyperandrogenism, a pathognomonic manifestation of PCOS. It has also been postulated that *Chasteberry* reduces elevated prolactin levels by exhibiting dopaminergic activity which inhibits the production of prolactin, thus in turn lowering adrenal stress and hyperinsulinemia. Hyperprolactinaemia is also one of the causes of cyclical disorders and corpus luteal insufficiency which can lead to PMS, oestrogen dominance and secondary amenorrhea (Mills and Bone 2000). In an uncontrolled study, *Chasteberry* reduced elevated prolactin levels in 80% of 34 women with hyperprolactinemia at a dosage of 30-40 mg per day for one month and improved symptoms of a variety of menstrual disorders including secondary amenorrhea, cystic hyperplasia of the endometrium, deficient corpus luteum function, metrorrhagia, polymenorrhea and oligomenorrhea (Barnes 2013). *Chasteberry* also reduces thyroxin releasing hormone (TRH)-induced prolactin release, normalised shortened luteal phases, corrected luteal phase progesterone deficiencies and reduced PMS symptoms in women with luteal phase defects due to latent hyperprolactinemia. *Chasteberry* should be considered a first line botanical therapy for hyperprolactinemia and given for the duration of at least 3 to 6 months. The daily dose of *Chasteberry* is 1-4 mL of a 1:2 dried plant tincture or 500-1000 mg of dried berries daily and is best taken as a single dose in the morning (Hywood and Bone 2004).

The herb *Berberis vulgaris* (*Berberine*) was also prescribed for IR (RP1-H, RP7-N). *Berberine* is an isoquinoline alkaloid (Imenshahidi and Hosseinzadeh 2016) and contains the active compound *rhizomacoptidis*. *Berberine* has been used in TCM widely for its anti-diabetic qualities and has similar effects to the allopathic drug Metformin. Various studies have shown that theca IR induced by androgen potentials is antagonised by *Berberine* interventions and thus improves IR and regulates androgen production (Li *et al.* 2013). In a prospective study on 150 infertile women with PCOS undergoing in vitro fertilisation, patients were randomised to receive *Berberine*, metformin, or placebo tablets for 3 months before ovarian stimulation. In the *Berberine* and metformin groups, there was reportedly greater reductions in total testosterone, fasting glucose, and fasting insulin, free androgen index and increases in sex hormone-binding globulin, were observed in comparison with placebo group. Overall, *Berberine* had a more pronounced therapeutic property and achieved more live births with fewer side effects than metformin (Imenshahidi and Hosseinzadeh 2016).

A 2014 study evaluating practitioners' experiences of phytotherapy showed that *Paeonia lactiflora*, *Glycyrrhiza glabra* and *Vitex agnus Castus* were the most commonly used herbs by practitioners (Rooney and Pendry 2014). The most popular choice was *P. lactiflora*, a herb often combined with *G. glabra* for the treatment of PCOS. A key constituent of *P. lactiflora*, paeoniflorin, significantly decreases testosterone production from the ovaries, thus reducing androgen levels in the body. *G. glabra* on the other hand, contains glycyrrhetic acid which further decreases testosterone production in ovaries. Research also suggests that *G. glabra* has been attributing to reducing body mass in overweight PCOS patients.

5.7.2 Supplementation

- Chromium (RP7-N): Chromium picolinate was prescribed as a supplement for IR in PCOS patients by RP7-N. Chromium supplementation in adults with PCOS was found to improve glucose tolerance, insulin sensitivity and ovulation rates as well as improves gut absorption. The use of chromium picolinate in a daily dose of 1000 mg in adolescent girls diagnosed with PCOS for six months significantly improved the regularity of their menstrual cycles, decreased their

ovarian volume as noted on ultrasonography, decreased the number of ovarian follicles between 2-9 mm, and decreased FT levels. Patient compliance is reported as being excellent, and side effects have not been reported, making this mode of treatment a very promising one (Amr and Abdel-Rahim 2015).

- Myo-Inositol: Inositol is a supplement prescribed by RP7-N to improve IR. Inositol belongs to the Vitamin B complex and has nine stereoisomers including the two common forms: myo-inositol (MYO) and D-chiro-inositol. MYO has a mechanism of action based on improving insulin sensitivity of target tissues. All the PCOS patients showed a significant improvement of typical hormonal parameters such as insulin and glucose levels after MYO treatment. Furthermore, MYO also has a positive effect on restoring ovulation and improving oocyte quality through the reduction of insulin plasma levels (Unfer *et al.* 2012).
- Vitamin D supplementation is prescribed by RP1-H, RP3-UT and RP7-N. RP3-UT and RP7-N based on the findings by these practitioners that most PCOS patients tended to have very low vitamin D levels. According to RP7-N, vitamin D “*should be optimal when dealing with any hormonal condition*”. There is currently a high prevalence of inadequate vitamin D levels in many populations. New evidence suggests that vitamin D deficiency is also a risk marker for IR and decreased fertility (Trummer *et al.* 2018). A review published by Menichini and Facchinetti (2020) on the effects of vitamin D supplementation in women with PCOS found a correlation between low vitamin D and IR, hyperandrogenism and obesity. It has thus been postulated that vitamin D supplementation may improve ovarian dysfunction and the endometrial environment, hence, improving fertility in a female (Trummer *et al.* 2018).
- Infrared sauna (IRS): IRS, according to RP7-N, is indicated to “*stimulate various bodily functions and to get rid of toxins*”. An IRS contains a heating element which emits at least one wavelength of infrared radiation. It is regarded as a powerful method of cellular cleansing which increases the metabolism and promotes blood circulation in order to eliminate toxins. Researchers have analysed the sweat from both traditional saunas and IRS saunas. Sweat from traditional saunas contained 97% water and 3% toxins which infrared saunas produced around 80% water and the remaining 15-20% contained heavy

metals such as sulphuric acid, sodium, ammonia, uric acid and fat-soluble toxins. It has been shown to dramatically aid weight loss (Euler 2012). A study showed that a 30-minute session of IRS could burn up to 600 calories by increasing core body temperature, heart rate, cardiac output and metabolic rate (Kihara *et al.* 2002).

5.8 Lifestyle Intervention

CAM therapy prides itself on its holistic approach of treating patients, thus, every CAM-specific therapy must be integrated with lifestyle interventions that include dietary counselling, physical activity recommendations, sleep recommendations and some form of emotional therapy. All practitioners included lifestyle advice and counselling as part of their treatment.

5.8.1 Dietary counselling

A variety of dietary approaches were offered, underpinned by the basic aim to reduce body weight and eliminate the consumption of culprit foods. Studies have demonstrated that weight loss via restricted energy intake results in improved clinical status in PCOS patients (Wright *et al.* 2004). Overall, it was recommended that PCOS patients eliminate processed, refined sugar from their diet entirely whilst adhering to a low CHO and high protein diet with a good portion of healthy fats and high fibre. Further suggestions included a dairy-free diet as well as intermittent fasting as options for the PCOS patient. Some research studies have found that women with PCOS tend to overeat, either for emotional reasons or for biological causes. It is also postulated that IR PCOS patients experience recurrent hypoglycaemia which triggers carbohydrate cravings and a decreased feeling of satiation after eating, which in turn can lead to overeating and obesity (Wright *et al.* 2004).

Naturopathy placed the most emphasis on dietary counselling, devising a nutrition plan tailored to the specific needs of the patient and investigating their current dietary choices in order to identify aggravating food sources. McKittrick (2002:67) also described the importance of tailoring the PCOS patients' diet to suit their lifestyle, preparation abilities, snack habits and cravings rather than using a "one-size-fits-all"

approach. RP7-N recommended a diet low in carbohydrates and high in mono-unsaturated fatty acid foods, substantiated by evidence that showed a significant improvement in the serum concentration of glucose, insulin, high-density lipoprotein cholesterol and triglycerides after a 2-week low CHO and high-protein diet (Douglas *et al.* 2006). The NP further recommended the following guidelines:

- Consume pesticide free food.
- Increase green, leafy vegetables such as broccoli, cauliflower, kale and brussel sprouts which contain sulforaphanes that detoxify the liver and remove excess estrogens.
- Increase good quality proteins such as eggs, almonds, oats, cheese, milk and chicken breast.
- Increase healthy fats such as avocado and olive oil which are high in mono-unsaturated fatty acids.
- Eat complex carbohydrates with a low glycaemic index such beans, whole grains and vegetables.

These recommendations were substantiated by a prominent study on the role of diet in the treatment of PCOS which recorded the beneficial effects of a low CHO diet and MUFA's. This study showed a significant improvement in the serum concentration of glucose, insulin, high-density lipoprotein, cholesterol and triglycerides after a 2-week low CHO and high-protein diet (Douglas *et al.* 2006). Most practitioners across all five modalities agreed with a low-carbohydrate, high-protein diet plan for their PCOS patients which strictly eliminated sugar and refined carbohydrate sources. Although the optimal diet has not yet been confirmed for PCOS, it has been postulated that a eucaloric low diet which is relatively low in carbohydrates (43%) and cholesterol, high in fibre, and comprising 45% fat (18% MUFA and 8% saturated fat) improved the metabolic profile of women with PCOS within 16 days (Douglas *et al.* 2006). Furthermore, a meta-analysis of overweight adults found that low CHO diets achieved significant improvements in waist circumference, total cholesterol, fasting glucose and serum insulin compared to low fat diets. It also showed significant improvements in weight and lipid profiles (McGrice and Porter 2017).

Reproductive hormones which play a complex role in PCOS, such as estrogen, progesterone, and testosterone are all steroid hormones and are responsible for reproductive health among other functions, and they all require cholesterol (and fat) to be produced in significant amounts. Furthermore, adequate healthy fat intake also helps prevent depression by maintaining serotonin levels (Medling 2017).

From the UT perspective, crash-diets and strict calorie restrictions were advised against and healthy, steady dietary changes were recommended. UT presents a unique aspect of treatment which is aimed to counteract the dominant temperament. Aspects of treating a melancholic and sanguineous temperament has been described by Hoosen (2017) from a dietary perspective. A patient belonging to the sanguineous temperament is advised to consume more protein and less carbohydrates. They should have “cooling” foods such as water, fruit and vegetables and avoid “hot” foods such as excessive sugar, fatty foods and meat consumption. A patient belonging to the melancholic temperament should adhere to the above recommendations with a few additions namely, to avoid foods that cause a phlegm/mucous build-up such as: frozen foods, rancid fats, white flour and gluten, excessive caffeine and artificially flavoured drinks.

RP4-H instituted a dairy-free free diet as part of the PCOS treatment and found intermittent fasting (IF) to be especially beneficial to patients. Dairy foods have been shown to produce an increased insulin response. A study published by Phy *et al.* (2015) on the effects of a low starch and dairy diet on obesity and PCOS showed that an 8-week low starch/low dairy diet resulted in weight loss, increased insulin sensitivity, and reduced free and total testosterone in women with PCOS. Several additional outcome measures were improved, including a reduction in VLDL and triglycerides, and an increase in vitamin D levels. There are various descriptions of the term IF; one study defined IF as day fasting or the alternate day fasting. A study by Chiofalo *et al.* (2017) on the effects of fasting on PCOS demonstrated that IF resulted in changes in the circulating levels of insulin growth factor-1 (IGF-1), insulin-like growth factor-binding protein 1 (IGFBP1), glucose and insulin. Considering the paramount importance of compensatory hyperinsulinemia, it was concluded that IF can reduce

IGF-1, IGFBP1, glucose and insulin levels and consequently have beneficial effects on ovarian function, androgen excess and infertility in PCOS women.

Overall, diet plays a significant role in improving the metabolic and psychological profile of PCOS patients and requires a massive lifestyle change.

5.8.2 Physical activity recommendations

RP7-N practitioner proposed 15 minutes per day of any enjoyable activity for the patient to engage in such as walking, swimming, jogging etcetera. RP4-H recommended at least 30 minutes per day combining cardio and high-intensity training, or weight training. RP3-UT emphasised the importance of becoming more active and mentioned that motivating the patient is the first step to becoming more involved in exercise or physical activity. Physical activity is often prescribed as a component of primary management for PCOS for multiple reasons: to reduce weight, improve metabolic parameters and improve overall QoL. IR is the hallmark of PCOS and endurance exercise which is moderate-to-vigorous may improve insulin sensitivity via weight-loss mechanisms (Aye *et al.* 2018). Harrison *et al.* (2010) conducted a systematic review on the effect of exercise therapy and PCOS and concluded that regular, moderate-intensity aerobic exercise over a short period improved reproductive outcomes including ovulation and menstrual cycle regulation in addition to the reduction of weight and IR in young, overweight women with PCOS. Based on this review, it was suggested that women with PCOS should engage in at least 90 min of aerobic activity per week at moderate intensity to achieve improved reproductive and cardiometabolic outcomes. Although weight loss improves every parameter of PCOS, it is significantly more difficult for obese patients to lose weight when implementing an exercise regimen when compared to lean PCOS patients. Faloia *et al.* (2004: 424) evaluated the effect of obesity on metabolic features, body composition and fat distribution of patients with PCOS which showed that none of the lean subjects suffered from metabolic syndrome compared to 37% of overweight-obese patients and 33.3% of overweight-obese control subjects. Thus, for exercise to accelerate the process of weight loss, a restriction of calorie intake must be implemented (Khademi *et al.* 2010).

Besides its significant physiological effects, light to moderate physical activity has been associated with improved mental health. Suffering from chronic illnesses such as PCOS has a negative mental impact and is associated with an increase in depressive symptoms pertaining to fears regarding fertility, loss of femininity, body image and decreased self-esteem (Banting *et al.* 2014). Preliminary studies on women with PCOS found that physically inactive women had higher depression scores than physically active women (Lamb *et al.* 2011). Mood enhancement, improved self-esteem, improved cognitive functioning and an overall improvement in the patient's QoL are some of the well-documented effects of increased physical activity. Light ambulation can be classified as light physical activity whilst cycling, exercise and sports can be classified as moderate-to-vigorous physical activity (Biddle 2016). Barriers to exercising, motivators and the need for support should be considered when advising physical activity as a management strategy for PCOS (Banting *et al.* 2014).

5.8.3 Sleep disturbances

RP3-UT considered sleep a governing factor in the aetiology of PCOS and analysed the patients sleep patterns for irregular sleep, oversleeping or lack of sleep. RP7-N also noted sleep as an important aspect of lifestyle intervention. Sleep is a crucial component of good health and plays an important role in metabolic regulation, emotional regulation, cognitive functioning and all physiological processes (Perry *et al.* 2013). PCOS is associated with significant psychological implications, the most significant one being high levels of stress and possible depression, which can interfere with healthy sleep patterns. Sleep disturbances in women with PCOS have been reported in recent years, particularly insomnia, which is characterised as the inability to initiate or maintain sleep, occurring at least three nights per week and affecting daytime functioning. 80% of insomnia cases are secondary (Franik *et al.* 2016). A study by Moran *et al.* (2015:471) revealed that sleep disturbances are almost twice as common in women with PCOS compared with women of a similar age without PCOS.

Some strategies to improve sleep disturbances are: the establishment of regular sleep patterns viz a regular bedtime and rising time, maintaining an ideal sleep environment which includes complete darkness, a comfortable bed, deep breathing, a mild temperature and no visual stimuli just before bedtime (television, electronics, reading).

Furthermore, consuming large meals and engaging in physical activity should be avoided before bed (Perry *et al.* 2013). Hoosen (2017) described a healthy sleep pattern for PCOS patients as including: 6-8 hours of sound sleep. Oversleeping or sleeping after sunrise could be harmful whilst afternoon naps could prove beneficial.

5.8.4 Emotional counselling

A female with PCOS is subjected to unfavourable changes such as impaired fertility and changes in physical appearance (associated with obesity and hirsutism) (Hahn *et al.* 2005) which challenge the female identity. This can psychologically impact women with PCOS, predisposing them to anxiety, depression and a decreased QoL (Teede, Deeks and Moran 2010). A decreased QoL also reduces the patient's motivation to improve their lifestyle (Glintborg and Andersen 2010). Furthermore, patients with PCOS are at risk of developing behavioural problems (Dokras *et al.* 2011). RP3-UT described the significance of motivating the patient to change their poor lifestyle and dietary choices. RP10-H described PCOS as being one of the most difficult diseases to treat, requiring massive diet and behavioural changes. Thus, most of the treatment involved in PCOS depends on the patient's ability to commit to and adhere to significant change. RP10-H also underlined the need to make PCOS patients aware of the tools they have available and help them realise the power they have to change. The practitioners stressed the importance of motivating and building up the patients' confidence during the consultation and stated that a patient needs to fully understand that the only way to successfully treat PCOS is to accept that a significant lifestyle change is necessary. In tandem with this, RP4-H emphasised the significance of the consult in itself and the practitioners' task of building up the patient's self-confidence, stating that "*You have to help them build up their self-confidence in the consult which is key in PCOS treatment*". RP12-A described emotional counselling as an important aspect of PCOS management since most patients have unresolved issues, particularly with abuse. This was congruent with RP4-H who described focussing consultations around the abuse component and building up the patient's self-confidence.

Ultimately, stress reduction can be achieved through the patient gaining an understanding of PCOS, seeking treatment to manage symptoms holistically and finally becoming aware of the tools and changes required to improve their overall QoL.

5.9 Summary

The researcher has collectively summarised all management approaches and strategies based on the documented and evidenced information presented by practitioners from each modality. These summaries include: CAM-specific therapy, adjunctive therapy, and lifestyle interventions.

Goals of management:

- Correct hormonal imbalance.
- Improve ovulation (thereby improving menstruation and fertility).
- Reduce weight.
- Improve blood sugar metabolism and IR.
- Improve psychological effects of PCOS.

Homoeopathic management:

- 1) Miasmatic/Constitutional prescription.
- 2) Keynote prescription.
- 3) Adjunctive herbal complex.
- 4) Lifestyle intervention strategy which includes: dietary counselling, physical activity recommendations and emotional counselling.
- 5) (Optional) Bio-puncture over the ovaries and liver.

Unani Tibb Management

- 1) Regimental Therapy.
 - 1.1) Diet and intermittent fasting.
 - 1.2) Massage therapy.
- 2) Vigorous exercise.
- 3) Pharmacotherapy: hot/cold drugs to correct temperament and address PCOS metabolic effects.
- 4) *Hijamat* (Wet cupping) over gynaecological areas to remove excess heat and moisture.

Ayurvedic Management

- 1) Eliminate toxicity to enhance digestion and improve excretion.
- 2) Administer purgative substances to cleanse pitta through the lower pathways.
- 3) Administer an enema based on the dosha.
- 4) Administer an errhine to regulate the HA axis.
- 5) Correct hormonal imbalance with traditional Ayurvedic herbs.
- 6) Correct obesity and IR with Ayurvedic herbs and diet.
- 7) Emotional counselling.
- 8) Stress-relieving techniques: yoga and meditation

Traditional Chinese Medicine Management

- 1) Acupuncture therapy once a week along gynaecological meridians, liver, stomach, spleen.
- 2) Herbal medicine to correct qi deficiency, reduce stagnation and improve circulation.
- 3) Prescribe clinical Chinese herbal medicine for PCOS.
- 4) Lifestyle intervention which includes: dietary counselling and physical activity recommendations.
- 5) Stress-relieving techniques: deep breathing techniques to relieve stress.

Naturopathy Management

- 1) Clinical herbal medicine.
- 2) Supplementation.
- 3) Adjunctive recommendation: acupuncture, yoga, meditation.
- 4) Dietary counselling.
- 5) Physical activity recommendations.
- 6) Emotional Counselling.

Chapter 6: Conclusion and Recommendations

The aim of the research study was to explore and document the approach to managing PCOS from diagnosis to treatment by selected CAM practitioners in the eThekweni area. Thematic content analysis was implemented in order to capture the philosophies, diagnostic approaches and therapeutic protocols of selected CAM practitioners in the management of PCOS. Furthermore, the study aimed to bridge the gap between CAM practitioners by providing documented information on PCOS across five common modalities: Ayurveda, homoeopathy, naturopathy, Traditional Chinese Medicine and Unani Tibb. The research discussion was carefully guided by the research question: How, given your chosen modality, do you manage PCOS from diagnosis to treatment?

A typical qualitative approach was used to document the perceptions and protocol used in the diagnosis and management of PCOS syndrome. Stratified purposive sampling was implemented in order to select a sample frame of 12 participants. Data was collected by means of personalised, semi-structured interviews and then analysed using Tesch's (1990) eight steps to data analysis and Creswell's (2014) approach. The previous chapter presented findings from the study by drawing on various, relevant literature sources to support the results. This chapter concludes by providing recommendations which could direct future research endeavours.

6.1 Conclusions derived from the analysis

CAM philosophies are underpinned by the principle of an energising life force and conforms to the idea that the body has an innate healing ability which must be augmented by therapy rather than opposed or suppressed. CAM therapies also share the idea of individuals having a constitution which can be identified according to a set of characteristics. Each philosophy is governed by a set of factors which support homeostasis: TCM is governed by yin and yang; AV is guided by three dosha's; UT is based on four humours and five governing factors and NP is governed by lifestyle and dietary factors. PCOS patients were generally classified as being sycotic and/or cancerinic miasmatically according to H; having a melancholic, sanguineous temperament according to UT; having excessive kapha and vata according to AV; and having a predominant yang deficiency with heat and moisture according to TCM.

Diagnosing PCOS generally involves a clinical diagnosis and a CAM-specific diagnosis. The clinical diagnosis includes a thorough case history, a general cursory examination and referral for blood and imaging tests. A CAM-specific diagnosis is generally based on the patient's constitution or areas of weakness.

Managing PCOS is challenging without a precise protocol, however, there are goals of PCOS management which can guide practitioners to developing the correct management strategy, these are to: correct hormonal imbalance, correct ovulation (thereby improving menstruation and fertility), reduce weight, improve blood sugar metabolism and IR, and improve the QoL of patients. PCOS management styles varied among practitioners but generally included three broad aspects: 1) CAM-specific therapy: including medicines and procedures. 2) Adjunctive therapy: including the use of other modalities, supplementation, other. 3) Lifestyle intervention: including dietary counselling, physical activity recommendations and stress-relieving strategies such as emotional counselling, yoga and meditation.

The most commonly used modality was NP which is integrated with lifestyle interventions implemented by every modality, followed by TCM with its use of acupuncture and common CHM's such as the formula *Expel Stasis* and the herb *Berberine*. The Ayurvedic formulations *Evecare*, *Ashwaganda* and *Shatavari* were also commonly prescribed across modalities. Phytotherapy was the most common adjunctive modality used with the most popular herbs being *Vitex agnus castus* and *Withania somnifera*. A ketogenic diet, emotional counselling and stress-relieving techniques were the most commonly mentioned lifestyle interventions.

In conclusion: PCOS management should not only focus on improving clinical features and metabolic parameters, but also on improving the psychological state of patients.

6.2 Limitations of the study

Limitations of this research includes that it relies on self-report and has an uneven representation of modalities. Naturopathy was not represented according to the

minimum guideline stipulated (two practitioners per discipline) due to the inability to source another naturopathic practitioner in the eThekweni area.

6.3 Recommendations for future studies

Considering the significant impact of stress and low self-esteem on the QoL of the patient, mentioned consistently by all practitioners, the researcher has proposed an additional goal of PCOS diagnosis: To fully assess the quality of life of the patient using an established QoL scale. This should be thoroughly investigated using an established QoL scale such as WHOQoL-100. The structure of the WHOQoL-100 represents six broad domains established by scientific experts and include 24 facets, producing 100 items in the assessment which are rated on a five-point scale (1-5) (Power *et al.* 2005: 2197). These domains include:

1. Physical health (energy, pain, sleep).
2. Psychological health (self-image, feelings, concentration).
3. Level of independence (mobility, activities, medication, work capacity).
4. Social relations (personal relationships, social support, sexual activity).
5. Environment (finances, freedom, safety, participation, physical environment, transport).
6. Spirituality/Beliefs.

Within the limitations of this study, it can be suggested that:

- A future study should expand the study location to include Kwa Zulu Natal in order to document a larger variety of participants from diverse ethnic backgrounds and socioeconomic backgrounds.
- The study should include the greater South African CAM practitioner population.
- Future studies should increase the sample size to a minimum of five practitioners per modality in order to increase the quantity and variety of information, as well as to draw more consistent conclusions.
- A self-reported qualitative study may be conducted on patients who use CAM therapy. This will enhance the literature gathered and provide a user perspective of the impact of CAM therapy in PCOS.

References

- Abduljabbar, H., Gazzaz, A., Mourad, S. and Oraif, A. 2016. Hijama (wet cupping) for female infertility treatment: a pilot study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 5(11): 3799-3801 DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20163842>
- Abramo, G. and D'Angelo, C.A. 2015. Accounting for gender research performance differences in ranking universities. *Current Science*, 109(10): 1783-1789. <https://www.jstor.org/stable/24906141>
- Adali, E., Yildizhan, R., Kurdoglu, M., Kolusari, A., Edirne, T., Sahin, H. G., Yildizhan, B. and Kamaci, M. 2008. The relationship between clinico-biochemical characteristics and psychiatric distress in young women with polycystic ovary syndrome. *Journal of International Medical Research*, 36(6): 1188-1196. DOI: 10.1177/147323000803600604
- Agarwal, S. P., Khanna, R., Karmarkar, R., Anwer, M.K. and Khar, R. K. 2007. Shilajit: a review. *Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives*, 21(5): 401-405.
- Akhtar, J. and Siddiqui, M. K. 2008. Utility of cupping therapy Hijamat in Unani medicine. *Indian Journal of Traditional Knowledge*, 7(4): 572-574.
- Alberti, K. G. M. M., Zimmet, P. and Shaw, J. 2007. International Diabetes Federation: a consensus on Type 2 diabetes prevention. *Diabetic Medicine*, 24(5): 451-463.
- Alebić, M. Š., Stojanović, N., Baldani, D. P. and Duvnjak, L. S. 2016. Metabolic implications of menstrual cycle length in non-hyperandrogenic women with polycystic ovarian morphology. *Endocrine*, 54(3):804.
- Alok, S., Jain, S. K., Verma, A., Kumar, M., Mahor, A. and Sabharwal, M. 2013. Plant profile, phytochemistry and pharmacology of *Asparagus racemosus* (Shatavari): a review. *Asian Pacific Journal of Tropical Disease*, 3(3): 242-251.

Al-Snafi, A.E. 2016. The pharmacological activities of Cuminum cyminum – A review. *IOSR Journal of Pharmacy*, 6(6): 46-65.

Amato, P. and Simpson, J.L. 2004. The genetics of polycystic ovary syndrome. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 18(5): 708.

American Psychological Association. 2015. Stress in America: The impact of discrimination. Available at: <https://www.verywellmind.com/what-are-the-main-causes-of-stress-3145063> (Accessed 18 February 2020).

Amoura, M., Lotfy, Z.H., Neveen, E. and Khloud, A. 2015. Potential effects of Mentha piperita (peppermint) on Letrozole-induced polycystic ovarian syndrome in female albino rat. *International Journal of Advanced Research*, 3(10): 211-226.

Amr, N. and Abdel-Rahim, H. E. 2015. The effect of chromium supplementation on polycystic ovary syndrome in adolescents. *Journal of Pediatric and Adolescent Gynecology*, 28(2): 114-118.

Anderson, R. A., Broadhurst, C. L., Polansky, M. M., Schmidt, W. F., Khan, A., Flanagan, V. P., Schoene, N. W. and Graves, D. J. 2004. Isolation and characterization of polyphenol type-A polymers from cinnamon with insulin-like biological activity. *Journal of Agricultural and Food Chemistry*, 52(1): 65-70.

Anjum, F., Shameem, I. and Mubeen, U. 2018. Efficacy of Azadirachta indica and Zingiber officinale on hirsutism in polycystic ovarian disease: a randomized controlled trial. *International Journal of Innovative Research in Medical Science*, 3(4): 1937-1945.

Anon. 2019. Top Homeopathic medicines list for PCOS treatment in India. Available: <https://homeomart.net/2019/09/10/top-homeopathic-medicines-list-for-pcos-treatment-in-india/> (Accessed 14 May 2020).

Arentz, S. 2015. The role of naturopathic medicine in the management of women with polycystic ovary syndrome (PCOS). D.Phil, University of Western Sydney, Australia.

Arentz, S., Abbott, J. A., Smith, C. A. and Bensoussan, A. 2014. Herbal medicine for the management of polycystic ovary syndrome (PCOS) and associated oligo/amenorrhoea and hyperandrogenism; a review of the laboratory evidence for effects with corroborative clinical findings. *BMC Complementary and Alternative Medicine*, 14(1): 511-.

Arentz, S., Smith, C. A., Abbott, J., Fahey, P., Cheema, B. S. and Bensoussan, A. 2017. Combined lifestyle and herbal medicine in overweight women with polycystic ovary syndrome (PCOS): a randomized controlled trial. *Phytotherapy Research*, 31(9): 1330-1340.

Ari, C. n.d. Folliculinum – A matridonial remedy to prevent infertility. Available: <https://www.remedia-homoeopathie.de/folliculinum-homeopathic-drug-picture-by-dr-christina-ari/e3533> (Accessed 06 January 2020).

Arora, M. 2018. PCOS treatment in ayurveda: herbs, therapies and essential tips. *Firstcry parenting*. Available: <https://parenting.firstcry.com/articles/pcos-treatment-in-ayurveda-herbs-therapies-and-essential-tips/> (Accessed 26 November 2019).

Arora, B., Arora, V. and Patel, S. 2014. Polycystic ovarian syndrome: an awareness guide for women. *Journal of Pharmacy Research*, 8(7): 884-892.

Arora, M. K., Yadav, A. and Saini, V. 2011. Role of hormones in acne vulgaris. *Clinical Biochemistry*, 44(13): 1036-1039.

Ataabadi, M. S., Alaei, S., Bagheri, M. J. and Bahmanpoor, S. 2017. Role of essential oil of *Mentha spicata* (spearmint) in addressing reverse hormonal and folliculogenesis disturbances in a polycystic ovarian syndrome in a rat model. *Advanced Pharmaceutical Bulletin*, 7(4): 651-654.

Athar, K.S.M., Shameem, I., Suhail, S. and Aafreen, S. 2016. Concept of Infertility among Obese Women in Unani System of Medicine-A Review. *International Journal of Ayurvedic and Herbal Medicine*. 8(2): 3163-3179.

Aye, M. M., Butler, A. E., Kilpatrick, E. S., Kirk, R., Vince, R., Rigby, A. S., Sandeman, D. and Atkin, S. L. 2018. Dynamic change in insulin resistance induced by free fatty acids is unchanged though insulin sensitivity improves following endurance exercise in PCOS. *Frontiers in Endocrinology*, 9: 592.

Azziz, R. 2004. PCOS: a diagnostic challenge. *Reproductive BioMedicine Online*, 8(6): 644-648.

Azziz, R. 2014. Polycystic ovary syndrome: what's in a name? *The Journal of Clinical Endocrinology & Metabolism*. 99(4): 1142-1145.

Azziz, R. 2016. New insights into the genetics of polycystic ovary syndrome. *Nature Reviews Endocrinology*, 12(2): 74-75.

Azziz, R., Carmina, E., Chen, Z., Dunaif, A., Laven, J. S., Legro, R. S., Lizneva, D., Natterson-Horowitz, B., Teede, H. J. and Yildiz, B. O. 2016. Polycystic ovary syndrome. *Nature Reviews Disease Primers*, 2: 16057.

Azziz, R., Carmina, E., Dewailly, D., Diamanti-Kandarakis, E., Escobar-Morreale, H. F., Futterweit, W., Janssen, O. E., Legro, R. S., Norman, R. J., Taylor, A. E. and Witchel, S. F. 2009. The Androgen Excess and PCOS Society criteria for the polycystic ovary syndrome: the complete task force report. *Fertility and Sterility*, 91(2): 456-488.

Azziz, R., Enrico C., Didier D., Evanthia Diamanti-Kandarakis, Hector F. Escobar-Morreale, Walter Futterweit, Onno E. Janssen et al. 2006. "Position statement: criteria for defining polycystic ovary syndrome as a predominantly hyperandrogenic syndrome: an androgen excess society guideline." *The Journal of Clinical Endocrinology & Metabolism*. 91(11): 4237-4245.

Bailey, B., Phinney, S. and Volek, J. 2019. Polycystic ovarian syndrome, insulin resistance, and inflammation. *Virta Health Corporation* (blog). Available: <https://www.virtahealth.com/blog/pcos-polycystic-ovarian-syndrome> (Accessed 1 January 2020).

Bailey, P. 2002. Homeopathy. In Shannon, S. ed. *Handbook of complementary and alternative therapies in mental health*. New York: Academic Press, 407-408.

Banting, L. K., Gibson-Helm, M., Polman, R., Teede, H. J. and Stepto, N. K. 2014. Physical activity and mental health in women with polycystic ovary syndrome. *BMC Women's Health*, 14(1): 51.

Barber, T.M., Joharatnam, J. and Franks, S. 2018. Pathogenesis and Management of Adiposity and Insulin Resistance in Polycystic Ovary Syndrome (PCOS). In *Pediatric Obesity: Humana Press, Cham*. 631-642.

Barbieri, R. L. 2014. Polycystic ovary syndrome: diagnosis and management. *NEJM Journal Watch. Women's Health*. Available: at http://www.jwatch.org/na35755/2014/10/08/polycystic-ovary-syndrome-diagnosis-and-management?query=etoc_jwwomen through <http://www.jwatch.org>. (Accessed 01 January 2020).

Barnes, J., Anderson, L. A. and Phillipson, J. D. 2001. St John's wort (*Hypericum perforatum* L.): a review of its chemistry, pharmacology and clinical properties. *Journal of Pharmacy and Pharmacology*, 53(5): 583-600.

Barnes, L. 2013. Principles and practice of phytotherapy. *Journal of the Australian Traditional-Medicine Society*, 19(3): 179-180.

Bashir, F. and Afrin, Z. 2019. Zanjabeel (*Zingiber officinale*): transformation of culinary spice to a multi-functional medicine. *Journal of Drug Delivery and Therapeutics*, 9(4): 721-725.

Ben-Haroush, A., Yogev, Y. and Fisch, B. 2004. Insulin resistance and metformin in polycystic ovary syndrome. *European Journal of Obstetrics, Gynecology and Reproductive Biology*, 115(2): 125-133.

Bhagavath, B. and Carson, S. A. 2012. Ovulation induction in women with polycystic ovary syndrome: an update. *American Journal of Obstetrics and Gynecology*, 206(3): 195-198.

Bhatia M. 2018. Thuja Occidentalis: Materia Medica. *Homeopathy for Everyone*. Available: <https://Hathy.com/materia-medica/thuja-occidentalis-3/> (Accessed 7 January 2020).

- Biddle, S. 2016. Physical activity and mental health: evidence is growing. *World Psychiatry*, 15(2): 176-177.
- Biswas, K., Chattopadhyay, I., Banerjee, R.K. and Bandyopadhyay, U. 2002. Biological activities and medicinal properties of neem (*Azadirachta indica*). *Current Science*, 82(11): 1336-1345.
- Boericke, W. 1901. *Homeopathic Materia Medica*. San Francisco: Hathitrust. Available: <https://www.materiamedica.info/en/materia-medica/william-boericke/calcareo-carbonica> (Accessed 20 February 2020).
- Bornhöft, G. and Matthiessen, P. eds. 2011. *Homeopathy in healthcare: effectiveness, appropriateness, safety, costs*. Berlin: Springer Science & Business Media. Available: https://books.google.co.za/books?id=ScGLDUuporMC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (Accessed 10 February 2020).
- Borrelli, F. and Ernst, E. 2002. Cimicifuga racemosa: a systematic review of its clinical efficacy. *European Journal of Clinical Pharmacology*, 58(4): 235-241.
- Brassard, M., AinMelk, Y. and Baillargeon, J.P. 2008. Basic infertility including polycystic ovary syndrome. *Medical Clinics of North America*, 92(5): 1163-1192.
- Bruner, B., Chad, K. and Chizen, D. 2006. Effects of exercise and nutritional counseling in women with polycystic ovary syndrome. *Applied Physiology, Nutrition, and Metabolism*, 31(4): 384-391.
- Carmina, E. 2009. Cardiovascular risk and events in polycystic ovary syndrome. *Climacteric*, 12(sup1): 22-25.
- Cassell, E. J. 2000. The principles of the Belmont report revisited: how have respect for persons, beneficence, and justice been applied to clinical medicine? *Hastings Center Report*, 30(4): 12-21.
- Chainani-Wu, N. 2003. Safety and anti-inflammatory activity of curcumin: a component of tumeric (*Curcuma longa*). *The Journal of Alternative & Complementary Medicine*, 9(1): 161-168.

Chatterjee, R. 2010. The healing touch of Thuja occidentalis in polycystic ovarian syndrome. *Homeopathy for Everyone*. Available: <https://Hathy.com/clinical-cases/the-healing-touch-of-thuja-occidentalis-in-polycystic-ovarian-syndrome/> (Accessed 7 January 2020).

Cheung, F. 2011. TCM: made in China. *Nature*, 480(7378): 82-83.

Chhatre, S., Nesari, T., Somani, G., Kanchan, D. and Sathaye, S. 2014. Phytopharmacological overview of Tribulus terrestris. *Pharmacognosy Review*, 8(15): 45-47.

Chiofalo, B., Laganà, A. S., Palmara, V., Granese, R., Corrado, G., Mancini, E., Vitale, S. G., Frangež, H. B., Vrtačnik-Bokal, E. and Triolo, O. 2017. Fasting as possible complementary approach for polycystic ovary syndrome: hope or hype? *Medical Hypotheses*, 105: 1-3.

Chuan, S. S. and Chang, R. J. 2010. Polycystic ovary syndrome and acne. *Skin Therapy Letter*, 15(10): 1-4.

Cianci, A., Panella, M., Fichera, M., Falduzzi, C., Bartolo, M. and Caruso, S. 2015. D-chiro-inositol and alpha lipoic acid treatment of metabolic and menses disorders in women with PCOS. *Gynecological Endocrinology*, 31(6): 483-486.

Coffey, S. and Mason, H. 2003. The effect of polycystic ovary syndrome on health-related quality of life. *Gynecological Endocrinology*, 17(5): 379-386.

Creswell, J.W. 2014. *Research design: qualitative, quantitative and mixed methods approaches*. 4th ed. Thousand Oaks, CA: Sage.

Croce, A. J. 2000. Thought behind the action: what are miasms? *Homeopathy Today Online*. Available: <https://www.homeopathycenter.org/homeopathy-today/thought-behind-action-what-are-miasms> (Accessed 25 February 2020).

Daniilidis, A. and Dinas, K. 2009. Long term health consequences of polycystic ovarian syndrome: a review analysis. *Hippokratia*, 13(2): 90-92.

Das, E. 2015. Homeopathy: principles of prescribing. *National Health Portal India*. Available: https://www.nh.gov.in/principles-of-prescribing_mtl (Accessed 18 February 2020).

De Leo, V., Musacchio, M. C., Cappelli, V., Massaro, M.G., Morgante, G. and Petraglia, F. 2016. Genetic, hormonal and metabolic aspects of PCOS: an update. *Reproductive Biology and Endocrinology*, 14(1): 1-2.

Deepthika, S.H.K. and Waratenne, P.R. 2019. Ayurveda management of polycystic ovarian syndrome: conceptual study. 4(4): 1-11.

DeSchepper, L. 2001. Hahnemann revisited: a textbook of classical homoeopathy for the professional. Santa Fe, NM: Full of Life Publishing.

Degroote, F. 2012. Homeopathic miasms and heredity. *Homoeopathic Links*, 25(3): 139-143. Dewailly, D. 2016. Diagnostic criteria for PCOS: is there a need for a rethink? *Best Practice & Research Clinical Obstetrics & Gynaecology*, 37: 5-11.

Diamanti-Kandarakis, E., Christakou, C. and Marinakis, E. 2012. Phenotypes and environmental factors: their influence in PCOS. *Current Pharmaceutical Design*, 18(3): 270-282.

Dokras, A., Clifton, S., Futterweit, W. and Wild, R. 2011. Increased risk for abnormal depression scores in women with polycystic ovary syndrome: a systematic review and meta-analysis. *Obstetrics & Gynecology*, 117(1): 145-152.

Domecq, J. P., Prutsky, G., Mullan, R. J., Sundaresh, V., Wang, A. T., Erwin, P. J., Welt, C., Ehrmann, D., Montori, V. M. and Murad, M. H. 2013. Adverse effects of the common treatments for polycystic ovary syndrome: a systematic review and meta-analysis. *The Journal of Clinical Endocrinology & Metabolism*, 98(12): 4647-4654.

Douglas, C. C., Gower, B. A., Darnell, B. E., Ovalle, F., Oster, R. A. and Azziz, R. 2006. Role of diet in the treatment of polycystic ovary syndrome. *Fertility and Sterility*, 85(3): 686-687.

Dovom, M. R., Tehrani, F. R., Djalalinia, S., Cheraghi, L., Gandavani, S. B. and Azizi, F. 2016. Menstrual cycle irregularity and metabolic disorders: a population-based prospective study. *PloS One*, 11(12): 1-2.

Drew P. 2004. The miasms: a discussion and summary with emphasis on carcinosinum and the cancer miasm. New Delhi: B. Jain.

D'Souza, J. 2016. 6 Amazing ways in which ashwagandha benefits women. *Z-Living*. Available: <https://www.zliving.com/health/natural-remedies/ashwagandha-health-benefits-for-women-82874/> (Accessed 13 January 2020).

Duijkers I. J. and Klipping, C. 2010. Polycystic ovaries, as defined by the 2003 Rotterdam consensus criteria, are found to be very common in young healthy women. *Gynecology Endocrinology*, 26(3): 152-160.

Dumesic, D. A., Oberfield, S. E., Stener-Victorin, E., Marshall, J. C., Laven, J. S. and Legro, R. S. 2015. Scientific statement on the diagnostic criteria, epidemiology, pathophysiology, and molecular genetics of polycystic ovary syndrome. *Endocrine Reviews*, 36(5): 487-525.

Dupius, C. 2020. Acupuncture points. Yin and yang house. Available: <https://theory.yinyanghouse.com/> (Accessed 11 January 2020).

Ekstrand, D.W. 2012. *The Four Human Temperaments*. Available: <http://www.thetransformedsoul.com/additional-studies/miscellaneous-studies/the-four-human-temperaments> (Accessed 14 May 2020).

El Sayed, S. M., Al-quliti, A. S., Mahmoud, H. S., Baghdadi, H., Maria, R.A., Nabo, M. M. H. and Hefny, A. 2014. Therapeutic benefits of Al-hijamah: in light of modern medicine and prophetic medicine. *American Journal of Medical and Biological Research*, 2(2): 46-71.

Eleftheriadou, M., Stefanidis, K., Lykeridou, K., Iliadis, I. and Michala, L. 2015. Dietary habits in adolescent girls with polycystic ovarian syndrome. *Gynecological Endocrinology*, 31(4): 269-271.

Emiroğlu, N., Cengiz, F. P. and Kemeriz, F. 2015. Insulin resistance in severe acne vulgaris. *Advances in Dermatology and Allergology/Postępy Dermatologii i Alergologii*. 32(4): 281.

Escobar-Morreale, H. F. 2010. Diagnosis and management of hirsutism. *Annals of the New York Academy of Sciences*, 1205(1): 166-174.

Euler, L. 2012. The incredible healing power of infrared saunas. *Cancer defeated*. Available: <https://www.cancerdefeated.com/the-incredible-healing-power-of-infrared-saunas/1734/> (Accessed 10 January 2020).

Eurocam. 2014. The contribution of complementary and alternative medicine to sustainable healthcare in Europe. Available: https://www.icmart.org/files/cam2020_final.pdf (Accessed 15 May 2020).

Faloia, E., Canibus, P., Gatti, C., Frezza, F., Santangelo, M., Garrapa, G.G.M. and Boscaro, M. 2004. Body composition, fat distribution and metabolic characteristics in lean and obese women with polycystic ovary syndrome. *Journal of endocrinological investigation*, 27(5):424-429.

Falzon, C. C. and Balabanova, A. 2017. Phytotherapy: an introduction to herbal medicine. *Primary Care*, 4(2): 217-227.

Fatima, G., Jabeen, A., Siddiqui, S.A. and Khalid, M. 2019. A Review on Glycyrrhiza glabra L.(Aşl al-Sūs) with Unani Perspective and Modern Pharmacology. *Journal of Drug Delivery and Therapeutics*, 9(4)736-741.

Fauser, B. C., Tarlatzis, B. C., Rebar, R. W., Legro, R. S., Balen, A. H., Lobo, R., Carmina, E., Chang, J., Yildiz, B. O., Laven, J. S. and Boivin, J. 2012. Consensus on women's health aspects of polycystic ovary syndrome (PCOS): the Amsterdam ESHRE/ASRM-Sponsored 3rd PCOS Consensus Workshop Group. *Fertility and Sterility*, 97(1): 28-38.

Fei, X., Yao, Q., Xie, J. and Lee, J. Y. 2018. Probing the Qi of traditional Chinese herbal medicines by the biological synthesis of nano-Au. *Journal of Materials Chemistry B*, 6(19): 3156-3162.

- Firdose, K. F. and Shameem, I. 2016. An approach to the management of polycystic ovarian disease in Unani system of medicine: a review. *International Journal of Applied Research*, 2(6): 585-590.
- Franik, G., Krysta, K., Madej, P., Gimlewicz-Pięta, B., Oślizło, B., Trukawka, J. and Olszanecka-Glinianowicz, M. 2016. Sleep disturbances in women with polycystic ovary syndrome. *Gynecological Endocrinology*, 32(12): 1014-1017.
- Franks, S. 2006. Diagnosis of polycystic ovarian syndrome: in defence of the Rotterdam criteria. *The Journal of Clinical Endocrinology & Metabolism*, 91(3): 786-789.
- Franks, S. and Hardy, K. 2010. Aberrant follicle development and anovulation in polycystic ovary syndrome. *Annales d'Endocrinologie*, 71(3): 228-229.
- Fu, H., Qiu, Y., Xia, M., Wei, F., He, H. and Yang, L. 2014. Spleen-Yang-deficiency patients with polycystic ovary syndrome have higher levels of visfatin. *Journal of Traditional Chinese Medicine*, 34(1): 42-47.
- Gaster, B. and Holroyd, J. 2000. St John's Wort for depression: a systematic review. *Archives of Internal Medicine*, 160(2): 152-156.
- Giandalia, A., Pappalardo, M. A., Russo, G.T., Romeo, E. L., Alibrandi, A., Di Bari, F., Vita, R., Cucinotta, D. and Benvenga, S. 2018. Influence of peroxisome proliferator-activated receptor- γ exon 2 and exon 6 and insulin receptor substrate (IRS)-1 Gly972Arg polymorphisms on insulin resistance and beta-cell function in southern Mediterranean women with polycystic ovary syndrome. *Journal of Clinical & Translational Endocrinology*, 13: 1-8.
- Gibson-Helm, M., Teede, H., Dunaif, A. and Dokras, A. 2017. Delayed diagnosis and a lack of information associated with dissatisfaction in women with polycystic ovary syndrome. *The Journal of Clinical Endocrinology & Metabolism*, 102(2): 604-612.
- Glintborg, D. and Andersen, M. 2010. An update on the pathogenesis, inflammation, and metabolism in hirsutism and polycystic ovary syndrome. *Gynecological Endocrinology*, 26(4): 281-296.

- Goodarzi, M. O. and Azziz, R. 2006. Diagnosis, epidemiology, and genetics of the polycystic ovary syndrome. *Best Practice & Research: Clinical Endocrinology & Metabolism*, 20(2): 193-205.
- Goodarzi, M. O., Dumesic, D. A., Chazenbalk, G. and Azziz, R. 2011. Polycystic ovary syndrome: etiology, pathogenesis and diagnosis. *Nature Reviews Endocrinology*, 7(4): 219-231.
- Goodman, N. F., Cobin, R. H., Futterweit, W., Glueck, J. S., Legro, R. S. and Carmina, E. 2015. American Association of Clinical Endocrinologists, American College of Endocrinology, and Androgen Excess and PCOS Society disease state clinical review: guide to the best practices in the evaluation and treatment of polycystic ovary syndrome-part 1. *Endocrine Practice*, 21(11): 1291-1300.
- Gousta, B. 2018. The role of homeopathy as a complementary and alternative medicine and its application. *International Journal of Medical Reviews*, 4(2): 62-63.
- Greenlee, H., Abascal, K., Yarnell, E. and Ladas, E. 2007. Clinical applications of Silybum marianum in oncology. *Integrative Cancer Therapies*, 6(2): 158-165.
- Gruber, F. W. 1996. The cycle of Carcinosis. *The New England Journal of Homeopathy*, 5(4). Available: <https://nesh.com/the-new-england-journal-of-homeopathy/vol-5-no-4-fall-1996/the-cycle-of-carcinosis/> (Accessed 19 February 2020).
- Gupta, G. L. and Rana, A. C., 2007. Withania somnifera (Ashwagandha): a review. *Pharmacognosy Reviews*, 1(1): 129-136.
- Hahn, S., Janssen, O. E., Tan, S., Pleger, K., Mann, K., Schedlowski, M., Kimmig, R., Benson, S., Balamitsa, E. and Elsenbruch, S. 2005. Clinical and psychological correlates of quality-of-life in polycystic ovary syndrome. *European Journal of Endocrinology*, 153(6): 853-860.
- Hajimonfarednejad, M., Ostovar, M., Raee, M. J., Hashempur, M. H., Mayer, J. G. and Heydari, M. 2019. Cinnamon: a systematic review of adverse events. *Clinical Nutrition*, 38(2): 594-602.

- Harrison, C. L., Lombard, C. B., Moran, L. J. and Teede, H. J. 2010. Exercise therapy in polycystic ovary syndrome: a systematic review. *Human Reproduction Update*, 17(2): 171-183.
- Hatherly, P. 2016. Hahnemann theory of miasms: a modern perspective. *Homœopathic Links*, 29(4): 236-238.
- He, D. Y. and Dai, S. M. 2011. Anti-inflammatory and immunomodulatory effects of *Paeonia Lactiflora* Pall., a traditional Chinese herbal medicine. *Frontiers in Pharmacology*, 2: 10.
- Hirsch Korn, K. A. 2005. The regulation and professionalization of herbal medicine. Ph.D. thesis, McMaster University.
- Hohl, A., Ronsoni, M. F. and Oliveira, M. D. 2014. Hirsutism: diagnosis and treatment. *Arquivos Brasileiros de Endocrinologia & Metabologia*, 58(2): 98-107.
- Hollinrake, E., Abreu, A., Maifeld, M., Van Voorhis, B.J. and Dokras, A. 2007. Increased risk of depressive disorders in women with polycystic ovary syndrome. *Fertility and Sterility*, 87(6): 1369-1376.
- Hoosen, M. 2017. Temperament an important principle for health preservation in Tibb an-Nabawi and Unani-Tibb. *Bangladesh Journal of Medical Science*, 16(4): 487-495.
- Hull, M. G. R. 1987. Epidemiology of infertility and polycystic ovarian disease: endocrinological and demographic studies. *Gynecological Endocrinology*, 1(3): 235-245.
- Huseini, H. F., Alavian, S. M., Heshmat, R., Heydari, M. R. and Abolmaali, K. 2005. The efficacy of Liv-52 on liver cirrhotic patients: a randomized, double-blind, placebo-controlled first approach. *Phytomedicine*, 2(9): 619-624.
- Hywood, A. 2012. Phytotherapy for polycystic ovarian syndrome. *Australian Journal of Herbal Medicine*, 24(3): 81-86.

Hywood, A. and Bone, K. 2004. Phytotherapy for polycystic ovarian syndrome (PCOS). *Townsend Letter for Doctors and Patients*, 256: 28. Available: <https://www.townsendletter.com/Nov2004/phyto1104.htm> (Accessed 20 February 2020).

Imenshahidi, M. and Hosseinzadeh, H. 2016. Berberis vulgaris and berberine: an update review. *Phytotherapy Research*, 30(11): 1754.

Iqbal, A., Sheeraz, M., Jan, A., Quraishi, H. A. and Raheem, A. 2018. Concept and management of polycystic ovarian syndrome in Greco Arabian medicine: a review study. *World Journal of Pharmaceutical Research*, 7(14): 487-501.

Israili, A. H. 1981. Humoral theory of Unani Tibb. *Indian Journal of History of Science*, 16(1): 95-99.

Jaiswal, Y. S. and Williams, L. L. 2017. A glimpse of Ayurveda: the forgotten history and principles of Indian traditional medicine. *Journal of Traditional and Complementary Medicine*, 7(1): 50-53.

Jamilian, M., Foroozanfard, F., Bahmani, F., Talaei, R., Monavari, M. and Asemi, Z. 2016. Effects of zinc supplementation on endocrine outcomes in women with polycystic ovary syndrome: a randomized, double-blind, placebo-controlled trial. *Biological Trace Element Research*, 170(2): 271-278.

Jiang, D. 2010. TCM treatment of polycystic ovary and PCOS. *Journal of Association of Traditional Chinese Medicine*. 2(1): 555578. Available: <https://juniperpublishers.com/jcmah/pdf/JCMAH.MS.ID.555578.pdf> (Accessed 20 March 2020).

Johannessen, K. 2017. Pulsatilla pratensis Mill (image). The Norwegian Biodiversity Information Centre (NBIC): Norway.

Joshi, A., Kulkarni, A., Chandran, S., Jayaraman, V. K. and Kulkarni, B. D. 2007. Nadi tarangini: A pulse based diagnostic system. In *2007 29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, August: 2207-2210. doi: 10.1109/IEMBS.2007.4352762.

Kadowaki, T. and Yamauchi, T. 2005. Adiponectin and adiponectin receptors. *Endocrine Reviews*, 26(3): 439-451.

Kam, W., Zhang, Z. and Bäärnhielm, S. 2019. Traditional Chinese medicine explanatory models of depressive disorders: a qualitative study. *Culture, Medicine, and Psychiatry*, 43: 387-403.

Kandaraki, E., Chatzigeorgiou, A., Livadas, S., Palioura, E., Economou, F., Koutsilieris, M., Palimeri, S., Panidis, D. and Diamanti-Kandarakis, E. 2011. Endocrine disruptors and polycystic ovary syndrome (PCOS): elevated serum levels of bisphenol A in women with PCOS. *The Journal of Clinical Endocrinology & Metabolism*, 96(3): 480-484.

Kasim-Karakas, S. E. and Mishra, S. 2009. Botanical treatment for polycystic ovary syndrome. In: *Complementary and Alternative Therapies and the Aging Population*. California: Academic Press.

Kent, J. T. 1905. *Materia medica*. Chicago: Boericke and Tafel. Available: <https://www.materiamedica.info/en/materia-medica/james-tyler-kent/natrum-muriaticum> (Accessed 20 February 2020).

Kersschot, J. 2007. Biopuncture and the treatment of sports injuries. *Journal of Biomedical Therapy*, 1(1): 20.

Khademi, A., Alleyassin, A., Aghahosseini, M., Tabatabaeefar, L. and Amini, M. 2010. The effect of exercise in PCOS women who exercise regularly. *Asian Journal of Sports Medicine*, 1(1): 35-40.

Khan, Q. A., Khan, A. A. and Parveen, S. 2019. Medicinal efficacy of Khar-e-Khasak Khurd (*Tribulus terrestris* Linn). *Journal of Drug Delivery and Therapeutics*, 9(3): 847-850.

Khan, S., Shameem, I., Sahibole, S. and Siddiqui, A. 2017. Efficacy of Unani formulation in infertility among obese women: a clinical study. *International Journal of Medical and Health Research*, 3(4): 131.

Kihara, T., Biro, S., Imamura, M., Yoshifuku, S., Takasaki, K., Ikeda, Y., Otuji, Y., Minagoe, S., Toyama, Y. and Tei, C. 2002. Repeated sauna treatment improves vascular endothelial and cardiac function in patients with chronic heart failure. *Journal of the American College of Cardiology*, 39(5): 754-759.

Kim, M., Cobbin, D. and Zaslowski, C. 2008. Traditional Chinese medicine tongue inspection: an examination of the inter-and intrapractitioner reliability for specific tongue characteristics. *The Journal of Alternative and Complementary Medicine*, 14(5): 527-536.

Kim, M. S. 2011. Clinical application of yin-yang theory and the five elements theory in traditional veterinary medicine. College of Veterinary Medicine: Korea. Available: <https://www.vin.com/apputil/content/defaultadv1.aspx?pId=11343&catId=34551&id=5124188> (Accessed 15 March 2020).

Kjerulff, L. E., Sanchez-Ramos, L. and Duffy, D. 2011. Pregnancy outcomes in women with polycystic ovary syndrome: a metaanalysis. *American Journal of Obstetrics and Gynecology*, 204(6): 558.

Kocaadam, B. and Şanlier, N. 2017. Curcumin, an active component of turmeric (*Curcuma longa*), and its effects on health. *Critical Reviews in Food Science and Nutrition*, 57(13): 2889-2895.

Kooreman, P. and Baars, E. W. 2011. Patients whose GP knows complementary medicine tend to have lower costs and live longer. *The European Journal of Health Economics*, 13(6): 769-776.

Korentayer J. 2012. Homeopathic constitutional types: Natrum muriaticum. *Arcanum Wholistic Clinic*. Available at: <https://arcanum.ca/2012/04/14/homeopathic-constitutional-types-natrum-muriaticum/> (Accessed 07 January 2020)

Kort, D. H. and Lobo, R. A. 2014. Preliminary evidence that cinnamon improves menstrual cyclicity in women with polycystic ovary syndrome: a randomized controlled trial. *American Journal of Obstetrics and Gynecology*, 211(5): 487.

Kousta, E., White, D. M. and Franks, S. 1997. Modern use of clomiphene citrate in induction of ovulation. *Human Reproduction Update*, 3(4): 359-365.

Kumar, N. and Singh, A. K. 2013. Phalatrikadi kvatha an ayurvedic hepatoprotective drug. *International Journal of Research in Pharmacy and Chemistry*, 3(3): 591-594.

Lamb, J. D., Johnstone, E. B., Rousseau, J. A., Jones, C. L., Pasch, L. A., Cedars, M. I. and Huddleston, H. G. 2011. Physical activity in women with polycystic ovary syndrome: prevalence, predictors, and positive health associations. *American Journal of Obstetrics and Gynecology*, 204(4): 352.

Lamba, C. D., Oberai, P., Manchanda, R. K., Rath, P., Bindu, P. H. and Padmanabhan, M. 2018. Evaluation of homoeopathic treatment in polycystic ovary syndrome: a single-blind, randomised, placebo-controlled pilot study. *Indian Journal of Research in Homoeopathy*, 12(1): 35-45.

Latha, R. C. R. and Daisy, P. 2010. Parameters in Streptozotocin Diabetic Rats. *International Journal of Pharmacology*, 6(2): 89-96.

Lauritsen, M. P., Bentzen, J. G., Pinborg, A., Loft, A., Forman, J. L., Thuesen, L. L., Cohen, A., Hougaard, D. M. and Andersen, A. N. 2014. The prevalence of polycystic ovary syndrome in a normal population according to the Rotterdam criteria versus revised criteria including anti-Mullerian hormone. *Human Reproduction*, 29(4): 792.

Lebacqz, K. 1980. Beyond respect for persons & Beneficence: Justice in Research. *IRB: Ethics & Human Research*, 2(7): 1-4.

Lebbe, M. and Woodruff, T. K. 2013. Involvement of androgens in ovarian health and disease. *Molecular Human Reproduction*, 19(12): 828-837.

Legro, R. S. 2012. December. Obesity and PCOS: implications for diagnosis and treatment. *Seminars in Reproductive Medicine*, 30(6): 496.

Lewith, G. and Robinson, N. 2016. Integrating complementary and alternative medicine (CAM) and conventional diagnoses. *European Journal of Integrative Medicine*. 8(6): 879-880.

Li, Y., Ma, H., Zhang, Y., Kuang, H., Ng, E. H. Y., Hou, L. and Wu, X. 2013. Effect of berberine on insulin resistance in women with polycystic ovary syndrome: study protocol for a randomized multicenter controlled trial. *Trials*, 14(1): 226.

Lilley, D. 2001. *Calcarea carbonicum* (2001). Available: <https://www.britishhomeopathic.org/charity/how-we-can-help/articles/homeopathic-medicines/c/calc-carb/> (Accessed 27 February 2020).

Lim, C. E. and Wong, W. S. 2010. Current evidence of acupuncture on polycystic ovarian syndrome. *Gynecological Endocrinology*, 26(6): 473-477.

Lim, T. K. 2012. *Juniperus communis*. In *Edible medicinal and non-medicinal plants*. Dordrecht: Springer.

Lin, M. J., Chen, H. W., Liu, P. H., Cheng, W. J., Kuo, S. L. and Kao, M. C. 2019. The prescription patterns of traditional Chinese medicine for women with polycystic ovary syndrome in Taiwan: a nationwide population-based study. *Medicine*, 98(24): 1-9.

Ling, W., Li, Y., Jiang, W., Sui, Y. and Zhao, H.L. 2015. Common mechanism of pathogenesis in gastrointestinal diseases implied by consistent efficacy of single Chinese medicine formula: a PRISMA-compliant systematic review and meta-analysis. *Medicine*, 94(27): 1.

Liu, Y.X., Hou, L.H. and Wu, X.K. 2009. Etiology and pathogenesis of polycystic ovary syndrome in traditional Chinese medicine. *Tianjin Journal of Traditional Chinese Medicine*, 26(2): 123-124..

Livadas, S., Pappas, C., Karachalios, A., Marinakis, E., Tolia, N., Drakou, M., Kaldrymides, P., Panidis, D. and Diamanti-Kandarakis, E. 2014. Prevalence and impact of hyperandrogenemia in 1,218 women with polycystic ovary syndrome. *Endocrine*, 47(2):631-638.

Lizneva, D., Suturina, L., Walker, W., Brakta, S., Gavrilova-Jordan, L. and Azziz, R. 2016. Criteria, prevalence, and phenotypes of polycystic ovary syndrome. *Fertility and Sterility*, 106(1): 6-15.

Lo, J. C., Feigenbaum, S L., Yang, J., Pressman, A. R., Selby, J. V. and Go, A. S. 2006. Epidemiology and adverse cardiovascular risk profile of diagnosed polycystic ovary syndrome. *The Journal of Clinical Endocrinology & Metabolism*, 91(4): 1357-1363.

Ma, Q. W. and Tan, Y. 2017. Effectiveness of co-treatment with traditional Chinese medicine and letrozole for polycystic ovary syndrome: a meta-analysis. *Journal of Integrative Medicine*, 15(2): 95-101.

Macut, D., Tziomalos, K., Božić-Antić, I., Bjekić-Macut, J., Katsikis, I., Papadakis, E., Andrić, Z. and Panidis, D. 2016. Non-alcoholic fatty liver disease is associated with insulin resistance and lipid accumulation product in women with polycystic ovary syndrome. *Human Reproduction*, 31(6): 1347-1353.

Makaya, T., Basu, S. and Poole, R. 2019. Management of teenagers with polycystic ovarian syndrome. *Paediatrics and Child Health*, 29(7): 303-308.

Manderson, L., Bennett, E. and Andajani-Sutjahjo, S. 2006. The social dynamics of the interview: age, class, and gender. *Qualitative Health Research*, 16(10):1317-1334.

March, W. A., Moore, V. M., Willson, K. J., Phillips, D. I. W., Norman, R. J. and Davies, M. J. 2010. The prevalence of polycystic ovary syndrome in a community sample assessed under contrasting diagnostic criteria. *Human Reproduction*, 25(2): 544-551.

Marsh, K. and Brand-Miller, J. 2005. The optimal diet for women with polycystic ovary syndrome?. *British Journal of Nutrition*, 94(2):154-165.

Marshall, J. C. and Dunaif, A. 2012. Should all women with PCOS be treated for insulin resistance? *Fertility and Sterility*, 97(1): 18-22.

McCaffrey, A. M., Pugh, G. F. and O'Connor, B. B. 2007. Understanding patient preference for integrative medical care: results from patient focus groups. *Journal of General Internal Medicine*, 22(11): 500-1505.

McCook, J. G., Reame, N. E. and Thatcher, S. S. 2005. Health-related quality of life issues in women with polycystic ovary syndrome. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 34(1): 12-20.

McElwee, K. J. and Shapiro, J. S. 2012. Promising therapies for treating and/or preventing androgenic alopecia. *Skin Therapy Letters*, 17(6): 1-4.

McEwen, B. J. 2017. Can omega-3 polyunsaturated fatty acids improve metabolic profile in polycystic ovary syndrome (PCOS)? *Advances in Integrative Medicine*, 4(2): 82-83.

McGrice, M. and Porter, J. 2017. The effect of low carbohydrate diets on fertility hormones and outcomes in overweight and obese women: a systematic review. *Nutrients*, 9(3): 204.

McKittrick, M. 2002. Diet and polycystic ovary syndrome. *Nutrition Today*, 37(2): 63-69.

Medling, A. 2017. Healthy fats for the PCOS diet. PcosDiva. Available at: <https://pcosdiva.com/2017/10/healthy-fats-pcos-diet> (Accessed 12 January 2020).

Menichini, D. and Facchinetti, F. 2020. Effects of vitamin D supplementation in women with polycystic ovary syndrome: a review. *Gynecological Endocrinology*, 36(1): 1-5.

Meuss, A.R. ed. 2000. *Weiss's herbal medicine: classical edition*. New York: Thieme.

Meyer, C., McGrath, B. P. and Teede, H. J. 2005. Overweight women with polycystic ovary syndrome have evidence of subclinical cardiovascular disease. *The Journal of Clinical Endocrinology & Metabolism*, 90(10): 5711-5716.

Mills, S. and Bone, K. 2000. *Principles and practice of phytotherapy: modern herbal medicine*. New York: Churchill Livingstone.

Mirza, S., Naaz, S. A. and Alim, S. M. 2016. Management of polycystic ovarian syndrome (Keesa-e-. Khusyatur Rehm): Unani perspective. *American Journal of Pharmacy and Health Research*, 4(1): 24-45.

Mitra, S. K., Gopumadhavan, S., Venkataranganna, M. V., Sarma, D. N. K. and Anturlikar, S. D. 1999. Uterine tonic activity of U-3107 (EveCare), a herbal preparation in rats. *Indian Journal of Pharmacology*, 31: 200-203.

Moon, K., Brewer, T.D., Januchowski-Hartley, S.R., Adams, V.M. and Blackman, D.A. 2016. A guideline to improve qualitative social science publishing in ecology and conservation journals. *Ecology and Society*, 21(3):18.

Moran, L. and Teede, H. 2009. Metabolic features of the reproductive phenotypes of polycystic ovary syndrome. *Human Reproduction Update*, 15(4): 477-488.

Moran, L. J., March, W. A., Whitrow, M. J., Giles, L. C., Davies, M. J. and Moore, V. M. 2015. Sleep disturbances in a community-based sample of women with polycystic ovary syndrome. *Human Reproduction*, 30(2): 466-472.

Morrell, A.J. 2015. An investigation into carbohydrate cravings and BMI in women with polycystic ovary syndrome. *EC Nutrition*, 1:72-95.

Morgante, G., Cappelli, V., Di, A. S., Massaro, M. G. and De, V. L. 2015. Polycystic ovary syndrome (PCOS) and hyperandrogenism: the role of a new natural association. *Minerva Ginecologica*, 67(5): 457-463.

Mukherjee, P. K., Rai, S., Bhattacharyya, S. and Debnath, P. K. 2006. Clinical study of 'Triphala'—a well known phytomedicine from India. *Iranian Journal of Pharmacology and Therapeutics*, 5(1): 51-54.

Nair, P. M. and Nanda, A. 2014. Naturopathic medicine in India. *Focus on Alternative and Complementary Therapies*, 19(3): 140-147.

Nehra, H. 2019. Ayurveda and modern perspective on Poly Cystic Ovarian Syndrome (PCOS): Review base on literary study. *Himalayan Journal of Health Sciences*. Available at: hjhs.co.in/index.php/hjhs/article/view/38/29 (Accessed 14 May 2020).

Nelson, A. and Nelson, V. 2010. "Hey Mitch-elle, you need a shave!": The school days of hirsute adolescents. *Qualitative Sociology Review*, 6(3): 100.

Nichols, M. 2017. The big picture of the adrenal glands and the HA axis. *Medicine with Heart Institute*. Available at: <https://mindfulness-medicine.com/author/admin/page/3> (Accessed 1 January 2020).

National Institutes of Health. 2019. National Cancer Institute: NCI dictionary of cancer terms. Available at: <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/adjunctive-therapy> (Accessed 17 February 2020).

Orio, F. and Palomba, S. 2013. New guidelines for the diagnosis and treatment of PCOS. *Nature Reviews Endocrinology*, 10(3): 130-132.

Owen, D. 2015. Principles and practice of homeopathy: *The therapeutic and healing process*. 2nd edition. London: Singing Dragon.

Pachiappan, S., Matheswaran, S. and Pushkalai, P. 2017. Medicinal plants for polycystic ovary syndrome: a review of phytomedicine research. *International Journal of Herbal Medicine*, 5(2): 78-79.

Palomba, S. 2018. *Infertility in women with polycystic ovary syndrome: pathogenesis and management*. Basel, Switzerland: Springer International Publishing.

Panda, S.R., Durgavati, K. and Sahu, S.K. 2014. A study of clinical parameters in the diagnosis of polycystic ovarian syndrome. *Journal of Evolution of Medical and Dental Sciences*, 3(42):10570-10579.

Pandey, A. K., Gupta, A., Tiwari, M., Prasad, S., Pandey, A. N., Yadav, P. K., Sharma, A., Sahu, K., Asrafuzzaman, S., Vengayil, D. T. and Shrivastav, T. G. 2018. Impact of stress on female reproductive health disorders: possible beneficial effects of shatavari (*Asparagus racemosus*). *Biomedicine & Pharmacotherapy*, 103: 46-49.

Panidis, D., Tziomalos, K., Chatzis, P., Papadakis, E., Delkos, D., Tsourdi, E. A., Kandaraki, E. A. and Katsikis, I. 2013. Association between menstrual cycle irregularities and endocrine and metabolic characteristics of the polycystic ovary syndrome. *European Journal of Endocrinology*, 168(2): 145-152.

Papalou, O. and Diamanti-Kandarakis, E. 2017. The role of stress in PCOS. *Expert Review of Endocrinology & Metabolism*, 12(1): 87-95.

Parasuraman, S., Thing, G. S. and Dhanaraj, S. A. 2014. Polyherbal formulation: concept of ayurveda. *Pharmacognosy Reviews*, 8(16): 73-80.

Park, B., You, S., Jung, J., Lee, J.A., Yun, K.J. and Lee, M.S. 2015. Korean studies on blood stasis: an overview. *Evidence-Based Complementary and Alternative Medicine*, (2015):1-7.

Patel, M. G. and Prajapati, D.P. 2017. Concept of polycystic ovarian syndrome: perspectives of Ayurveda and modern science. *International Journal of Pharmacognosy and Phytochemical Research*, 9(10): 1364-1365.

Paterson, E. M. 1978. The chronic miasms in prescribing. *British Homeopathic Journal*, 67(04): 281-289.

Peigné, M. and Dewailly, D. 2014, September. Long term complications of polycystic ovary syndrome (PCOS). In *Annales d'endocrinologie*, 75(4): 195.

Penner, J. 2017. Xue Fu Zhu Yu Tang: Herb formulas. *American Dragon*. Available: <https://www.americandragon.com/Herb%20Formulas%20copy/XueFuZhuYuTang.html> (19 March 2020).

Perry, G. S., Patil, S. P. and Presley-Cantrell, L. R. 2013. Raising awareness of sleep as a healthy behavior. *Preventing Chronic Disease*, 10: E33.

Phahamane, E.P. 2014. A group analysis evaluation of the selected members of the acidum family of homoeopathic remedies in terms of known materia medica. M.Tech. Durban University of Technology: Available: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1004.3617&rep=rep1&type=pdf> (Accessed 16 May 2020).

Phatak, S.R. 1999. Materia Medica of Homoeopathic Medicines. New Delhi, India: B Jain Publishers.

Phy, J. L., Pohlmeier, A. M., Cooper, J. A., Watkins, P., Spallholz, J., Harris, K. S., Berenson, A. B. and Boylan, M. 2015. Low starch/low dairy diet results in successful treatment of obesity and co-morbidities linked to polycystic ovary syndrome (PCOS). *Journal of Obesity & Weight Loss Therapy*, 5(2): 1-12.

Pizzorno, J.E. and Murray, M.T., 2012. Textbook of Natural Medicine-E-Book. *Elsevier Health Sciences*.

Power, M., Quinn, K. and Schmidt, S. 2005. Development of the WHOQOL-old module. *Quality of Life Research*, 14(10): 2197-2214.

Pradhan, P., Joseph, L., Gupta, V., Chulet, R., Arya, H., Verma, R. and Bajpai, A. 2009. Saraca asoca (Ashoka): a review. *Journal of Chemical and Pharmaceutical Research*, 1(1):62-71.

Qin, B., Panickar, K. S. and Anderson, R. A. 2010. Cinnamon: potential role in the prevention of insulin resistance, metabolic syndrome, and type 2 diabetes. *Journal of Diabetes Science and Technology*, 4(3): 685-693.

Qiu, J. 2015. When the East meets the West: the future of traditional Chinese medicine in the 21st century. *National Science Review*, 2(3): 377.

Raja-Khan, N., Stener-Victorin, E., Wu, X. and Legro, R. S. 2011. The physiological basis of complementary and alternative medicines for polycystic ovary syndrome. *American Journal of Physiology-Endocrinology and Metabolism*, 301(1): 1-10.

Ramugade, D. D. 2018. Ayurvedic Management of PCOS vis -a- vis of Diabetes Mellitus. *Ayurlog: National Journal of Research in Ayurved Science*, 6(3). Available: <https://www.ayurlog.com/index.php/ayurlog/article/view/82> (Accessed 15 May 2020).

Rashidi, H., Tehrani, F. R., Khomami, M. B. Tohidi, M. and Azizi. F. 2014. To what extent does the use of the Rotterdam criteria affect the prevalence of polycystic ovary syndrome? A community-based study from the Southwest of Iran. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 174: 100-105.

Reddy, P.S., Begum, N., Mutha, S. and Bakshi, V. 2016. Beneficial effect of Curcumin in Letrozole induced polycystic ovary syndrome. *Asian Pacific Journal of Reproduction*, 5(2):116-122.

Ried, K. 2015. Chinese herbal medicine for female infertility: an updated meta-analysis. *Complementary Therapies in Medicine*, 23(1):122.

Ried, K. and Stuart, K. 2011. Efficacy of Traditional Chinese Herbal Medicine in the management of female infertility: a systematic review. *Complementary Therapies in Medicine*, 19(6): 236.

Rojas, J., Chávez, M., Olivar, L., Rojas, M., Morillo, J., Mejías, J., Calvo, M. and Bermúdez, V. 2014. Polycystic ovary syndrome, insulin resistance, and obesity: navigating the pathophysiologic labyrinth. *International Journal of Reproductive Medicine*, 2014. doi: 10.1155/2014/719050

Rooney, S. and Pendry, B. 2014. Phytotherapy for polycystic ovarian syndrome: a review of the literature and evaluation of practitioners' experiences. *Journal of Herbal Medicine*, 4(3): 159-171.

Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. 2004. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome (PCOS). *Human Reproduction*, 19(1): 45-47. <https://doi.org/10.1093/humrep/deh098>

Saiyed, A., Jahan, N., Makbul, S. A. A., Ansari, M., Bano, H. and Habib, S. H. 2016. Effect of combination of *Withania somnifera* dunal and *Tribulus terrestris* linn on letrozole induced polycystic ovarian syndrome in rats. *Integrative Medicine Research*, 5(4): 293-300.

Sam, S. and Ehrmann, D. A. 2017. Metformin therapy for the reproductive and metabolic consequences of polycystic ovary syndrome. *Diabetologia*, 60(9): 1656-1661.

Sankaran, R. 2005. *The sensation in homoeopathy*. Mumbai: Homoeopathic Medical Publishers.

Saraswathi, M. N., Karthikeyan, M., Kannan, M. and Rajasekar, S. 2012. *Terminalia bellerica* Roxb.—a phytopharmacological review. *International Journal of Research in Pharmaceutical and Biomedical Sciences*, 3:96-99.

Sawant, A., Patil, S. and Shah, S. 2017. Review on PCOD/PCOS & its treatment in different medicinal systems—allopathy, Ayurveda, homeopathy. *In Clinition's Science Journal*, 1(1): 12-13.

Saxena, S. 2005. *Glycyrrhiza glabra*: medicine over the millennium. Available: <http://nopr.niscair.res.in/bitstream/123456789/8122/1/NPR%204%285%29%20358-367.pdf> (Accessed 09 March 2020).

Schmidt, J. B. 1994. Hormonal basis of male and female androgenic alopecia: clinical relevance. *Skin Pharmacology and Physiology*, 7(1-2): 61.

Schwandt, T. A., Lincoln, Y. S. and Guba, E. G. 2007. Judging interpretations: but is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Evaluation*, 2007(114): 11-25.

Sen, A. and Hammes, S. R. 2010. Granulosa cell-specific androgen receptors are critical regulators of ovarian development and function. *Molecular Endocrinology*, 24(7): 1393-1403.

Senckenberg. 2009. *Withania somnifera* (L.) Dunal (image). In: *African plants: a photo guide*. Frankfurt: Senckenberg. Available: <https://www.gbif.org/occurrence/1830873483> (Accessed 13 March 2020).

Setji, T. L., Holland, N. D., Sanders, L. L., Pereira, K. C., Diehl, A. M. and Brown, A. J. 2006. Nonalcoholic steatohepatitis and nonalcoholic fatty liver disease in young women with polycystic ovary syndrome. *The Journal of Clinical Endocrinology & Metabolism*, 91(5):1741-1747.

Shameem, I. and Rehana, K. 2016. An overview of polycystic ovarian disease associated secondary amenorrhoea in Unani system of medicine. *International Journal of Science and Research*, 7(10): 318-322.

Sharma, H. K. and Sharma, R. K. 2010. Evaluation of efficacy and safety of Evecare® syrup in infertility due to polycystic ovarian syndrome. *Indian Journal of Clinical Practice*, 21(2): 131-132.

Sharma, K. and Bhatnagar, M. 2010. *Asparagus racemosus* (Shatavari): a versatile female tonic. *Health*, 3(4): 5-6.

Sheehan, H. E. and Hussain, S. J. 2002. Unani Tibb: History, theory, and contemporary practice in South Asia. *The Annals of the American Academy of Political and Social Science*, 583(1): 122-135.

Sherr, J. 1990. The homœopathic proving of chocolate. Malvern: Dynamis School of Advanced Homœopathic Studies. Available: <http://www.hominf.org/remedy/chocolat.htm> (Accessed 20 February 2020).

Shisana, O., Labadarios, D., Rehle, T., Simbayi, L., Zuma, K., Dhansay, A., Reddy, P., Parker, W., Hoosain, E., Naidoo, P. and Hongoro, C. 2014. SANHANES-1 Team (2013). *South African National Health and Nutrition Examination Survey*. Cape Town: HSRC Press.

Shoorei, H., Khaki, A., Ainehchi, N., Taheri, M. M. H., Tahmasebi, M., Seyedghiasi, G., Ghoreishi, Z., Shokoohi, M., Khaki, A. A. and Raza, S. H. A. 2018. Effects of *Matricaria chamomilla* extract on growth and maturation of isolated mouse ovarian follicles in a three-dimensional culture system. *Chinese Medical Journal*, 131(2): 218-224.

Shors, T. J., Pickett, J., Wood, G. and Paczynski, M. 1999. Acute stress persistently enhances estrogen levels in the female rat. *Stress*, 3(2): 163-171.

Sills, E. S., Perloe, M., Tucker, M. J., Kaplan, C. R., Genton, M. G. and Schattman, G. L. 2001. Diagnostic and treatment characteristics of polycystic ovary syndrome: descriptive measurements of patient perception and awareness from 657 confidential self-reports. *BMC Women's Health*, 1(1): 3.

Singh, A., Kiran, D., Singh, H., Nel, B., Singh, P. and Tiwari, P. 2008. Prevalence and severity of dysmenorrhea: a problem related to menstruation, among first and second year female medical students. *Indian Journal of Physiology and Pharmacology*, 52(4): 389-397.

Singh, N. 2012. Panchakarma: cleaning and rejuvenation therapy for curing the diseases. *Journal of Pharmacognosy and Phytochemistry*, 1:1-10.

Singh, O., Khanam, Z., Misra, N. and Srivastava, M. K. 2011. Chamomile (*Matricaria chamomilla* L.): an overview. *Pharmacognosy Reviews*, 5(9):82.

Singh, P., Singh, R., Gupta, L.N. and Kumar, N. 2015. Lodhra: a single remedy for different ailments. *International Journal of Pharmacy and Biological Sciences*, 6: 1-7.

Singh, S. S., Pandey, S. C., Srivastava, S., Gupta, V. S., Patro, B. and Ghosh, A. C. 2003. Chemistry and medicinal properties of *Tinospora cordifolia* (Guduchi). *Indian Journal of Pharmacology*, 35(2): 83-91.

Singh, U.P. and Singh, D.P. 2002. Neem in human and plant disease therapy. *Journal of Herbal Pharmacotherapy*, 2(3): 13-28.

Siriwardene, S. D., Karunathilaka, L. A., Kodituwakku, N. D. and Karunarathne, Y. A. U. D. 2010. Clinical efficacy of Ayurveda treatment regimen on subfertility with polycystic ovarian syndrome (PCOS). *Ayu*, 31(1): 24.

Sirmans, S.M. and Pate, K.A. 2014. Epidemiology, diagnosis, and management of polycystic ovary syndrome. *Clinical epidemiology*. 6:1. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3872139/> (Accessed 24 January 2019).

Smits, T. 1998. *Carcinosinum* (15T). Available: <http://www.tinussmits.com/3861/carcinosinum.aspx> (Accessed 28 February 2020).

Srinivasan, K., 2006. Fenugreek (*Trigonella foenum-graecum*): a review of health beneficial physiological effects. *Food Reviews International*, 22(2): 203-224.

Stankiewicz, M. and Norman, R. 2006. Diagnosis and management of polycystic ovary syndrome. *Drugs*, 66(7): 903-912.

Stein, I. F. 1958. The Stein-Leventhal syndrome: a curable form of sterility. *New England Journal of Medicine*, 259(9): 420-423. DOI: 10.1056/NEJM195808282590904

Stohs, S. J. 2014. Safety and efficacy of shilajit (mumie, moomiyo). *Phytotherapy Research*, 28(4): 475-479.

-Heel. 2000. *Biotherapeutic index*. 5th edition. -Heel: Baden-Baden, Germany.

Surjushe, A., Vasani, R. and Saple, D.G. 2008. Aloe vera: a short review. *Indian Journal of Dermatology*, 53(4):163-166.

Svendsen, P .F., Madsbad, S. and Nilas, L. 2010. The insulin-resistant phenotype of polycystic ovary syndrome. *Fertility and Sterility*, 94(3): 1052.

Teede, H., Deeks, A. and Moran, L. 2010. Polycystic ovary syndrome: a complex condition with psychological, reproductive and metabolic manifestations that impacts on health across the lifespan. *BMC medicine*, 8(1): 41.

Teixeira, M. Z. 2013. 'New Homeopathic Medicines' database: a project to employ conventional drugs according to the homeopathic method of treatment. *European Journal of Integrative Medicine*, 5(3): 270-278.

Tembhurne, S. V., Feroz, S., More, B. H. and Sakarkar, D. M. 2014. A review on therapeutic potential of *Nigella sativa* (kalonji) seeds. *Journal of Medicinal Plants Research*, 8(3):167-177.

Tesch, R. 1990. *Qualitative research: analysis types and software tools*. New York: The Falmer Press: 322.

Thomas, J. and Kuruvilla, K. M. 2012. Cinnamon. In *Handbook of herbs and spices*. Cambridge: Woodhead Publishing.

Thomas, R. 2007. *Cimicifuga racemose* (L.) Nutt. Photograph. Available: <https://api.gbif.org/v1/image/unsafe/http%3A%2F%2Fbioimages.vanderbilt.edu%2Fgq%2Fthomas%2Fg0094-02-02.jpg> (Accessed 13 March 2020).

Tomlinson, J., Pinkney, J., Adams, L., Stenhouse, E., Bendall, A., Corrigan, O. and Letherby, G. 2017. The diagnosis and lived experience of polycystic ovary syndrome: a qualitative study. *Journal of Advanced Nursing*, 73(10): 2318-2326.

Trop, G. 2018. Alice Kuzniar: The birth of homeopathy out of the spirit of Romanticism. *Seminar: A Journal of Germanic Studies*. 54(3): 395-397.

Trummer, C., Pilz, S., Schwetz, V., Obermayer-Pietsch, B. and Lerchbaum, E. 2018. Vitamin D, PCOS and androgens in men: a systematic review. *Endocrine Connections*, 7(3): 95-113.

Tsan, V. 2019. *Homeopathic treatment for polycystic ovarian syndrome (PCOS)*. Available: https://www.academia.edu/34278321/Homeopathic_Treatment_for_Polycystic_Ovarian_Syndrome_PCOS (Accessed 26 November 2019).

Umer, K.H., Zeenat, F., Ahmad, W., Ahmad, I. and Khan, A.V. 2017. Therapeutics, phytochemistry and pharmacology of Alsi (*Linum usitatissimum* Linn): an important Unani drug. *Journal of Pharmacognosy and Phytochemistry*, 6(5): 377-383.

Unfer, V., Carlomagno, G., Dante, G. and Facchinetti, F. 2012. Effects of myo-inositol in women with PCOS: a systematic review of randomized controlled trials. *Gynecological Endocrinology*, 28(7): 509-515.

Unluhizarci, K., Karaca, Z. and Kelestimur, F. 2013. Hirsutism – from diagnosis to use of antiandrogens. *Polycystic Ovary Syndrome*, (40): 103-114.

United States. National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. 1978. *The Belmont report: ethical principles and guidelines for the protection of human subjects of research*. Bethesda, Maryland: DHEW publication.

Van der Horst, E. ed. 1994. *Chinaherb formulae: a guide to diagnosis and select a formula in practice*. Cape Town: Chinaherb.

Vani, T., Rajani, M., Sarkar, S. and Shishoo, C. J. 1997. Antioxidant properties of the ayurvedic formulation triphala and its constituents. *International Journal of Pharmacognosy*, 35(5): 313-317.

Villella, S. 2016. *PCOS and Natural Therapies: Jean Hailes*. Available: https://assets.jeanhailes.org.au/Webinars/Slides_PCOS_natural_therapies.pdf (Accessed 14 May 2020).

Wang, J. G., Anderson, R. A., Graham, G. M 2007. The effect of cinnamon extract on insulin resistance parameters in polycystic ovary syndrome: a pilot study. *Fertility and Sterility*, 88(1): 240-243.

Wang, H. and Cheng, Y. 2006, January. A quantitative system for pulse diagnosis in traditional Chinese medicine. In *2005 IEEE Engineering in Medicine and Biology 27th Annual Conference*: 5676-5677.

Wang, R. and Mol, B. W. J. 2017. The Rotterdam criteria for polycystic ovary syndrome: evidence-based criteria? *Human Reproduction*, 32(2): 261-264.

Wei, W., Zhao, H., Wang, A., Sui, M., Liang, K., Deng, H., Ma, Y., Zhang, Y., Zhang, H. and Guan, Y. 2012. A clinical study on the short-term effect of berberine in comparison to metformin on the metabolic characteristics of women with polycystic ovary syndrome. *European Journal of Endocrinology*, 166(1): 99.

Weiss, T. R. and Bulmer, S. M. 2011. Young women's experiences living with polycystic ovary syndrome. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 40(6): 709-718.

Welt, C. K. and Carmina, E. 2013. Lifecycle of polycystic ovary syndrome (PCOS): from in utero to menopause. *The Journal of Clinical Endocrinology & Metabolism*, 98(12): 4629-4638.

Wright, C. E., Zborowski, J. V., Talbott, E. O., McHugh-Pemu, K. and Youk, A. 2004. Dietary intake, physical activity, and obesity in women with polycystic ovary syndrome. *International Journal of Obesity*, 28(8): 1026.

Wu, X., Ng, E. H. Y., Stener-Victorin, E. and Legro, R. S. 2014. Effects and mechanisms of complementary and alternative medicine during the reproductive process. *Evidence-Based Complementary and Alternative Medicine*, 2014. Available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4009242/> (Accessed 8 January 2019).

Yoon, Y. Z., Lee, M. H. and Soh, K. S. 2000. Pulse type classification by varying contact pressure. *IEEE Engineering in Medicine and Biology Magazine*, 19(6):106-110.

Yu, H. F., Chen, H. S., Rao, D. P. and Gong, J. 2016. Association between polycystic ovary syndrome and the risk of pregnancy complications: a PRISMA-compliant systematic review and meta-analysis. *Medicine*, 95(51): 1.

Zangeneh, F.Z., Minaee, B., Amirzargar, A., Ahangarpour, A. and Mousavizadeh, K. 2010. Effects of chamomile extract on biochemical and clinical parameters in a rat model of polycystic ovary syndrome. *Journal of reproduction & infertility*, 11(3):169-174.

Zhang, J., Li, T., Zhou, L., Tang, L., Xu, L., Wu, T. and Lim, D. C. 2010. Chinese herbal medicine for subfertile women with polycystic ovarian syndrome. *Cochrane Database of Systematic Reviews*, (9): 1-36.

Zhang, L., Zhu, L., Wang, Y., Jiang, Z., Chai, X., Zhu, Y., Gao, X. and Qi, A. 2012. Characterization and quantification of major constituents of Xue Fu Zhu Yu by UPLC-DAD–MS/MS. *Journal Of Pharmaceutical and Biomedical Analysis*, 62: 203-209.

Zhou, J. and Qu, F. 2009. Treating gynaecological disorders with traditional Chinese medicine: a review. *African Journal of Traditional, Complementary and Alternative Medicines*, 6(4): 494-517.

Appendices

Appendix A: Letter of Information



LETTER OF INFORMATION

Dear participant,

Thank You for taking the time to participate in this study.

Research Title: An exploration into the diagnosis and management of Polycystic Ovarian Syndrome by Complementary and Alternative Medical (CAM) practitioners in the eThekweni area.

Principal Researcher: Faathimah Khan (BHSC)

Supervisor: Dr Madhueshwaree Maharaj
(MTech)

Brief Introduction and Purpose of the Study:

Polycystic Ovarian Syndrome (PCOS) is an increasingly prevalent endocrinopathy of great clinical importance. There is an evident gap in existing knowledge as to the therapeutic protocols implemented by various disciplines of Complementary and Alternative Medicine (CAM) in the management of Polycystic Ovarian Syndrome. There is also dissatisfaction reported by women diagnosed with PCOS in the initial diagnosis, information and emotional support provided by Health-care practitioners.

CAM practitioners generally engage with patients' more extensively with emphasis on listening to the patients' concerns as well as providing time and knowledgeable advice to patients. This increases the likelihood that females with PCOS will seek alternative interventions through CAM in light of the many diverse psychological implications consequential of its widespread clinical effects.

The purpose of the proposed research is to contribute to evidence based knowledge pertaining to PCOS by documenting various CAM approaches to diagnosing and managing PCOS. This could ultimately assist practitioners to treat more

cases of PCOS successfully and efficiently. More importantly, it will assist in improving the quality of life of females suffering with PCOS.

Outline of Procedures:

Location

I will arrange to meet and interview you at a location and time convenient to your schedule.

Consent

You will be asked to sign a **letter of informed consent** prior to the commencement of the interview. You have complete free will in choosing to participate in this research and will not be obligated or coerced in any way. Should you wish to decline participating thereof, you will not be required or expected to provide any explanation.

Duration

The interview will be **20 minutes** long.

Capturing data and confidentiality

The interview will be audio recorded. On your audio recording you will be assigned a code, thus your name will not appear on the recording or in the research to ensure that you remain anonymous.

Purpose

The purpose of the interview is to document the diagnostic and therapeutic protocols implemented by you according to your field of practice as well as your perceptions of PCOS.

Risks or Discomforts to the Participant: None.

Benefits:

The proposed research could potentially broaden your scope of knowledge about PCOS according to various CAM modalities, which is prevalent and challenging to treat in practice. The research will provide existing protocols in the diagnosis and management of PCOS which may supplement your understanding of PCOS and improve your approach to managing the disease thereof.

Reason why the participant may be withdrawn from the study:

Should you wish to withdraw from the study at any time, there will be no adverse consequences.

Remuneration: You will not receive any monetary compensation for participating in this study.

Costs of the Study: You will not be liable for any expenses or costs that may be involved in this study.

Confidentiality: A code will be assigned to your audio-recording after the interview and this code will be used in transcription so that you will remain anonymous.

Research-related injury: The nature of this research is qualitative and involves a simple interview process at a location preferred to You. The study does not involve clinical trials or testing of any form. There is therefore no risk of sustaining any injury during the study.

**Persons to Contact in the Event of Any Problems
or Queries:****Researcher (Faathimah Khan)**

Cell: 060 503 3154

E-mail: Authoressk@gmail.com

Supervisor (Dr M Maharaj)

Head of Department : Homoeopathy

Department of Homoeopathy

Faculty of Health Sciences

Durban University of Technology

Tel: **031 373 2514**

E-mail: madhum@dut.ac.za

Institutional Research Ethics Administrator (Prof S Moyo)

Complaints can be reported to the DVC: Research, Innovation and Engagement.

Tel: 031 373 2375 or 031 373 2577

E-mail: moyos@dut.ac.za

Appendix B: Consent for research study

Appendix B



CONSENT FOR RESEARCH STUDY

- I hereby confirm that I have been informed by the researcher, **Faathimah Khan**, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **IREC 111/19**.
- I have also received, read and understood the above written information (**Participant Letter of Information**) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (**of my own free will**) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant

Date

Time

Signature

I, Faathimah Khan herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Full Name of Researcher

Date

Signature

Appendix C: Consent for Pilot Study

Appendix C



CONSENT FOR PILOT STUDY

Statement of Agreement to Participate in the Pilot Study:

- I hereby confirm that I have been informed by the researcher, **Faathimah Khan**, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **111/19**.
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I'm aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant

Date

Time

Signature

I, **Faathimah Khan** herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Full Name of Researcher

Date

Signature

Full Name of Witness (If applicable)

Date

Signature

Full Name of Legal Guardian (If applicable)

Date

Signature

Appendix D: Interview Guide for CAM practitioners



Appendix D

Interview Guide for CAM practitioners in the English Language

Section A: Demographic Data

Please mark the appropriate box with an X

1. Age: _____
2. Gender: Male ☐ Female ☐
3. Practitioner: _____
4. Area: _____

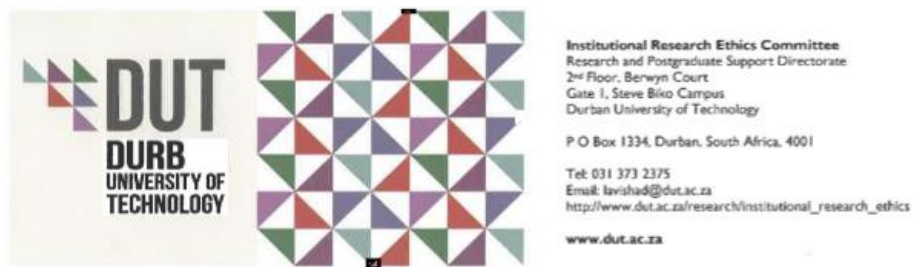
Section B: Interview questions for CAM practitioners

Grand tour question: How, given your chosen modality, do you manage PCOS from diagnosis to treatment?

Probing questions:

1. Describe your understanding of PCOS based on the philosophical foundation of your specific medical system.
2. Describe what you know to be the aetiologies/ contributing factors to the development of PCOS?
3. Describe how you would diagnose a patient with PCOS?
4. What is your approach to managing patients with PCOS?
5. What treatment do you prescribe?
6. What additional modalities do you employ or recommend for patients with PCOS?

Appendix E: IREC Approval



16 September 2019

Miss F N Khan
51 Enniskillen Crescent
Morningside
4001

Dear Miss Khan

An exploration into the management and diagnosis of Polycystic Ovarian Syndrome by Complementary and Alternative Medical (CAM) practitioners in the eThekweni area.

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the data collection tool has been approved. Kindly ensure that participants used for the pilot study are not part of the main study.

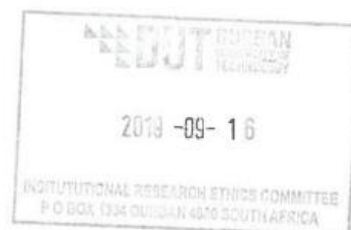
Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC Standard Operating Procedures (SOP's).

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely,

Professor J K Adam
Chairperson: IREC



Appendix F: Editing certificate

DR RICHARD STEELE

BA, HDE, MTech(Hom)

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EDITING CERTIFICATE

Re: Faathimah Khan

Master's dissertation: An exploration into the diagnosis and management of Polycystic Ovarian Syndrome by Complementary and Alternative Medical (CAM) practitioners in the eThekweni area

I confirm that I have edited this dissertation and the references for clarity, language and layout. I returned the document to the author with track changes so correct implementation of the changes and clarifications requested in the text and references is the responsibility of the author. I am a freelance editor specialising in proofreading and editing academic documents. My original tertiary degree which I obtained at the University of Cape Town was a B.A. with English as a major and I went on to complete an H.D.E. (P.G.) Sec. with English as my teaching subject. I obtained a distinction for my M.Tech. dissertation in the Department of Homoeopathy at Technikon Natal in 1999 (now the Durban University of Technology). I was a part-time lecturer in the Department of Homoeopathy at the Durban University of Technology for 13 years.

Dr Richard Steele

2020-05-12

per email