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Literature Study

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Abstract

Polycystic ovarian syndrome (PCOS) is one of the most common hormonal disorders affecting millions of women in the western culture today. Diagnosis is often difficult due to the variety of symptoms these women experience. The information that follows diagnosis is unsatisfactory to the afflicted women, leaving them with a feeling of neglect from the medical community. The purpose of this study is to illuminate the pharmacological and non-pharmacological treatments of PCOS. This literature study was carried out by analyzing nine clinical studies. Lifestyle modification is the most effective non-pharmacological treatment available to obese or overweight women with PCOS which can be combined with pharmacological treatments to strengthen the effectiveness. Nurses have the ability to play a vital roll in these women's lives by giving them support, knowledge and motivation in their struggle with PCOS.

Key Words

Polycystic Ovarian Syndrome, Treatments, Lifestyle Modification, Metformin, Weight Reduction, Nursing.

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Contents

Introduction

Polycystic Ovarian Syndrome (PCOS) is one of the most common hormonal disorders affecting reproductive women in the world today. As the western culture spreads throughout the world, so does its negative effects of inactivity and increased weight gain, causing a variety of health risks including PCOS. Approximately 20 percent of women in the reproductive age show an indication of having PCOS (Norman, Davies, Lord & Moran, 2002). Even though this is one of the most common hormonal disorders, the afflicted women often have trouble being diagnosed, often receiving unsatisfactory information afterward.

The common clinical symptoms often differ from woman to woman. Most of the women affected are not even aware that they have the syndrome until they begin having problems conceiving. Diagnosis and treatment is complicated because of the variation of manifestations in the women affected. There is no cure for PCOS, and the treatment consists of symptom improvement through both medical treatments and lifestyle modifications. Symptom improvement can be accomplished by life changes such as losing weight through exercising and dieting as well as medical therapy such as oral contraceptive pills, insulin sensitizers, and anti-androgens (Sharpless, 2003).

These women feel emotionally devastated due to not only having PCOS but also from the physical implications of the syndrome. On top of this, these women feel neglected from the lack of information and support they receive from the medical community. Information involving the pharmacological and non-pharmacological treatments of PCOS is extremely important for nurses in order for them to provide the proper care, knowledge and support to the affected women.

Background

In 1934, Irving Stein and Michael Leventhal described the condition of seven women who were infertile, overweight, with excess facial and body hair who had cysts on their ovaries as a “new” disorder. Today, more than seventy years later, not much more is known, and studies

are continuing to gather more information. Recently, there has been links to syndrome X, the metabolic syndrome that has a connection to insulin resistance (Harris & Carey, 2000).

Pathology

The etiology of PCOS is thought to be linked to familial genetics and environmental components, but that is not certain. Clinically, it is defined as oligomenorrhea associated with hyperandrogenism and has been described as “the thief of womanhood.” These women seek medical help for infertility and hirsutism or unwanted hair growth (Sharpless, 2003). PCOS´s basic cause is stemmed from the ovaries’ lack of ability to produce hormones in the proper proportions. Another link to the cause of PCOS is thought to be insulin resistance, which leads to hyperinsulinemia, a high concentration of insulin that may be responsible for acanthosis nigricans, an increase in body fat. The high levels of insulin cause hyperandrogenaemia by thickening the ovarian thecal cells, which directly stimulates the production of androgen, specifically testosterone, and also decreasing the sex hormone-binding globulin (SHBG). The overabundance of testosterone leads to acne, excess hair growth and alopecia. Hyperinsulinemia triggers the pituitary gland to over produce luteinizing hormone (LH), which in turn leads to anovulation (Salmi, Zisser & Jovanovic, 2004). During the process of ovulation, a cyst, which is a small fluid-filled sac, engulfs the egg in order to provide nourishment. These cysts are normal. PCOS women have multiple cysts that grow in a ring on the ovaries; however, not all women with PCOS have polycystic ovaries (Hammerly & Kimball, 2003).

Symptoms Associated with PCOS

The common clinical manifestations of PCOS:

- menstrual irregularities
- high levels of androgen
- obesity
- hyperinsulemia
- infertility (Jackson, 2004-2005)

Menstrual Irregularities

Irregular menstruation is defined as having a cycle length greater than 35 days or less than 21 days with a variance of four days in between months. PCOS women often experience long periods of absent menstruations, oligomenorrhoea or even no menstruations at all, known as amenorrhoea (Harris & Carey, 2000).

High Levels of Androgen

The symptoms associated with the high levels of androgen, specifically testosterone, in the body are irregular or absent menses, hirsutism, acne, anovulatory and infertility (Royal College of Obstetricians and Gynaecologists, 2003). These high levels lead to an increased muscle mass, a deepening of the voice and a decrease in breast size (Jackson, 2004-2005).

Obesity

One out of every two women with PCOS is clinically obese (Jackson, 2004-2005); furthermore, more than fifty-percent of these women have abdominal obesity phenotype (Pasquali & Gambineri, 2004). The high level of masculine hormones triggers the body to increase its fat storage. There is even a strong correlation with insulin resistance to obesity (Porsman & Tseng, 2006). The more weight the women with PCOS gain, the more severe the symptoms manifest, which is due to the hyperinsulinemia (Harris & Carey, 2000).

Hyperinsulinemia

Insulin resistance triggers increased production of insulin, which leads to hyperinsulinemia, high levels of insulin in the body. Insulin resistance worsens as the excess fat in the abdominal region increases (Porsman & Tseng, 2006).

Infertility

A woman is considered to be infertile after one year of sexual intercourse without protection or if a woman cannot carry a child full-term, having one or more miscarriages (Porsman & Tseng, 2006).

The Long-Term Risks

The consequences of this syndrome extend beyond the realm of reproduction problems; these women have a high risk for cardiovascular diseases, hypertension, obesity, diabetes type II, insulin resistance, hyperinsulinemia, obstructive sleep apnea, endometrial cancer and ovarian cancer (Ehrmann, 2005; Salmi, Zisser & Jovanovic, 2004). Not only are there long-term physical implications but long-term emotional implications as well. PCOS women's quality of life is dampened by the constant battle with their weight, inability to become pregnant and by their increased hair growth (Griffin McCook, Reame & Thatcher, 2004).

Diagnosis

The syndrome does not manifest the same symptoms in every woman, and because of this, it is very difficult to set a standard diagnosis. The most basic diagnosis is with an ultrasound of the ovaries showing the presence of cysts; however, not all women with PCOS have cysts. Therefore, it is better to focus on biochemical criteria for confirmation of the syndrome. An assessment of fasting glucose and insulin, lipids and triglycerides plus hyperandrogenaemia levels gives a more precise diagnosis (Royal College of Obstetricians and Gynaecologists, 2003).

PCOS Treatment

Medical Management

Because there is no cure, the treatment of PCOS consists of improving the symptoms, menstruation dysfunction, androgen excess, infertility and obesity. The treatment depends on the woman's age, suffering and whether or not she wishes to become pregnant (Weström, Åberg, Andersson & Jönsson, 2005).

The predominant therapy for PCOS is oral contraceptives, which takes over the production of a woman's own hormones and increases the SHBG levels while decreasing the ovaries' testosterone production. This, in turn, helps reduce acne and hirsutism as well as helps regulate the menstrual period (Harris & Carey, 2000).

The two most common medicines that suppress the high levels of androgen are cyproterone acetate and spironolactone (Harris & Carey, 2000). For women trying to become pregnant, however, this treatment is not an option due to the adverse effect of irregular vaginal bleeding (Harris & Carey, 2000; Ehrmann, 2005).

The most commonly prescribed medicine that increases the body's sensitivity to insulin is metformin (Porsman & Tseng, 2006), which is the primary treatment for diabetes type II (Ehrmann, 2005). This treatment is evolving but has not sufficiently established itself as a basic treatment. Metformin is sometimes prescribed to help women with PCOS in weight loss; however, it has unsatisfactory results and needs more research to clearly define its roll (Lord, Flight & Norman, 2003).

Self-Management through Lifestyle Modification

The primary self-treatment that is recommended is weight reduction; just a five to ten percent reduction of total body weight has shown a successful result in restoring the menstrual cycle. Of the 50 percent of obese women, 70 percent struggle with difficulties in reducing their weight (Porsman & Tseng, 2006). According to a study done by Wright et al. (2004), obese PCOS women did not have a significant difference in overall eating habits and physical

activity compared to normal women of the same body size. Insulin resistance can play a key roll in dieting difficulties of women with PCOS. The body's resistance to its own ability to ingest insulin leads dieting women to have hunger attacks and even an extreme craving for sugary snacks (Porsman & Tseng, 2006). Exercise is an important part of lifestyle modification. A lean body with low body fat helps regulate the testosterone levels within the body, which increases SHBG, leading to an improvement of symptoms like acne, hirsutism and insulin resistance (Harris & Carey, 2000).

The Emotional Impact of PCOS

The emotional consequence of PCOS has been, for the most part, neglected by the medical research community. The main focus has been on the effectiveness of the different treatments available and the pathology of the syndrome (Griffin McCook, Reame & Thatcher, 2004). According to a study done by Barbara Snyder (2005), women with PCOS felt that before they were diagnosed, they had to search for their own answers, going from doctor to doctor trying to get a diagnosis, or once getting a diagnosis, trying to find information about the syndrome. The women in the study felt that once they were diagnosed, they did not receive adequate information from their doctors or that the information they had received was very confusing. Besides the need to search for answers, the other main concerns of the women in the study interviewed were "wanting to be normal," "gaining control," "letting go of guilt" and "dealing with it." Furthermore, women interviewed in a study conducted by Kitzinger and Willmott (2003), felt "freakish," "abnormal" and "not proper women" because of their lack of or irregular menstruation, infertility and excess hair growth. The women interviewed felt that the health professional had a general reluctance to take their symptoms as seriously as they would have liked.

Nurse's Responsibility

According to Sweden's Health and Medical Service Act (1982:763) a patient has the right to receive individually adapted information concerning his or hers personal health status and the available treatment methods as well as prevention methods for disease and/or injury. The authors of this review feel that Dorothea Orem's self-care nursing theory allows a nurse to

encourage the patients to overcome their limitations. This theory focuses on the patient's ability to take responsibility for their own health. There are three focuses: self-care, self-care deficit and the theory of nursing systems. The idea is that patients are capable of self-care; however, sometimes they lack the necessary information and it is a nurse's job to provide knowledge and support in order for the patients to be able to continue taking care of themselves (Kirkevold, 2000). According to this theory, nurses must be able to provide knowledge, support and motivation in order to give the best possible care to the women afflicted with PCOS. Through this support, knowledge and the proper motivation, these women are able to promote their own self-care, leading to a better quality of life.

Statement of Purpose

The purpose of this literature study is to illuminate the pharmacological and non-pharmacological treatments of PCOS.

Specific Questions

What are the different kinds of treatments available, and which gives the best results: pharmacological or non-pharmacological?
Which diet produces the best long-term or short-term results?

Method (literature study)

This literature study was carried out by obtaining nine quantitative journal articles. These articles, all of which are found in this written review, were searched, examined, organized, critiqued, analyzed and summarized (Polit & Beck, 2006).

Search Profile

The search for the articles was conducted in PubMed and Cinahl database with free-text terms such as: PCOS, treatment, life style changes, insulin resistance, insulin sensitizers, quality of life, exercise, metformin treatment and/or diet as well as MESH-terms, all of which can be found in the search topic matrix. The inclusion criteria were articles written in English that were published in medical journals in the last five years, possibly ten, depending on the article's content.

Search Topic Matrix

Database	Search Terms	limits	Hits	Chosen articles
PubMed	pcos AND lifestyle modification	Only items with links to full text, published in the last 5 years, Clinical trial, Meta-Analyses, Randomized controlled Trial	2	1
	pcos AND physical activities	Only items with links to full text, published in the last 5 years, Clinical trial, Meta-Analyses, Randomized controlled Trial	0	0
	pcos and exercise	Only items with links to full text, published in the last 5 years, Clinical trial, Meta-Analyses, Randomized controlled Trial	4	1
	pcos AND exercise	Only items with links to full text, published in the last 5 years	49	0
	pcos AND nutrition AND exercise	Only items with links to full text, published in the last 5 years	42	0
	pcos AND treatment AND lifestyle changes AND insulin resistance		11	1
	pcos AND lifestyle changes		17	0
	pcos and metformin treatment		313	0
PubMed	Pcos AND therapy AND lifestyle AND changes AND quality of life		0	0
	Pcos AND treatment AND life style AND changes AND insulin resistance AND quality of life		0	0

	Pcos AND treatment AND lifestyle changes AND insulin resistance AND quality of life		0	0
	Pcos AND treatment AND lifestyle changes AND insulin resistance		11	0
	Pcos AND treatment AND lifestyle changes		17	0
	pcos AND diet composition		19	2
	pcos AND dietary treatment		48	1
	pcos AND oral anticonception treatment		3	1
	pcos AND insulin sensitivity AND obese AND lifestyle modification		4	1
	Pcos AND therapy AND lifestyle AND changes		9	0
[MESH]	"Polycystic ovary syndrome/complications" [MESH] OR "Polycystic ovary syndrome/diagnosis" [MESH] OR "Polycystic ovary syndrome /therapy" [MESH] OR "Polycystic ovary syndrome/metabolism" [MESH] OR "Polycystic ovary syndrome/diet therapy" [MESH] OR "Polycystic ovary syndrome/genetics" [MESH] OR "Polycystic ovary syndrome/nursing" [MESH] OR "Polycystic ovary syndrome/therapy)"	Limits: only items with links to free full text, English, published in the last 5 years, Clinical trial, Meta- Analysis, Randomized Controlled Trial	72	1
CINAHL	Pcos		133	0
	Pcos AND nutrition		16	0
	Pcos AND quality of life		8	0
	Pcos AND experience		3	0
	Pcos AND understanding		11	0
	Pcos AND nursing		19	0
	pcos AND caring		2	0

Assessment and Analysis

After the search profile was fulfilled, the first criterion of importance was determining the relevance of the article through its title in order to compare its compliance with the aim of this review. The second criterion of importance was analyzing the articles' content by reading its abstract. The third criterion of importance was that the chosen articles were completely read plus examined according to the Willman and Stoltz (2003) assessment method. The assessment of the articles, which have passed the criteria, will give a perspective of the articles' credibility. The result is presented as an integrated analysis.

Results

Pharmacological Treatments

The effect of metformin and a hypo-caloric diet was used in a study by Pasquali et al. (2000) to evaluate the results in a group of PCOS women with abdominal obesity phenotype. The metformin treatment with lifestyle change lead to a greater reduction of abdominal fat, body weight, testosterone, hyperinsulinemia as well as a significant improvement of hirsutism and a more regularized menstrual cycle, which improved their fertility rate. Metformin showed a greater improvement of menstruation when compared with metformin plus lifestyle modification; however, the metformin plus lifestyle change did show a greater reduction of body weight (seven to ten percent) while significantly reducing androgen levels (Hoeger et al., 2004). On the other hand, when metformin was combined with lifestyle modifications, it did not significantly reduce body weight in PCOS women with a BMI over 30, according to a study written by Tang et al. (2006), nor did it have a significant difference in menstrual regulation.

In a study written by Vanky, Salvesen and Carlsen (2004), a treatment of metformin, lifestyle advice plus a low-dose dexamethasone further reduces testosterone by 27 percent as well as other androgen levels compared to a treatment of metformin, lifestyle advice plus placebo.

The number of menstrual cycles increased in both groups without showing a significant difference in either.

An oral contraceptive treatment improved hyperandrogenicity but failed to improve weight reduction and insulin sensitivity in a group of women with PCOS, according to a study researched by Wahrenberg et al. (1999).

Non-Pharmacological Treatments

A realistic weight loss goal of two to five percent combined with realistic exercise goals showed that it is possible to improve insulin sensitivity in PCOS women (Huber- Buchholz, Carey & Norman, 1999). The participants of this study were able to regulate their irregular or nonexistent menstruations through their lifestyle treatment program. In a study written by Tolino et al. (2004), participants with a BMI over 30 underwent a calorie reduced diet: four weeks with 500 calories, then six months with a 1,000 calorie low-fat diet, whereas participants with a BMI between 25 and 30 underwent a low-fat diet consisting of 1,000 calories during a seven-month period. Seventy-eight of the participants who completed the study lost more than 5 percent of their original body weight, thus improving menstruation, hirsutism and androgen levels as well as fasting insulin levels. There were 66 women with irregular or non-existent menstrual cycles that after the treatment showed menstrual cycle improvement, whereof 55.5 percent became pregnant after previous infertility, 33.3 percent regularized their menses and 11.2 percent restored their menses. According to a study done by Moran, Noakes, Clifton, Tomlinson and Norman (2003), while comparing two diets one of low protein and the other of high protein, they came to the conclusion that the dietary composition is of little importance. The importance lies in weight reduction through a reduced calorie diet that leads to improved androgen levels, insulin sensitivity and regular menses. In a study written by Starnents et al. (2003), similar results were found. They researched the effects of two short-term diets, one consisting of high protein and the other of high carbohydrates, which were given to the participants to create a 1,000 calorie deficit in order for the women to lose one kilogram per week. They also were able to show that dietary composition was insignificant and that weight loss was the key factor leading to improvements in their reproductive and metabolic irregularities.

Pasquali et al. (2000) were able to show improvements in PCOS symptoms through a hypo-caloric diet consisting of 1,200-1,400 calories daily, whereof 50 percent were carbohydrates, 30 percent total lipids and 20 percent protein, combined with metformin. The effects of metformin with or without lifestyle modification during a 48 week period were compared in a study by Hoeger et al. (2004). Metformin plus lifestyle modification had a 30 percent better result than the lifestyle modification itself; however, lifestyle modification had similar results with those participants taking metformin without any lifestyle changes. According to a study written by Tang et al. (2006), there was no significant result of weight loss between metformin combined with lifestyle changes compared to lifestyle changes alone in obese PCOS women. They found that weight loss was the most significant factor in regulating menstrual cycles. Wahrenberg et al. (1999) studied the effects of a very low calorie weight reduction program compared with oral contraceptives. They found that the weight reduction group decreased their total starting body weight while the oral contraceptive group remained the same weight.

Discussion

Discussion of the Method

The authors of this literature study consciously chose to examine the medical side of PCOS in order to provide information and knowledge to nurses, who, in turn, could give the proper care and support to the afflicted women. PCOS is an interesting topic that affects many silent sufferers. In the early stages of searching for articles for this project, the authors of this study realized that there were few, if any, articles that had examined both PCOS and nursing. The importance and potential of linking nursing and PCOS together was appreciated in this study. The main problem with the project has been time restraints, which is why a literature review was chosen instead of a quantitative or qualitative study. The majority of the articles chosen were from PubMed's database; however, a few were found in Cinahl database as well. The articles found in Cinahl were mostly used in the background and discussion areas of this review, but none were deemed suitable for the main articles analyzed. The search words that were used provided a rich source of articles, of which were narrowed down to the final nine

articles through reading and discussing the abstracts. The majority of articles about PCOS are quantitative studies with a minute number of qualitative studies; therefore, all of the main articles analyzed in this review are quantitative studies.

Lifestyle modification was often used throughout the articles. Many of the articles thoroughly defined the different treatments but neglected to fully describe exactly what the lifestyle change was. One lifestyle modification was different from the next; for example, one article described it as diet while another described it as diet and exercise.

Several studies were missing their own criticisms of the studies. Many of these studies consisted of very low caloric diets with unrealistic goals that neglected to see any faults with the diets or even the emotional support needed for these women during the studies. There were very few studies about the women's psychosocial issues, their quality of life or even the importance of care and nursing.

Discussion of the Results

This study illuminates the pharmacological and non-pharmacological treatments of PCOS. Metformin is one of the leading pharmacological treatments proved helpful in regulating PCOS women's menstrual cycles (Hoeger et al., 2004; Lord, Flight & Norman, 2003), even though it did not have a significant affect in obese PCOS women nor did it help with weight reduction (Tang et al., 2006). When metformin is combined with a lifestyle change of diet and exercise, it has a greater effect on many of the PCOS symptoms such as androgen levels, hyperinsulinemia, hirsutism, and infertility as well as increasing weight loss and decreasing abdominal fat (Pasquali et al., 2000). Even though metformin has positive results, many of the participants could not complete the studies because of the harsh side affects of the doses of metformin. The most common side affects of metformin are nausea, stomach cramping, vomiting, appetite suppression and diarrhoea (FASS, 2006). This can be counteracted by a slow introduction of metformin (Conway, 2000), of which was not applied in any of the studies.

Androgen levels are further reduced when a low-dose dexamethasone is added to the combined treatment of metformin and lifestyle change, improving the regulation of

menstruation. Dexamethasone usually promotes weight increase due to its diabetogenic characteristics; however, the low dose was given in order to avoid this side effect (Vanky, Salvesen & Carlsen, 2004). Another pharmacological treatment is oral contraceptives, which improves menstrual cycles (Wahrenberg et al., 1999) as well as acne through increasing oestrogen levels (Harris & Carey, 2000).

Weight reduction and lifestyle changes are the leading non-pharmacological treatments available. The weight reduction was obtained through many different strenuous diets consisting of a low calorie intake focusing on different strategies. The different diet strategies were of little importance; the main importance being the reduced total body weight (Huber-Buchholz, Carey & Norman, 1999; Moran, Noakes, Clifton, Tomlinson & Norman, 2003; Pasquali et al., 2000; Staments et al., 2003; Tolino et al., 2004). The drop-out rates were between 25 percent and 40 percent; however, not all of the drop-outs were seen negatively. There were many women that had to interrupt the treatment process due the increased fertility through ovulation, which led to pregnancy (Huber- Buchholz, Carey & Norman, 1999; Moran, Noakes, Clifton, Tomlinson & Norman, 2003; Pasquali et al., 2000; Staments et al., 2003; Tolino et al., 2004). Many of the participants found it hard to comply with the strict low calorie diets and chose to drop-out of the studies. One diet consisting of a 500 daily calorie intake for duration of four weeks then doubling it to 1,000 calories daily for six months, was given to women with a BMI over 30. Women who had a BMI between 25 and 30 received a 1,000 calorie daily diet for seven months. It is unrealistic to expect an overweight woman to eat 500 to 1,000 calories for any length of time, not only physically but mentally as well. It is very hard for someone with a BMI over 25 to suddenly reduce their energy intake to such a severe level for such a long period of time. It is not surprising that many participants drop out due to non-compliance. The psychological strength that is needed to restrain oneself from eating within these restrictions is often beyond the reach of these women. A study done by Wright, Zborowski, Talbott, McHugh-Pemu and Youk (2004) showed that there was not a significant difference in dietary intake and exercise between obese PCOS women and women of similar size and shape. They found that normal weight women with PCOS had a lower energy intake when compared with normal weight women without PCOS. The obese women with PCOS want to lose weight and look like a “normal woman,” which is to be thin, have a beautiful complexion and a lack of excess hair (Snyder, 2006). They are often constantly dieting and trying to lose their extra weight. These women found a sense of control over the syndrome and their lives through finding a health care provider who could explain their

unanswered questions while listening and giving support at the same time (ibid). Unfortunately, because of the diagnosis difficulties and the differences of symptom manifestations experienced, most women do not find a health care provider who can explain everything, often leaving them with a feeling of frustration, loneliness, misunderstanding and uncertainty for the future (Snyder, 2006; Kitzinger & Willmott, 2002).

The studies that were examined in this literature study had neglected to look at the psychological and emotional factors, only examining the diverse physiological factors in the short-term. These studies often provided lifestyle modification consisting of food intake and physical activities advice; however, none provided psychological or emotional support to the participants. The hypo-caloric diets that the women followed during the studies did lead to a loss of weight, but the weight loss is often not maintained in the long-term. It is not advised to follow a very low calorie diet for a long period of time; although it has fast results, it leads the body to think it is in a period of famine. Therefore, it is vital that the weight reduction should have realistic long-term goals, giving the body time for adapting. In a study done by Hoeger et al. (2004), they actually did have a realistic long-term plan consisting of a simple diet plus exercise, which had the possibility for a one kilogram per week weight loss.

The illumination of the pharmacological and non-pharmacological treatments of PCOS shows that there is no simple “one-treatment-fits-all” solution. The best available treatment to women with PCOS is to individually adapt the treatment so that it consists of pharmacological and/or non-pharmacological aspects. The treatment should be individually adapted to the woman’s symptom manifestations and problem areas, focusing on lifestyle modifications and giving pharmacological support as well as psychological support when needed. The most important part of the treatment is self-care through weight reduction. All of the studies have shown that weight reduction is the key factor in improving the symptoms of the syndrome. This can be achieved through calorie reduction, low-carbohydrate diets or even low- to high-protein diets. The method is not of importance, rather the results of the lifestyle change. The authors of this study feel that a lifestyle modification includes eating nutritious foods while avoiding those that quickly raise glucose levels within the body as well as an individually adapted exercise program. Non-pharmacological treatments should be combined with the pharmacological medications to combat the different symptoms that manifest. Pharmacological treatments can lead to a further reduction of the manifestations of the

symptoms such as androgen levels, hyperinsulinemia, hirsutism, acne and ovulation to name a few.

Knowledge is another very important aspect of the treatment, not only knowledge of the syndrome but knowledge of the woman's own vital roll in the treatment itself. The women gain control through this knowledge of the syndrome (Snyder, 2006). This knowledge can be provided by a well-informed nurse who is also able to listen and give the emotional support needed; therefore, a nurse has a key roll in the treatment process of PCOS. Dorothea Orem's self-care nursing theory encourages patients to take responsibility for their health while overcoming limitations. Nurses are to fill voids and deficits with knowledge, motivation and support in order for the patients to continue taking care of themselves. The authors of this study feel that it is vital for nurses to be able to provide knowledge and support to the women with PCOS in order for them to receive the best possible care. The practical implications of patients with PCOS responses to a study done by Snyder (2006) suggested that a nurse could have a positive impact on women with PCOS through the following areas: diagnosis, physical problem management, psychosocial problem management and education. Another aspect that cannot be forgotten is the economical benefit of screening teenagers for PCOS because of the long-term health risks these women have such as cardiovascular diseases, diabetes and cancer. By preventing some of the long-term health risks that are associated with PCOS, there would be benefits not only to these women's health but also financially for society.

Conclusion

Lifestyle modification is the most effective non-pharmacological treatment available to obese or overweight women with PCOS that can be combined with pharmacological treatments to strengthen the effectiveness. Dietary restriction and an increase in physical activities are the primary lifestyle modifications recommended for weight loss. Nurses have the ability to play a vital roll in these women's lives giving them support, knowledge and motivation in their struggle with PCOS. A nurse must be able to provide the information and support needed by these women in order for the women to lead a healthy and normal life. We suggest that further studies need to examine the vital roll nurses could have in treatment of PCOS women.

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Author/ title/ Journal/ Year/ Country	**Objective**	**Method /Participants/ Drop-out rate**	**Results**	**Judgment criteria**
Hoeger, K., Kochman, L., Wixom, N., Craig, K., Miller, R. & Guzick, D. / **"A randomized, 48-week, placebo-controlled trial of intensive lifestyle modification and/or metformin therapy in overweight women with polycystic ovary syndrome: a pilot study."**/ *Fertility and Sterility*/ 2004/ USA.	To examine the effect of metformin therapy plus lifestyle changes on ovulation as well as androgen concentrations in women suffering from polycystic ovary syndrome (PCOS).	A randomized controlled trial of four groups during a 48 week intervention: lifestyle modification plus metformin 850 mg twice daily, lifestyle modification plus placebo, placebo alone or metformin 850 mg twice daily./ 38 overweight/obese women with PCOS/ 15 drop-outs (39% drop-out rate).	It was possible to see a significant weight reduction in the 48th week in all groups except for the placebo, the highest reduction being the metformin and lifestyle modification group. Androgen reduction occurred in the combined group modification. There was no significance in the ovulation difference rate between the groups.	Grad 1-89% Quantitative
Huber-Buchholtz, M., Carey, D. & Norman, R. / **"Restoration of Reproductive Potential by Lifestyle Modification in Obese Polycystic Ovary Syndrome: Role of Insulin Sensitivity and Luteinizing Hormone."**/ The Journal of Clinical Endocrinology & Metabolism/ 1999/ Australia.	To study the correlation between insulin sensitivity, LH levels and ovulation cycles after lifestyle changes in infertile anovulatory overweight PCOS women.	After an initial evaluation they were divided either to a group or an individualized diet and exercise program during 6 months. /Two groups were used one consisting of 18 infertile overweight women with PCOS and the control group, of 10 overweight PCOS women without menstrual disorder. /3 dropped out from the infertile group and 4 from the control group	Nine women of the infertile group became regular in their ovulation, and two of the participant became pregnant. Showing that It is possible to improve and restore normal menstrual function and fertility in PCOS women by using a realistic weight and diet program.	Grad 1- 85% Quantitative
Moran, L.J., Noakes, M., Clifton, P.M., Tomlinson, L. & Norman, R.J./ **"Dietary composition in restoring reproductive and metabolic physiology in overweight women with polycystic ovary syndrome"**/ The Journal of Clinical Endocrinology & Metabolism/ 2003/ Australia.	To investigate the effect of two different diets influence on weight reduction, body shape, glucose- and insulin haemostat and lipid levels among overweight women with PCOS. The aim was also to investigate the diets effectiveness on the reproductive functions, specifically on ovulation, menstrual cycles, and hirsutism.	The participants followed a strict diet during 16 weeks. The participants where divided in two groups one low protein diet and the other high protein diet. / 45 overweight women with PCOS where recruited to the study./ 17 did not complete the study.	A weight reduction of about 7.7 kg (SD 0.7) was the final result. The lipids values improved and the insulin values decreased, SHBG increased while testosterone decreased. The diets composition didn't have any significance concerning the results. It was a weight reduction that was the matter of importance.	Grad 1-87% Quantitative

Author/ title/ Journal/ Year/ Country	Objective	Method /Participants/ Drop-out rate	Results	Judgment criteria
Pasquali, R., Gambineri, A., Biscotti, D., Viennati, V., Gagliardi, L., Colitta, D., Fiorini, S., Cognigni, G., Filicori, M. & Morselli-Labate, A. / **"Effect of Long-Term Treatment with Metformin Added to Hypocaloric Diet on Body Composition, Fat Distribution, and Androgen and Insulin levels in Abdominally Obese Women with and without Polycystic Ovary Syndrome."**/ The Journal of Clinical Endocrinology & Metabolism/ 2000/ Italy.	To study the effectiveness of a hypo-caloric diet combined with metformin on the body's weight and fat distribution along with specific hormones and glucose- insulin levels in abdominally obese women with and without PCOS.	A randomized, double- blind design was used where all the participants took specific blood tests and a computerized tomography (CT). The women were given a low-calorie diet for the six month period and after one month randomly placed into two groups of two: PCOS women and obese controls taking metformin twice daily (12 and 8 respectively) or taking a placebo daily (8 and 12 respectively) for six months. They were re-tested after a one month period as well as after the six month period. / 20 PCOS women and 20 controls./ The drop-out rate was 12.5%, 3 women in the control group were excluded due to non-compliance and 2 women in the PCOS women were excluded due to pregnancy.	13 PCOS women were hirsute (9 in the metformin group & 3 in the placebo group) which had a significant decrease after the metformin treatment but not with the placebo. None of the control women experienced hirsutism. Acanthosis nigricans existed in 9 PCOS women and 6 controls and showed no improvement in either group. PCOS women improved their menstrual cycles, however; the metformin group had a significantly higher improvement than the placebo group.	Grad 1-85% Quantitative
Stamets, K., Taylor, D.S., Kunselman, A., Derners, L.M., Pelkman, C.L. & Legro, R.S./ **"A randomized trial of the effects of two types of short-term hypocaloric diets on weight loss in women with polycystic ovary syndrome"**/ Fertility and sterility/ 2003/ USA.	To investigate the short-term effects of two different diets where weight reduction was the main measure for women with PCOS that wanted to become pregnant.	A randomized trial where the participants were divided in two different calorie restricted diets. One with high protein rate and the other with high carbohydrate rate. / 35 woman with PCOS where studied under a 4 week period. / 9 of the participants dropped out the first week.	The both groups resulted in significant weight reduction, but there where not any relevant difference between the two diets regarding the different variables such as circulating androgen level, circulating lipid profile, and glucose tolerance. High protein resulted in a weight loss of about 3.6% and the diet with a high ratio of carbohydrate resulted in a weight reduction of about 4.2%.	Grad 1-87% Quantitative

Author/ title/ Journal/ Year/ Country	Objective	Method /Participants/ Drop-out rate	Results	Judgment criteria
Tang, T., Glanville, J., Hayden, C., White, D., Barth, J. & Balen, A. / **"Combined lifestyle modification and metformin in obese patients with polycystic ovary syndrome. A randomized, placebo-controlled, double-blind multicentre study."**/ Human Reproduction/ 2006/ United Kingdom.	To study the effectiveness of metformin and lifestyle changes on anovulatory obese PCOS women.	A randomized, placebo-controlled, double- blind multicentre study consisting of two groups: a metformin group (850 mg) twice daily and a placebo group. The participants were given dietary advice and individualized diets from a dietician with the aim of reducing their total daily intake. The participants were also encouraged to increase daily exercise. / 143 women were randomly divided in two groups and followed up during 6 months/. 13 drop-outs from the metformin group and 8 from the placebo.	There was an improvement of menstruation but the difference between the two groups was not considered a significant difference. The study was unable to demonstrate that metformin had an inducing effect on weight reduction.	Grad 1-87% Quantitative
Tolino, A., Gambardella, V., Caccavale, C., D'Ettore, A., Giannotti, F., D'Antò, V. & De Falco, C.L. /"**Evaluation of ovarian functionality after a dietary treatment in obese women with polycystic ovary syndrome"**/ European Journal of Obstetrics & Gynecology and Reproductive Biology/ 2004/ Italy.	To investigate the long-term effect of a low calorie diet on both the clinical and biochemical disorders among women with PCOS.	The participant followed a strict diet, and after starting the diet they were evaluated every month. / 144 overweight women participated. 114 with hirsutism. /23 (15.9 %) of the participants in the study dropped-out. 36 (25%) women additionally dropped out because of pregnancy during the study.	A weight reduction of 5% and/or a proper BMI shows improvement in the reproductive function. It also demonstrates improvements in the insulin levels, insulin resistance and the biological indicators for androgenism. .	Grad 1-80% Quantitative
Vanky, E., Salvesen, K. & Caralsen, S./ **"Six-month treatment with low-dose dexamethasone further reduces androgen levels in PCOS women treated with diet and lifestyle advice, and metformin."**/ Human Reproduction/ 2004/ Norway.	To study the effectiveness of low-dose dexamethasone on PCOS women's androgen levels while being treated with diet, lifestyle advice and metformin.	They were randomly divided into two groups. The participant received individual counseling at inclusion concerning diet and lifestyle. The participant used metformin in the study, the difference between the groups was a placebo group and the other used dexamethasone 0.25 mg daily during 6 months./ 50 women with PCOS were recruited to the study./ 12 participants decided to drop- out from the study.	It was possible to see a difference between the group's androgen levels. There was a significant difference in testosterone, androstenedione and dehydrepianosterone sulphate and free testosterone in women treated with lifestyle changes, metformin and dexamethasone.	Grad I-89% Quantitative

Author/ title/ Journal/ Year/ Country	Objective	Method /Participants/ Drop-out rate	Results	Judgment criteria
Wahrenberg, H., Ek, I., Reynisdottir, S., Caralström, K., Bergqvist,A. & Arner, P./ **"Divergent Effects of Weight Reduction and Oral Anticonception Treatment on Aadrenergic Lipolysis Regulation in Obese Women with Polycystic Ovary Syndrome."**/ The Journal of Clinical Endocrinology & Metabolism/ 1999/ Sweden.	To investigate whether or not the abdominal subcutaneous adipose cell lipolysis in obese PCOS women can be influenced by weight reduction or by oral anti-conception therapy.	PCOS women were openly offered one of two programs: 10 chose a very low calorie diet (VLCD) weight reduction (WR) program group and 10 chose a 3 month low dose combined oral contraceptive (OC) pill treatment. The waist/ hip ratio, body mass index, blood pressure were measured after an overnight fast. Blood tests, serum insulin and an adipose tissue biopsy were taken. The weight reduction group was re-examined after 2-4 weeks to avoid acute catabolic effects of the VLCD and then all the women were re-tested after the 3 month period. / 20 obese PCOS women were assessed: 17 of these women filled the protocol of the study. / 0 drop-outs.	The weight reduction group had a loss of 8 ± 3 kg, dropped the basal lipolysis rate by half and improved insulin sensitivity. The oral contraceptive group's weight was unchanged but did have a decrease in free testosterone levels although it was not possible to see an affect on the lipolysis.	Grad I-91% Quantitative

Exempel på bedömningsmall för studier med kvantitativ metod (in Swedish):

Poängsättning 0 1 2 3

Abstrakt (syfte, metod, resultat=3p)	Saknas	1/3	2/3	Samtliga
Introduktion	Saknas	Knapphändig	Medel	Välskriven
Syfte	Ej angivet	Otydligt	Medel	Tydligt
Metod				
Metodval adekvat till frågan	Ej angiven	Ej relevant	Relevant	
Metodbeskrivning (repeterbarhet möjlig)	Ej angiven	Knapphändig	Medel	Utförlig
Urval (antal, beskrivning, representativitet)	Ej acceptabel	Låg	Medel	God
Bortfall	Ej angivet	> 20 %	5-20 %	< 5 %
Bortfall med betydelse för resultatet	Analys saknas / Ja	Nej		
Etiska aspekter	Ej angivna	Angivna		
Resultat				
Frågeställning besvarad	Nej	Ja		
Resultatbeskrivning (redovisning, tabeller etc)	Saknas	Otydlig	Medel	Tydlig
Statistisk analys (beräkningar, metoder, signifikans)	Saknas	Mindre bra	Bra	
Confounders	Ej kontrollerat	Kontrollerat		
Tolkning av resultatet	Ej acceptabel	Låg	Medel	God
Diskussion				
Problemanknytning	Saknas	Otydlig	Medel	Tydlig
Diskussion av egenkritik och felkällor	Saknas	Låg	God	
Anknytning till tidigare forskning	Saknas	Låg	Medel	God
Slutsatser				
Överensstämmelse med resultat (resultatets huvudpunkter belyses)	Slutsats saknas	Låg	Medel	God
Ogrundade slutsatser	Finns	Saknas		

Total poäng (max 47 p)

Grad 1: 80 %
Grad 2: 70 %
Grad 3: 60 %