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The Model for Integrating Medicine and Psychology as a Valid Theoretical Framework for Polycystic Ovary Syndrome

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ABSTRACT--*Polycystic Ovary Syndrome is a hormonal condition common in women of reproductive age. The types of symptoms, severity, chronicity vary in every woman. The study aimed at evaluating the applicability of the model for integrating medicine and psychology for PCOS.Due to lack of researches in PCOS in relation to psychological aspects in Indian context, this review will draw attention to issue in diagnosis and treatment of comorbid problems associated with PCOS. Researches published in various databases like PubMed, google scholar, web of sciences were reviewed according to the factors associated to the model. The adverse physical and psychosocial effects may lead to unhealthy behaviour and impact health related quality of life. Medical professionals have an opportunity to educate women about the disease process of PCOS and to implement strategies to treat these patients physical and psychosocial problems to improve their wellbeing for a lifetime.*

Keywords-- *Polycystic Ovary Syndrome, PCOS, Psychological factors, Quality* of life.

I. INTRODUCTION

Polycystic ovarian syndrome is a hormonal condition, common in endocrine disorder. PCOS is diagnosed largely in women of childbearing age. It is present in 12-21% of reproductive women and most of the women remain undiagnosed (Boyle, 2008). In India the prevalence of PCOS ranges from 2.2% to 26% (Choudhary, N., Padmalatha, V., et al., 2011). Women diagnosed with PCOS may present wide number of symptoms and different causes. The Rotterdam criteria is widely acceptable diagnostic criteria for PCOS across Europe, Australia and Asia. This criterion encompasses the definition by National Institute of Health which has described women with PCOS (Boyle & Teede, 2008). Two of the following three criteria are required:

- Anovulation
- Hyperandrogenism
- Polycystic Ovaries on ultrasound (Rotterdam, 2003)

There are number of symptoms a woman experience with PCOS, and these symptoms vary with age. Women are at a higher risk if they have genetic predisposition, and the onset of symptoms can be triggered by environmental factors. Irregular or scanty menstrual cycle, hirsutism, acne and pimples, infertility, metabolic symptoms like thyroid, diabetes, obesity are some of the common physical symptoms present in women diagnosed with PCOS. Psychological symptoms include stress, anxiety, depression, emotional disturbances, sexual dysfunction and eating disorders.

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When diagnosing and assessing a woman with PCOS, a medical professional should consider and address not only physical symptoms present but also psychological distress associated with it. Only little attention has been received in the literature on how psychosocial factors not only could trigger women to develop PCOS, but also how the interaction of unknown factors, i.e. hormones with known factors i.e. psychological and physical symptoms could change the psychophysiological mechanism and lead to severity of PCOS. The complex interaction between biological and psychosocial abnormalities have limited the development of integrative approach to management of this condition. The severity of the condition may lead to changes in degree brain functioning (Kaye et.al., 2013). PCOS has adverse psychological issues which could also vary due to cultural differences in the way women respond to emotional and physical problems (Sundararaman, P.G., & Shweta, 2008). Advancement for assessment and diagnosis of this condition is necessary in order to understand mechanism of PCOS in general and make patient specific alterations in the treatment or management programmes.

Aline to this view, the objective of the present paper is to evaluate the applicability of The Model of Integrating medicine and psychology in Polycystic Ovary Syndrome.

II. ANALYSIS OF MODEL

Various models have been developed in the field of health psychology to conceptualise the way in which behavioural medicine and psychology interact with each other. The model for integrating medicine and psychology (MI-MAP) was developed after 10 years of rigorous training of medical professionals about behavioural health and psychosocial factors. It also trained psychologist about pathophysiology and physical signs and symptoms. To an extent, health psychologist plays a vital role in medical setting which makes it necessary for them to understand physical health concerns of patient presentation. MI-MAP helps to make psychosocial presentation of patient easier and its purpose is to bring attention of physicians, nurses, psychologist, specialists, social workers.

Considering the above information and taking into account the development and maintenance of MI-MAP model, this paper demonstrates PCOS can be a culmination of these factors. This model focuses on factors related to physical health, regimen factors, individual factors and comorbid psychopathology factors respectively in sequential manner (Boyer, 2008).

III. DISEASE FACTORS

The hormonal condition, PCOS may begin with clear symptoms or without any noticeable sign or symptom. Helm, M.G., Teede, H., Dunaif, A. & Dokras, A. (2017) conducted a research on delayed diagnosis and lack of information associated with dissatisfaction in women with polycystic ovary syndrome. The results suggested that majority of women reported delayed diagnosis and lack of information about this condition. Diagnosis of Polycystic ovary syndrome is difficult as there isn't any specific test that can be performed by medical professionals and also, different clinicians use different diagnostic criteria. Experience of PCOS in every woman is unique because no women have exact same symptoms.

Some women come up with symptoms like hair growth, delayed menstrual cycle, and hair loss whereas on the other hand some women show cysts in ovaries and weight gain. Sometimes symptoms of PCOS are imitated with

pubertal changes seen in adolescence as girls may also experience weight gain, irregular periods, acne as part of maturation which leads to unnoticeable diagnosis (Witchel, S., Oberfield, S., Rosenfield, R., et.al., 2015).

Disease factor also suggests diagnosis on time prompts PCOS women to take medical services and relieves distress. There was a positive association between women's wellbeing and relief in symptoms when diagnosed at initial stage (Helm, M.G., Teede, H., Dunaif, A. & Dokras, A., 2017). With an asymptomatic onset of PCOS, women can experience severity of the problems which leads to severe psychological distress and health anxiety.

Another important consideration in PCOS is whether it involves trauma. According to the model there are two ways which makes a disease is traumatic. The disorder may involve symptoms or diagnostic information which an individual perceives as threatening or experiencing and discussing about side effects leads to stressful situation. Research shows that it is becoming increasingly apparent that due to the complexity of the condition, women with PCOS will be more prone to metabolic and other complications in near future. The research also highlighted that PCOS women are more prone to develop cardiovascular issues, hypertension, type 2 diabetes and risk of breast and ovary cancer in later life (Daniilidis, A., & Dinas, K., 2009).

Another consideration in disease factor is disease progression i.e. the course of the disease. PCOS is a chronic condition which pose a lot of stress and demand to cope up with those stressors over a long period of time. For instance, infertility is one of major stressor reproductive women experience. Hair loss, sexual dysfunction and hirsutism affects the well- being of women as well as her relationship. The severity of the condition is different for every woman but as discussed above each woman experience different type of stressors whether the severity is low or high. However, the chronicity of PCOS in each woman depends upon the pathophysiology, management of lifestyle and diverse aspects of treatment, availability of treatment, response to a treatment and most importantly presence of physical and mental comorbid problems. Environmental stressors and coping strategies also affect the severity of the condition. PCOS shows long term challenges and demands to cope up with, which leads to an uncertainty of whether a woman has high probability of cure or ineffective treatment which has no positive outcome. Women who take birth control pills as a treatment for PCOS face side effects like spotting and scanty periods, gain sudden weight, or develop symptoms like breast tenderness, nausea, constipation and bloating (Barbieri, R.L., et al., 2019)

In order to understand triggers, stressors and coping behaviour related to each woman diagnosed with PCOS, it is important to consider various ways in which this condition and its symptoms express themselves over a period time by focusing not only on physical and equally on psychological aspects also. The prolonged stress of persistent symptoms leads a woman towards a consistent requirement of self-treatment. And this continuous need to cope with this condition results in burnout and frustration which unknowingly again affects the hormonal imbalance of a women (Boyer, 2008). Studies have suggested dysregulation of cortisol in PCOS, mainly through the increased activity of the hypothalamic-pituitary-adrenal axis (HPA) and increased cortisol-secretion. Increased secretion of adrenocorticotropic hormone (ACTH) may also potentially lead to increased development of adrenal androgen in PCOS (Klopfentein, B., 2019). Symptoms like facial hair growth, acne, obesity and skin discoloration or pigmentation leads to reduction in health-related quality of life, poor self-esteem and distress related to physical appearance (Bazarganipour, F., Ziaei, S., et.al., 2013). The type of symptoms a woman experiences also an impact on her functional independence. Those who have visible symptoms, experience higher level of depressive

symptoms, anxiety, emotional disturbances and poor quality of life as they feel inferior and stigmatized in a social context (Zickmund et.al., 2003).

IV. REGIMEN FACTORS

The way disease factors can differ but provide some predictability, the spectrum of treatments available for specific diseases at the point of diagnosis is generally known. Providers predict the type of stressors and complications that may occur by understanding the specific treatment regimen that will be used to treat patient condition. Many of the regimen factors include the degree to which the treatment can be tolerated by the patient and their families, and the degree to which the can and will actively participate in treatment process (Boyer, 2008). There are troublesome symptoms that vary in every patient which require adequate treatment. Diet, exercise, bariatric surgery, Ovulation induction, insulin management, In vitro fertilization techniques, oral contraceptive pills, combination therapies and alternative techniques are emerging as most commonly practiced medicine and treatment for PCOS (Badawy, A. & Elnashar, A., 2011).

2.1 Complexity

PCOS treatment focuses on both, short term and long term metabolic, psychological and reproductive factors. Management and monitoring of long-term factors lead complications in clinical routine care (Teede, H., Deeks, A., & Moran, L., 2010). There are large or a smaller number of behaviours related to treatment and also the time and scheduling of specific treatment related behaviour maybe more or less complex. For instance, taking medicine four different times a day, instead of one or two times a day (Boyer, 2008). PCOS is considered not only to be characterized by the combination of hyperandrogenism and chronic anovulation, but also includes carbohydrate metabolism disorder, with an emphasis on insulin resistance and increased risk of developing diabetes. Weight gain and eventually the emergence of obesity leads to other endocrine and reproductive disorders (Junior, J.M., Baracat, M.C., et al., 2015). The treatment process employed for PCOS does not address the cause of the condition, rather focuses on the effects or complications associated with it like hyperandrogenism, infertility, menstrual dysfunction, prevention of cancer, diabetes (Junior, J.M., Baracat, M.C., et al., 2015).

2.2 Intrusiveness

Intrusiveness is another most important consideration of the disease or treatment for management of the disease which highlights how much the symptoms of disease interfere with day to day functioning of an individual (Boyer, 2008). Devins (2001) identified three factors which interfere with daily life pursuits of patients- relationship and personal development, intimacy and instrumental life domains. In determining how an individual or family will react to an illness, it is important to reflect upon the health condition and self-management process involved with it as well as lifestyle change and activities that maybe interrupted for that particular family or individual (Boyer, 2008).

Evidences have well established that women diagnosed with PCOS have higher level of psychological distress. Obesity, hirsutism, infertility, acne have strong influence on psychosocial functioning of a women. Reduced overall psychological morbidity and reduced health and sex quality of life has been detected (Brady, C., Mousa,

S.S., & Mousa, S.A., 2009). Barnard, L., Balen, A.H., et al. (2007) analysed cognitive functioning in PCOS. Results highlighted impaired performance which impact daily functioning like speed and accuracy, reaction time and word recognition task. PCOS decreases quality of life and martial sexual functioning and hirsutism effects the well-being and martial relationship of women (Drosdzol, A., Skrzypulec, V., et al., 2007).

Symptoms like sleeping problems, diabetes, pigmentation, acne were all reported to reduce health related quality of life in women with PCOS. Women also reported lower self-esteem, decreased social activity and decreased interest in sexual activity (Coffey, S., & Mason, H., 2003).

2.3 Side effects

Side effects of any treatment regimen can become a primary deterrent to the continued participation of patients in treatment care. The nature of side effects of medications and self-treatment can be unpleasant or detrimental to quality of life (Boyer, 2008). Hormonal contraceptives are prescribed to PCOS women for menstrual regulation, body hair growth, body weight. Consuming these medications for a long period of time can lead to adverse side effects like irregular bleeding, breast tenderness, weight loss, bloating, disturbed cholesterol level and insulin resistance (goodman, N.F., Cobin, N.H., et al., 2015).

Metformin is widely to use to treat diabetes and other symptoms in PCOS. Metformin has significant gastrointestinal side effects like nausea, constipation, reduced appetite and metallic like taste. Other medicines like thiazolidinediones, acarbose, naltrexone, orlistat, statins also show contrary side effects hyperparathyroidism, renal failure, headache, abdominal pain, muscle-skeletal pain, cardiovascular symptoms, cholesterol disturbance and fatty liver (Duleba, A.J., 2012). Traditional treatment choices comprise of cyclic progestins, contraceptive pills, anti-androgenic medicines and ovulation induction. These methods show significant number of long-term consequences like infertility, weight gain, migraine, sexual dysfunction (Lanham, M.S., Lebovic, D.I., et al., 2006).

V. INDIVIDUAL FACTORS

As individual and regimen factors discuss about the demands of an individual and family to treat and manage the disease process, the third factor, i.e. individual factor states how an individual and family interact with these demands i.e. how they cope with the challenges and changes in daily life, deal with expectation and functional independence. Issues like cognitive skills, knowledge about disease, health beliefs, coping styles and social support play an important role to see the level of interaction between individual and other mechanisms (Boyer, 2008).

Understanding the progression of a disease, treatment schemas or self-management activities require basic cognitive abilities of an individual. Also, some treatment regimens are difficult to understand like scheduling of treatment process which pose more problem for someone with lower or poor cognitive skills (Boyer, 2008). Metformin and cyclic progestins affects cognitive skills of women diagnosed with PCOS like forgetting, retention problems, mental awareness (Lanham, M.S., Lebovic, M., et al., 2006). Many patients feel that they do not have enough knowledge of PCOS, i.e. understanding and its complexity. Perception of insufficient knowledge have negative impact of quality of life, feeling, emotional disturbances and cognitive impairment (Bernard, L., Ferriday, D., et al., 2007). Avery, J.C., Braunack, A.J., et al. (2007) conducted a research which highlighted that many of the women used internet as a primary source of knowledge to learn more about the complexity of the condition and were actively participating in social support groups and health management problems to cope better with the

condition. An online survey assessed level of concern, dietary habits, knowledge, health care satisfaction and healthy living in PCOS women and controlled group. Findings suggested women diagnosed with PCOS had more motivation and knowledge to implement better dietary habits and preventive health strategies in daily life (Colwell, K., Lujan, M.E., Lawson, K.L., 2010).

Culture has become a more important factor in the delivery of the health services (Whitfield, W., Clark, & Anderson, 2003). The parameters like factors which affect the access to health services, risk for health problems and utilisation of the services are largely considered in the domain of health psychology and treatment program (Boyer, 2008). PCOS exists with varying prevalence in all ethnic groups based on weight, diet, lifestyle, and cultural background. Nevertheless, the importance of its dimensions varies depending upon the political, ethnic, cultural and social factors in the societies (Moghadam, Z.B., Fereidooni, B., et al, 2018). Cross-cultural studies indicate the impact of PCOS on an individual's health related quality of life unique to that individual's perception, values and culture (Upadhya, K., 2007).

Cultural variables may impact a women's response and behaviour towards different symptoms of PCOS. Schmid, J., et al (2004) highlighted that in comparison to Austrian women, Brazilian women were significantly more concerned about infertility, facial hair growth and irregular menstrual cycle. Research also suggested in culture with higher expectations from women to have an ideal body and to be fertile impact with QOL negatively. Another important variable of individual factor is health beliefs. Individuals create their ideas and beliefs about the disease causes, signs and symptoms of the diseases, treatment and recovery of the disease, and also construct their own hypothesis about the disease factor (Leventhal & Nerenz, 1982). Various factors like severity of the condition, susceptibility about the complications of the disease, cost and benefits of the treatment, and knowledge about environmental and social cues may affect the treatment participation (Beker, 1991). Lin & Dollahite (2018) identified that women with PCOS were associated with susceptibility for the disease and also had poor control over health outcomes. It reported that women diagnosed with PCOS have higher perceived severity of diabetes, endocrine disorders and cardiovascular diseases as compared to normal women.

Coping with PCOS is a difficult task, women often feel isolated because of the signs and symptoms they experience. Women with increased psychological distress engage in maladaptive coping strategies like escape-avoidance and less of problem-solving techniques (Carron, R., Kooienga, S., et al., 2017). Researches on copy styles of women with PCOS in turkey highlighted that maladaptive coping strategies were associated with decreased health related quality of life, withdrawal, helplessness and self-pity (Benson, S., Hahn, S., et al., 2010). Ability to cope with any illness is one of the most important dimensions to examine quality of life. Fateme, B., Nazafarin, H., et al. (2014) examined various positive and negative coping strategies of PCOS women which included religious beliefs, thoughts, separation, isolation, support seeking from friends and family and treatment seeking and information validation. A significant positive relationship between social support and health-related quality of life shows its significance in response to PCOS related problems (Emback, M.P., Lindberg, M., et al., 2014).

VI. COMORBID PSYCHOPATHOLOGY

The involvement of psychological disorders raises challenges which can have a profound impact on health issues, self-management of chronic or severe medical condition, reaction to medical treatment and its results

(Boyer, 2008). While medical professionals are increasingly identifying symptoms and treatment for PCOS, little attention has been paid to psychological causes and symptoms of this recurrent endocrine disorder (Melissa, H., 2006). PCOS is associated with number of psychological problems and disorders like depression, eating disorders, anxiety, sexual dysfunction and stress related issues (Melissa, H., 2006). Anxiety is associated with infertility and alopecia while depression is associated with acne. Women with hirsutism have lower level of psychological quality of life. PCOS women with psychiatric morbidities have significantly lower quality of life as compared to healthy women (Chaudhari, A.P., Mazumdar, K., & Mehta, P.D., 2018).

Kaur, S.P., Sharma, S., et al. (2019) conducted a research on prevalence of anxiety, depression and eating disorders in women with polycystic ovarian syndrome in North Indian population in Haryana. It highlighted that PCOS women are at higher risk of developing risk of moderate to severe anxiety and depression. Also, PCOS women have more chances of developing bulimia nervosa as compared to controlled group. Psychiatric illness and issues are common in women suffering from PCOS (Ozenli, Y., et al., 2008). Depression and anxiety disorder are the most common psychological condition. Azizi, M., & Elyasi, F. (2017) studied psychosomatic aspects of polycystic ovary syndrome. Two general categories emerged: psychosocial issues linked to PCOS like body dissatisfaction, sexual and emotional functioning, body image disturbances, fertility, health related quality of life and coping responses; another category was psychological disorders like mood disorders, anxiety disorders and eating disorders.

PCOS show prominent androgenic features, hormonal imbalance and depressive symptoms. Depression and stress are major factors associated with impaired endocrine features. Also, study shows obesity in PCOS as a high-risk factor for development of depression and disturbed emotional state (Sadeeqa, S., Mustafa, T., et al., 2018). Bernadett, M., & Szeman, N.A. (2016) reviewed the prevalence of eating disorders among women with PCOS. The results indicated significant increase in eating disorder specially bulimia nervosa in PCOS women as compared to healthy women. The findings also suggested disordered eating has significant negative influence on PCOS treatment.

Balachandra, D., Sivashankar, P., et al. (2018) assessed the prevalence of depression among woman suffering from polycystic ovarian syndrome. The present research indicates substantially high prevalence and risk of depression in women with PCOS. Variables that have been significantly associated with depression include marriage, self-perception, divorse and family history.

Eftekhar, T., et al. (2014) evaluated sexual factors like orgasms, desire, arousal, lubrication, satisfaction and pain in women with PCOS. The results showed significant sexual dysfunction as a comorbidity. Jones, W.B., Zolese, J., & White, P. (1997) highlighted that monoamine imbalances is the major factor contributing as a cause of PCOS, accompanying psychiatric illness or issues.

Somatization is characterised as expressing things that cannot emotionally conveyed by projecting to body. Somatisation has been found higher in women with PCOS as compared to healthy groups. Additionally, PCOS women were more sensitive to stress and interpersonal relationship which are known to be associated with increased sensitivity (Ozturk, M.O., et al., 2008). Reproductive health has a strong influence on mood of an individual. Although increased level of estrogen has antidepressant effect on women, increased level of androgen can result in anti-social behaviour, aggression and impulsive behaviour (Kartalc, S., 2010). In line with these

findings, the results also indicated that patients with PCOS had higher ideations of paranoia compared to the controlled group.

VII. FUTURE IMPLICATIONS AND SUGGESTIONS

MI-MAP's applicability for understanding PCOS can help to facilitate a comprehensive and accurate diagnosis and treatment plan process (Boyer, 2008). However, no model exist which supplements the psychosocial factors that describe the development of PCOS pathophysiology, that can be assessed empirically. Such multidimensional research in PCOS population based on psychological, social and emotional factors can significantly help in advancement of our abilities to connect with specific brain functioning. Furthermore, this can also help us to identify the how hormones interact with cognitive emotional processes that drive a particular behaviour in PCOS. Since, there is very limited amount of research in this area, medical health care professionals need to pay special attention to psychosocial aspects of PCOS. In addition to physical symptoms like obesity, hair growth, acne and skin pigmentation, the aspect of delayed menstruation and infertility has also emerged as a challenge. This research paper will help clinicians to be aware of high risk of women with PCOS for major depression, severe anxiety disorder and binge eating disorder and sign and symptoms and cause of PCOS leads to reduced health-related quality of life (Himelein, et al., 2006). In India, the lack of knowledge and pressure to fulfill the socially anticipated role of women, women suffering from PCOS only seek to become pregnant (in case of married women) and to normalise their monthly periods (in case of unmarried women). However, the information about PCOS needs to be disseminated and women encouraged to adopt expertise, attitudes and practice strategies to handle this disorder (Sharma, S., & Mishra, A.J., 2017).

PCOS is occurring more often in young Indian women than before and has been overlooked. PCOS and comorbid problems contributes to the global health care burden (Chaudhary, A., Jain, S., & Chaudhari, P., 2017). Asian Indian have higher proportion of body fat, abdominal adiposity. As obesity is a major health problem in adolescent and growing children, more adolescent girls are at higher risk of developing PCOS in seventeen (Ramanand, S.J., et al., 2013).

A review of psychology distress research in PCOS patients, primarily performed in western culture, shows weight issues have negative effect globally. Women from non-western background rate infertility as most stressful. It is therefore important to consider the psychosocial dimensions of PCOS management and use suitable therapies (Sundararaman, P.G., & Shweta, 2008).

While there are no systematic studies from India, there is a substantial increase in findings by endocrinologists, gynaecologist, dermatologists etc. India's health budget is unlikely to meet expense of lifestyle intervention that involves nutritional, behavioural therapy and alternative practices like exercise which is one of the major reasons of lack of awareness of PCOS as a multidimensional disease (Ganie, M.A., & Kalra, S., 2011).

Thus, the multi-dimensional approach towards diagnosis and treatment of PCOS physiological and psychological factors involves great understanding of the disease regarding possible lifestyle management and treatment approaches.

VIII. DISCLOSURE OF INTEREST

No potential conflict of interest was reported by the author(s).

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