

Research Progress in the Treatment of Obese Polycystic Ovary Syndrome with Traditional Chinese Medicine

Yu Wang¹, Hongxia Su^{2,*}

¹Shaanxi University of Chinese Medicine, Xianyang 712046, Shaanxi, China

²Affiliated Hospital of Shaanxi University of Chinese Medicine, Xianyang 712000, Shaanxi, China

*Correspondence Author

Abstract: Polycystic ovary syndrome (PCOS) is a common endocrine disorder in gynecology, with a high clinical incidence, which seriously affects the quality of life of adolescent and reproductive age women. This article expounds the progress of traditional Chinese medicine treatment of obese polycystic ovary syndrome, considers phlegm dampness as its primary pathogenic factor, and takes tonifying kidney, invigorating spleen and soothing liver as the basic treatment principles, in order to provide reliable and effective reference for traditional Chinese medicine treatment of PCOS.

Keywords: Polycystic ovary syndrome, Obese type, Traditional Chinese medicine.

1. Understanding and Treatment of Obese PCOS in Western Medicine

Polycystic ovary syndrome (PCOS) is a common gynecological reproductive endocrine disease, mainly characterized by hyperandrogen, rare ovulation or no ovulation, polycystic ovary change and insulin resistance. The main clinical manifestations were menstrual disorders, infertility, excessive hair, acne, obesity and acanthosis nigricans. Research statistics show that the incidence of obese PCOS is on the rise year by year, about 5%-10% [1], and about 40%-60% of PCOS women are overweight or obese [2]. The characteristic lesions and ovulation disorders of obese PCOS patients are relatively serious.

Western medicine usually uses ovulation promotion, menstrual cycle recovery, androgen reduction, insulin resistance improvement and surgery to treat PCOS, but it has many adverse reactions and unsatisfactory efficacy [3]. In recent years, Chinese medicine has achieved a good effect on the treatment of obese PCOS, so this article reviews it, hoping to provide reference for further research and treatment of this disease.

2. TCM's Understanding of the Etiology and Pathogenesis of Obese PCOS

Although there is no name of PCOS in traditional Chinese medicine, according to its various symptoms, it can be treated with the same treatment for different diseases such as menstrual disorders, amenorrhea and infertility. Most domestic scholars believe that PCOS is due to the dysfunction of the zang-fu organs, which leads to the disorder of human metabolism, so there are pathological products such as phlegm turbidity and blood stasis, which mainly involve the three viscera of kidney, spleen and liver. According to clinical manifestations and systemic symptoms, it can be divided into kidney deficiency phlegm dampness, spleen deficiency phlegm dampness and liver stagnation of qi.

3. Chinese Medicine Treatment

3.1 Kidney Deficiency Phlegm Dampness

Kidney is the base of Yin and Yang of Zang-fu organs, the main essence, the cell palace, is an important basis for female reproduction. Kidney Yin deficiency, insufficient blood, Chong Ren blood sea can not overflow, then the amount of menstruation is small or amenorrhea, Tianyi deficiency, tunnel impassability, infertility. Kidney Yang deficiency, life gate fire failure, kidney loss of warm, can also be palace cold infertility, which shows that kidney essence is insufficient, then reproduction passive, so it is manifested as less amenorrhea or infertility. Kidney Yang deficiency spleen Yang loss in warm and nourishing, transport disorder, phlegm and dampness gathering obesity, Yin deficiency fire, so acne, hairy. Therefore, the treatment from tonifying the kidney, from the source to ensure sufficient blood, is the treatment of obesity combined with polycystic ovary syndrome fundamental.

Xia Qinhua believes that "kidney deficiency as the basis, phlegm as the standard" is the key pathogenesis of obese PCOS. In terms of medication, Fructus liguensis, dry lotus grass, and ripe rehmannia tonifying kidney Yin; The combination of epimedium, Cornus officinalis, Morinda officinalis and atracylodes atracylodes, white rhizoma, pinellia pinellia, and saponification can not only replenish kidney Yang, but also reduce phlegm, improve the local blood supply of ovaries, make the envelope soft and thin, and then facilitate the discharge of follicles [4]. Zhao Chunxia [5] observed that the clinical effective rate of tonifying kidney and eliminating phlegm combined with metformin in the treatment of obese polycystic ovary syndrome reached 91.43%, which was higher than the effective rate of 20% in the Western medicine group alone, and the adverse reactions in the study group were less and the incidence was lower, and the safety was high. Through the study, Tian Xuemei [6] et al. found that Bushen-qutan formula could not only improve insulin resistance and glucose and lipid metabolism disorders in obese PCOS model rats, but also promote ovarian

granulosa cell proliferation and have a good effect on endometrial tolerance.

3.2 Spleen Deficiency Phlegm Dampness

"Fu Qing main female Family · Seed" there is a cloud: "the woman has body obesity, sputum and saliva are very much, can not conceive, people think that the reason is Qi deficiency, who knows it is wet." The spleen is the basis of the acquired day, the main transport. Spleen deficiency is the transport of loss, water and grain fine transport disorder, water wet stop, block Qi machinery, Qi and blood biochemical lack of source, the month can not be at the moment, wet into phlegm, phlegm block chong Ren, fat membrane congestion, so difficult to conceive. Therefore, it is very important for obesity patients with polycystic ovary syndrome to strengthen spleen and remove phlegm.

Li Chenggang [7] et al. adopted Buzhong Yiqi Decoction for the treatment of obese PCOS, and the total effective rate reached 87.5%. This prescription was used to tonalize spleen and eliminate phlegm and dampness, treating both symptoms and root causes. Clinical observation found that BMI and androgen levels of obese PCOS patients were significantly reduced, and insulin resistance was alleviated. Treatment with Ms. Cheung [8] spleen expectorating party fueling PCOS, party in rhizoma atractylodis, poria cocos, atractylodes, pinellia, coix seed, such as drugs, can dry wet phlegm, and to the healthy spleen and stomach, both, At the same time, modern pharmacological studies have shown that Jianpi expectorant drugs can act on spleen to regulate immune function, act on gastrointestinal tract to improve gastrointestinal digestive function, adjust bacterial structure, and improve human glucose metabolism. Jiang Xinfang [9] et al. observed that Jiawei Cangfu Daotan Decoction combined with Yousiyue could correct the insulin resistance of patients with spleen deficiency and phlegm dampness PCOS, inhibit inflammatory response, improve abnormal secretion of sex hormones and promote ovarian ovulation, and the overall treatment effect was better than simply using Yousiyue, which was more conducive to improving the quality of life of patients. Atractylodes atractylodes [10], atractylodes atractylodes and atractylodes atractylodes extracts can reduce the level of serum inflammatory factors, play an anti-inflammatory role, reduce the inflammatory expression of adipocytes through anti-inflammatory, and alleviate metabolic abnormalities and insulin resistance in obese patients with PCOS. Shenqi Tiaoti [11] prescription can significantly improve the insulin resistance and inflammatory microenvironment of patients with spleen deficiency and phlegm dampness type of PCOS, and then control the disease of PCOS, promote the metabolism of sugar and lipid, and improve the clinical effect.

3.3 Liver-qi Stagnation

"Wan's female Branch" cloud: "sorrow thinking, anger resentment, qi stagnation and blood stagnation and not through." Women are born with the liver, and the treatment of gynecological diseases is mostly based on the liver. The liver is the master of catharsis, and the liver depression is less than the catharsis of the liver, the stagnation of qi machinery, the movement of qi and blood and the distribution of body fluid

are abnormal. Blood flow is not smooth, chong Ren disorder, so menstruation is very irregular amenorrhea, and then infertility; Body fluid stagnation, wet accumulation into sputum, so obesity; Chronic liver depression, qi and blood loss, phlegm and fluid obstructed in the skin, the manifestations of hypertrichosis, acne and other diseases. Therefore, regulating the drainage of liver channel can improve the condition of obesity patients with polycystic ovary syndrome.

Zhang Jing [12] et al. found that Danzhi Xiaoyao pill combined treatment of infertility caused by liver depression syndrome PCOS has good clinical effect, and Fangzhong Mupan, Paeony and Tuckaia can promote the growth and development of follicles by regulating the follicle microenvironment; In addition, gardenia, bupleurum, licorice and other liver regulating qi effect, can regulate emotions, regulate sex hormone levels, and promote the maturation of follicles, enhance endometrial receptivity, thereby improving the success rate of pregnancy. Ding Lingling [13] et al. added flavor on the basis of Chaihu Shugan powder to treat liver qi stagnation type PCOS, and found that the levels of free fatty acids and CRP in patients were reduced, thereby improving their insulin resistance, and the level of β -endorphin was significantly higher, which acted on the hypothalamic-pituitary-ovarian axis to regulate female reproductive endocrine function and further promote egg cell maturation. Fang Zhongxiang Fu main into the liver meridian, its effect is to ease the liver depression, regulate the qi wide, regulate the menstrual pain. Modern studies [14] have found that it can promote the development of follicles and ovulation, reduce insulin resistance and improve ovarian microcirculation.

4. Acupuncture Treatment

4.1 Milli acupuncture Therapy

Acupuncture is one of the common traditional Chinese medicine treatments for PCOS, which is based on syndrome differentiation and adjustment of the functions of various viscera. The main points are spleen channel, stomach channel, bladder channel, kidney channel and Ren pulse. By stimulating acupuncture points, the hypothalamic - pituitary - ovarian axis and hypothalamic-pituitary-gonadal axis tend to balance, thereby improving ovarian function, making menstruation regular and normal elimination, and finally achieving the purpose of regulating endocrine.

Wang Lanlan [15] et al. analyzed the treatment of obese PCOS with Shu-mu combined point method and oral administration of Western medicine Dain-35 in 70 cases respectively, and found that Shu-mu combined point acupuncture therapy could improve the patients' BMI and hormone levels, as well as improve the clinical symptoms of traditional Chinese medicine such as menstrual period, volume, color and quality, and promote the regularity of menstruation. Compared with Western medicine, it has no adverse reactions, safe and effective, so it has more advantages. He Wanting [16] randomly divided 68 obese patients with PCOS into observation group and control group, and treated them for a total of 6 menstrual cycles. The control group was given conventional western medicine treatment,

and the observation group was given Tongyuan acupuncture combined with Bushen Huoxue prescription on the basis of the control group. Finally, it was found that the total effective rate and the improvement of LH, T, E2 and PRL in the observation group were significantly better than those in the control group. At present, the mechanism of acupuncture treatment for obese PCOS is not very clear. Intestinal flora disorders are present in the occurrence and development of endocrine metabolic diseases and inflammation, and some intestinal symbiotic flora can affect androgen metabolic enzymes through different pathways, and then participate in androgen metabolism, while high androgen secretion is a typical manifestation of PCOS, so there is a etiological relationship between intestinal flora changes and diseases. Studies have shown [17] that acupuncture can increase the content of beneficial intestinal bacteria by changing the number and diversity of specific intestinal flora of patients, inhibiting inflammatory response, maintaining the balance of internal and external environment of patients, covering insulin sensitivity, regulating energy metabolism and other measures, thus reducing the incidence of PCOS.

4.2 Embedding Therapy

Embedding therapy is based on acupuncture, the body can absorb collagen buried in the relevant points, this method can not only reduce the number of acupuncture, but also play a long-term stimulation effect, to achieve the purpose of treatment, but also consolidate and improve the curative effect. Stomach channel, bladder channel, Ren channel, gallbladder channel and spleen channel are the main points of acupoint catenary treatment for obese PCOS [18]. A number of studies have proved that obese polycystic ovary syndrome is effective after acupoint catgut embedding treatment.

Song Xinggui [19] conducted a retrospective study on 180 obese PCOS patients and divided them into a control group and an observation group. The control group was given metformin and hypogeic Zhuyu decoction combined treatment, and the observation group was given eight-point umbilical cord embedding treatment on the basis of the control group. Results: After treatment, the total effective rate, insulin resistance, related sex hormone indexes, inflammatory factors and TCM symptom scores in the observation group were better than those in the control group, and the ovulation rate and pregnancy rate of the patients were improved. ($P < 0.05$). Xu Ying [20] et al. randomly divided 148 obese PCOS patients into western medicine group and acupoint catenary embedding group to observe the therapeutic effect of acupoint catenary embedding therapy on obese PCOS patients. The results showed that acupoint embedding regulated the metabolism and hormone levels of PCOS patients, and improved ovarian reserve function, and the effect was significant. It was found that sustained stimulation of uterine acupoints could not only improve the local blood circulation of the uterus, but also regulate the activity of the endocrine axis of the hypothalamic-pituitary-ovarian axis, so that the hormones of PCOS rats could reach homeostasis [21]. In addition, modern research believes [22] that acupoint embedding treatment helps to significantly improve the body's basic metabolic rate, which can further accelerate the body's sugar metabolism, increase the rate of fat decomposition, and achieve weight reduction.

4.3 Moxibustion Therapy

"Acupuncture is not for, moxibustion is appropriate", moxibustion method has the role of complementary treatment. Moxibustion is moxa as the raw material, the focus of its moxibustion or corresponding points, through its warming effect to encourage the vitality of the human body, stimulate the function of the viscera, so as to achieve the purpose of dredging the meridians, regulating qi and blood, and treating diseases.

Chen Yuru [23] used moxibustion uterus point to treat ovulation disorder patients with polycystic ovary syndrome (PCOS). 187 PCOS patients were randomly divided into blank group, control group and treatment group. Clomiphene was used in all 3 groups, moxibustion was added to the treatment group, and HCG5000IU was added to the control group. The study found that patients with PCOS ovulation disorder can induce ovulation by moxibustion uterine point treatment, which is an effective, low adverse reaction and non-invasive method of traditional Chinese medicine to induce ovulation, and the combined treatment with clomiphene can play their respective advantages. Lin Jing [24] observed that the treatment of renal Yang deficiency syndrome with moxibustion can improve the ratio of LH, FSH and LH/FSH, and significantly reduce the level of serum IGF-1 in patients with PCOS. In addition, umbilical and abdominal ginger moxibustion combined with drugs to treat PCOS infertility is safe and effective, and the efficacy is better than that of simple drug treatment [25]. Moxibustion combined with traditional Chinese medicine decoction can improve the ovarian reserve function and sex hormone level, promote mature follicle development and endometrial growth in PCOS patients, and help improve the pregnancy rate of patients [26].

4.4 Auricular Point Therapy

Auricular point sticking belongs to the external treatment method of traditional Chinese medicine, which is a way to diagnose and treat diseases through both ears. Twelve meridians are all through the ear, the kidney master reproduction, and opening in the ear, stimulating the ear point can adjust and restore female reproductive function. In addition, the shape of the auricle is similar to that of an inverted embryo, and its tender point is used as a basis for clinical treatment, which can regulate endocrine hormones through biological holographic reflex, neuro-humoral pathway and other mechanisms to improve PCOS symptoms.

Through clinical observation, Li Yan [27] et al. applied pressure on endocrine, spleen, stomach, tri-jiao, large intestine, hunger point and auricular point of internal genitals to obese PCOS patients. The research proved that auricular point pressure could help patients improve BMI, regulate sex hormone levels and improve insulin resistance. Li Yuchang [28] et al. applied auricular point sticking combined with metformin to treat PCOS, and the patients' BMI and blood lipid levels were significantly reduced, achieving good weight loss effect. According to the collected literature, endocrine, uterus, ovary, internal genitalia, liver, spleen and kidney are the auricular points used more frequently in the treatment of PCOS. As the pathogenesis of PCOS in traditional Chinese

medicine is mainly kidney deficiency, spleen deficiency and liver depression, the treatment principle is to tonify kidney and spleen, soothing liver and regulating menstrual flow. Endocrine, uterus, ovary and internal genitalia are selected to regulate female reproductive endocrine function and improve body sex hormone level.

5. Brief Summary

PCOS is a complex pathological change involving multiple systems and factors. The proposal of genetic and susceptibility genes makes it possible to understand the disease from the aspects of molecules and genes. The specific causes of the disease are closely related to obesity, psychology, life, inflammation, androgen level, changes in intestinal flora spectrum and other factors, and the occurrence and development of the disease are not caused by a single factor. Therefore, clinical guidance needs to study the etiology and scientific treatment. At present, Western medicine mainly uses drugs, surgery and other methods to treat PCOS, which mainly improves hormonal, metabolic and reproductive functions by regulating insulin resistance and reducing androgen levels. The recurrence rate of PCOS after drug withdrawal in Western medicine is high, and there are gastrointestinal reactions, edema and other adverse reactions. Although the effect of traditional Chinese medicine is not as rapid as that of Western medicine, its safety has been greatly improved, and its adverse reactions are also few. The most important thing is that traditional Chinese medicine can treat the essence of the disease based on syndrome differentiation and achieve the purpose of improving the overall symptoms. It has shown remarkable clinical efficacy and provided a valuable reference for the treatment of PCOS. It makes up for the deficiencies of Western medicine.

To sum up, the treatment of PCOS by traditional Chinese medicine has the advantages of strong safety and few adverse reactions. More importantly, the treatment is based on the theory of traditional Chinese medicine, and the treatment of PCOS is based on syndrome differentiation and seeking the root of the disease. Moreover, the current curative effect of traditional Chinese medicine in the treatment of this disease is exact, and worthy of clinical promotion and application. However, the specific mechanism and target of TCM treatment of PCOS are still unclear, and further basic and clinical studies are needed.

References

- [1] LI R, ZHANG Q, YANG D, et al. Prevalence of polycystic ovary syndrome in women in China: a large community-based study[J]. *Hum Reprod*, 2013, 28(9):2562-2569.
- [2] SAWANT S, BHIDE P. Fertility treatment options for women with polycystic ovary syndrome[J]. *Clin Med Insights Reprod Health*, 2019, 13:1179558119890867.
- [3] Liao Chao-Qing, Zhong Hai-Ying, Xia Shu-Fang, et al. Clinical effect of Qushi Huatan Zhuyai prescription combined with Clomiphene citrate on patients with phlegm-dampness obstructive polycystic ovary syndrome [J]. *Chinese Patent Medicine*, 2012, 44(12):3858-3861.
- [4] Xue Mengjie, Xia Qinhu. Professor Xia Qinhu's experience in treating infertility caused by obese polycystic ovary syndrome with "tonifying kidney and eliminating phlegm" [J]. *Journal of Zhejiang Chinese Medicine University*, 2018, 42(6):460-462, 472.
- [5] Zhao Chunxia. Curative effect of traditional Chinese Medicine on obese polycystic ovary syndrome [J]. *Inner Mongolia Traditional Chinese Medicine*, 2023, 42(06):62-64.
- [6] Tian Xuemei, Huang Yinghong, Xu Xiaojuan, et al. Effects of Bushen Huatan therapy on regulating endometrium in female mice with obese polycystic ovary syndrome through VEGF/Akt pathway [J]. *Chinese Journal of Traditional Chinese Medicine*, 20, 38(07):169-172+267-269.
- [7] Li Chenggang, Zhou Li, Li Shuang, et al. Clinical observation of Jiawei Buzhong Yiqi Decoction in the treatment of obese polycystic ovary syndrome [J]. *Journal of Hubei University of Medicine*, 2018, 37(2):136-139.
- [8] Zhang Y. Clinical observation of Jianpi Qutan Prescription combined with weight management in the treatment of obese polycystic ovary syndrome complicated with IR [D]. *Guangxi University of Chinese Medicine*, 2023.
- [9] Jiang Xinfang, Lian Xina, Wang Hong, et al. Clinical study of modified Cangfu Daotan Decoction in the treatment of insulin resistance of spleen deficiency phlegm-dampness polycystic ovary syndrome [J]. *Yunnan Journal of Traditional Chinese Medicine*, 2024, 45(06):56-60.
- [10] Zhuang Dan, Qin Jing, Wang Huiyang, et al. Research progress of pharmacodynamic components of *Atractylodes atractylodes* [J]. *Bioprocessing*, 2021(03).
- [11] Hao Song-Li, Zhang Chun-Lan, Meng Xiao-Yu, et al. Curative effect of Shenqi Tiaoti prescription on spleen deficiency phlegm-dampness type of insulin resistance in polycystic ovary syndrome and its influence on inflammatory microenvironment [J]. *Hebei Traditional Chinese Medicine*, 202, 44(06):913-917.
- [12] Zhang Jingjing, Zhu Ranran, Liu Na, et al. Study on the effect of Danzhi Xiaoyao Pill combined with polycystic ovary syndrome on infertility caused by liver depression based on the theory of "emotional disease" [J]. *Clinical Misdiagnosis and treatment*, 2018, 37(06):77-81.
- [13] Ding LING-Ling. The clinical study of Shugan Jieyu Zhuyu Decoction in treating infertility of polycystic ovary syndrome with liver-qi stagnation [J]. *Journal of Modern Integrated Chinese and Western Medicine*, 2019, 28(08):879-882.
- [14] Xie Pengpeng, Fu Yanhong, Tao Lili. Effect and mechanism of Bushen Tiojing Decoction in the treatment of infertility with polycystic ovary syndrome [J]. *Liaoning Journal of Traditional Chinese Medicine*, 2019, 46(02):340-343.
- [15] Wang Lanlan. A clinical study on the treatment of obese polycystic ovary syndrome with acupuncture combined with Shu Mu acupuncture [D]. *Gansu University of Chinese Medicine*, 2019.
- [16] Ho Wanting, Fok Chi Ho, Gao Xiu On. Clinical observation of Tongyuan acupuncture combined with Bushen Huoxue prescription in the treatment of obese polycystic ovary syndrome [J]. *Journal of Guangzhou*

- University of Traditional Chinese Medicine, 2019, 41(05):1233-1237.
- [17] Zhang Wanyu, ZHANG Yanli, Fu Xin, et al. Study on treatment of polycystic ovary syndrome by Chinese Medicine based on intestinal flora [J]. World of Chinese Medicine, 2019, 19(05):712-718.
- [18] Zhou LAN, Zhou Wei, Li Mingyu, et al. Study on the rule of acupoint selection in the treatment of obese polycystic ovary syndrome based on data mining [J]. Henan Traditional Chinese Medicine, 20, 40(11):1733-1737.
- [19] Song Xing-Gui, FU Hong-Yi, DU Haisheng, et al. Treatment of obese polycystic ovary syndrome by embedding thread at eight points around umbilical cord and its effect on androgen level, glucose and lipid metabolism [J]. Journal of Hunan University of Traditional Chinese Medicine, 2019, 44(05):838-845.
- [20] Xu Ying, MI Haixia, Yang Yang. Effect of acupoint catgut embedding therapy on metabolism and hormone levels in patients with polycystic ovary syndrome [J]. Chinese Journal of General Medicine, 2019, 22(04):665-668.
- [21] Wu Jiaman, Ning Yan, Ye Yangyang, et al. Effects of Acupuncture on Endometrium and Pregnancy Outcomes in Patients with Polycystic Ovarian Syndrome Undergoing In Vitro Fertilization-Embryo Transfer: A Randomized Clinical Trial[J]. CHINESE JOURNAL OF INTEGRATIVE MEDICINE, 2022, 28(8):736-742.
- [22] Zhou Yuyu, Yang Shuo, Xiong Linlin, et al. Effect of acupoint catenary assisted therapy on FBG, PBG and HbA1c in overweight or obese patients with type 2 diabetes mellitus [J]. Journal of Yunnan University of Traditional Chinese Medicine, 2019, 46(04):11-15+24.
- [23] Chen Yu-Ru. Clinical study of moxibustion uterus point in ovulation induced by polycystic ovary syndrome [J]. Chinese Practical Medicine, 2017, 12(13):117-118.
- [24] Lin Jing. Clinical observation on the effect of moxibustion on renal Yang deficiency syndrome and the influence of serum IGF-1 level in patients with polycystic ovary syndrome [D]. Fujian University of Chinese Medicine, 2021.
- [25] He Djuan, Huang Xiaotao, Liang Shaorong. A randomized controlled study of Modified Cangfu Daotan Recipe combined with umbilical abdomen Pu ginger moxibustion in the treatment of infertility in kidney deficiency phlegm-dampness syndrome polycystic ovary syndrome [J]. Chinese Journal of Integrated Traditional and Western Medicine, 202, 42(05):553-559.
- [26] Xu Haixia, Zhu Chunlan, Tang Hong. Effect of moxibustion combined with Chinese medicine on ovarian reserve function in infertility patients with polycystic ovary syndrome [J]. Shanghai Journal of Acupuncture and Moxibustion, 21, 40(05):571-575.
- [27] Li Yan, HAO Songli, ZHANG Chunlan, et al. Clinical observation of auricular point seed pressure in the treatment of adolescent overweight/obese polycystic ovary syndrome [J]. Journal of Modern Integrated Chinese and Western Medicine, 2018, 27(35):3877-3879+3906.
- [28] Li Yu-Chang, Feng Ting, HE Ming-Jing. Effect of auricular point compression and metformin on insulin resistance in obese patients with polycystic ovary syndrome [J]. Chinese Medical Innovation, 2020, 17(25):153-157.