Obesity, Diabetes and Female Poly Cystic Ovary Syndrome (PCOS) Practices of different Herbal treatments in Khyber Pakhtunkhawa (KPK), Pakistan

ABSTRACT

It is alarming to see how common metabolic issues like obesity, diabetes, and polycystic ovarian syndrome (PCOS) are in Pakistan right now. Because of the societal stigma attached to women's obesity and reproductive issues, not even they are aware of these issues or how they affect women's reproductive cycles. They only disclose their problems to local herbalists or healers. Herbalists employ the plants' immense medicinal potential to treat a wide range of illnesses. Data about the use of phytomedicine to treat ailments affecting women in Pakistan's northern areas has been attempted to be gathered. The early years of the twenty-first century saw the development of plant-based treatments that were dependable in saving people from obesity and diabetes. The prescription of ethnomedicin was thoroughly examined with respect to doses and administration by means of cross-interviews with patients, old and knowledgeable tribal peoples, and local healers. There are now 35 known native medicinal herbs. The plant names, portions that are used, and method of application have all been well researched. The fact that this study offers a comprehensive account of the therapeutic plants that have been researched in the study locations makes it significant for the field of ethno-nutrition. Future pharmacological screening and active phytochemical identification might benefit from this knowledge in order to develop potent pharmaceuticals.

Keywords: Obesity, Diabetes, Herbal Medicines, Phytomedicines, Plant medicine and PCOS

Introduction:

Since ancient times, people have used medicinal plants all throughout the world to heal certain ailments. It is a fact that most villages depend on plant-based medications, either directly or indirectly. Again, the native people who reside in remote, very remote locations are totally dependent on natural therapies. Local healers and herbalists use affordable medicinal herbs to treat the common people (Rehman et al., 2023). This ancient medical system based on plants still provides primary healthcare for over 75% of the world's population. WHO estimates that 80 percent of the world's population mostly uses traditional medicine (Yadav et al., 2020). Numerous plant-based medicinal systems, such as Ayurveda, Siddha, Unani, and others, have been developed since the beginning of human civilization. The chemical components of allopathic therapies are costly and may have unfavourable side effects. Patients are searching for an alternative drug that is less costly and won't have any side effects. The earliest phytomedicines developed in the twenty-first century regularly prevented fatal diseases in patients. Among the many advantages of herbal medicine are its increased patient tolerance, lack of side effects, and very inexpensive cost. Plant-based phytomedicines have shown great promise in treating incurable infectious diseases as overweight, opportunistic AIDS infections, PCOS and

obesity (Pachiappan et al., 2017). Plant-based anti-infective chemicals are also important in the treatment of several malignancies (Rehman et al., 2023).

For thousands of years, people have turned to plants as remedies for a variety of ailments. Pakistan's traditional medical system serves about 95% of the population related to PCOS (Hosseinkhani et al., 2018). In Northern Pakistan, women who have abnormal weights are not rare. This is a developed neighbourhood, and the women here have a strong belief in the healing power of locally cultivated herbs for a wide range of illnesses. Many women decide not to see doctors because they are afraid or ignorant. Traditional healers have outstanding knowledge of adjacent medicinal plants (Birjees et al., 2022). Several plants were used by the Pahari tribes in district Swat, Upper Dir, Malakand, Kohistan, and Mardan, Swat, to cure their metabolic problems and obesity (Mussarat et al., 2021). Several research have been done on the use of ethno-medical herbs by the tribal people of KPK, Pakistan, to cure metabolic issues (Marwat et al., 2014). Recent research has examined the traditional knowledge of Pakistan's tribal people living in the KPK region on herbal folk remedies for PCOS and obesity (Khanage et al., 2019). The folk medicine used to treat obesity, diabetes, and other associated conditions is also utilised by the rural people of Gilgit (Khan et al., 2021). Data on the traditional knowledge of using phytomedicine to treat female diseases has been gathered from the tribal people of Pakistan's Diamer District in Gilgit. There have also been reports of the tribal people of Azad Kashmir, Pakistan, using traditional medicine to treat metabolic diseases. Numerous research have been done on the use of plants to treat problems related to obesity, weight growth, weight reduction, and cardiovascular disease (Ullah et al., 2018). The majority of people—more than 80%—live in villages, and West KPK, Swat, Malakand, Gilgit, and Kashimir are home to a sizable tribal population (MN and Ahmad, 2018). Obesity issues are more likely to spread because of the climate and soil conditions. Sexually transmitted infections (STIs) are a major concern to public health since they are one of the main causes of sickness and even death globally. Diabetes and cardiovascular disease are also closely related to STIs (Zain et al., 2018). They have profound implications on the economy, society, and health, particularly in developing countries. In our country, rural women are disproportionately affected by obesity-related conditions including diabetes and cardiovascular disease. Pakistan uses medicinal plants to treat diabetes and cardiovascular disease (Majeed et al., 2021). In the research region, hyperlipidemia, diabetes, cardiovascular problems, and polycystic ovarian syndrome difficulties are common. Other metabolic disorders that have been researched include infertility, cancer, lung, and muscular issues. Given this, the goal of the current study was to discover the medicinal plant resources and the tribal people of World's traditional knowledge for treating metabolic issues and PCOS (Kumar and Kumar, 2022). An overview of plant species, families, sections used, applications for illnesses, estimated doses in hypothetical circumstances, and ethno-medicinal values to treat metabolic issues in common and tribal peoples have been developed in this study.

Review of Literature;

A study showed that Obesity is a major cause of death, diabetes, cardiovascular diseases, and cancer globally. In South Africa, the number of people suffering from excess body weight is increasing. An ethnobotanical study in the Nkonkobe Municipality identified 20 plants for managing obesity. Three plants, Cissaempelos capensis, Curtisia dentata, and Schotia latifolia, were found to have weight-reducing properties. These plants were used in decoctions and infusions, with some belief in their efficacy. Further phytochemical and pharmacological investigations are needed to validate their use for obesity treatment (Afolayan and Mbaebie., 2010).

A study tested the antidiabetic and antiobesity properties of medicinal plants in vitro. The extracts of sweet gale, roseroot, sheep sorrel, stinging nettles, and dandelion were tested for total antioxidant capacity, α-amylase, α-glucosidase inhibition, and advanced glycation end products. Myrica gale EE showed the highest total phenolic content and FRAP value, while also showing lower IC50 values for α-amylase and α-glucosidase inhibition compared to acarbose. The study also found that Myrica gale EE and stinging nettles significantly inhibited adipogenesis in adipocytes, suggesting their potential in managing type 2 diabetes and obesity (Sekhon and Rupasinghe., 2019).

One scientist named as Saad worked on Obesity, characterized by excessive fat mass and chronic inflammation, leads to insulin resistance, diabetes, and metabolic dysfunctions. Natural agents like thymoquinone, curcumin, punicalagin, resveratrol, quercetin, and genistein have been shown to have immunomodulatory properties, potentially aiding in the treatment of inflammatory diseases. Traditional Greco-Arab and Islamic diets and medicinal plants have been shown to have immunomodulatory effects, with in vitro studies, animal studies, and clinical trials supporting their effectiveness. This comprehensive review aims to evaluate the potential of these herbs in managing obesity-related inflammation based on clinical trials (Saad., 2022).

Nyangono and its coworkers studies that Diabetes is a metabolic disease characterized by chronic hyperglycemia, disrupting carbohydrate, lipid, and protein metabolism due to defects in insulin secretion. The International Diabetes Federation estimates that by 2045, 629 million adults will have diabetes worldwide. In Cameroon, 5.59% of adults had diabetes in 2018, regardless of gender. An ethnopharmacological study was conducted in the Department of Dja and Lobo to identify and characterize medicinal flowers used in managing metabolic syndrome. Surveys were conducted among 135 natives from six villages, identifying 85 species in 49 families. The study identified 41 species involved in diabetes treatment, with decoction and trituration being the most common preparation methods. Phytochemical screening revealed flavonoids, phenols, polyphenols, tannins, saponins, and anthocyanins in almost all extracts. The results provide valuable information for the region and suggest the need for modern processing units specialized in medicine manufacturing (Nyangono et al., 2022).

Another study revealed that (PCOS) is an endocrine disorder affecting one in every 15 women worldwide. It is characterized by increased levels of male hormones, acne, and hirsutism, which

can lead to insulin resistance, miscarriage, or infertility. Treatment for PCOS can be achieved using natural and allopathic remedies. A review of literature from 1990-2021 found that plants like aloe vera and chamomile improve fertility by increasing ovarian follicles. Vitex agnus-castus and octane reduce hirsutism by reducing testosterone and androgen levels. Liquorice, ginseng, cinnamon, and de chiro Inositol lower lipid and blood glucose levels. Stachys lavandulifolia and fennel change endometrial tissue parameters in PCOS (Manouchehri et al., 2023).

In one study (PCOS) is a complex endocrine disorder characterized by polycystic ovaries, chronic anovulation, and hyperandrogenism. It leads to symptoms such as irregular menstrual cycles, hirsutism, acne, and infertility. Evidence-based medical management emphasizes a multidisciplinary approach, as conventional pharmaceutical treatment may be contra-indicated, associated with side effects, and not effective in some cases. Women with PCOS express a strong desire for alternative treatments, and this review examines the reproductive endocrine effects of herbal medicine in PCOS. The review included 33 studies, with eighteen pre-clinical studies explaining the reproductive endocrine effects of whole herbal extracts in oligo/amenorrhoea, hyperandrogenism, and PCOS. The interventions included herbal extracts of Vitex agnus-castus, Cimicifuga racemosa, Tribulus terrestris, Glycyrrhiza spp., Paeonia lactiflora, and Cinnamomum cassia. Endocrine outcomes included reduced luteinising hormone, prolactin, fasting insulin, and testosterone. There was evidence for the regulation of ovulation, improved metabolic hormone profile, and improved fertility outcomes in PCOS. However, the quantity of pre-clinical data was limited, and the quality of clinical evidence was variable. Further pre-clinical studies are needed to explain the effects of herbal medicines not included in this Paper (Arentz et al., 2014).

Objectives:

1. **Prevalence and Risk Factors:**
    - Determine the prevalence of obesity, diabetes, and PCOS among females in Khyber Pakhtunkhwa (Maya et al., 2022).
    - Identify the common risk factors associated with obesity, diabetes, and PCOS in the region (Maya et al., 2022).
2. **Herbal Treatment Practices:**
    - Investigate the current practices of using herbal treatments for managing obesity, diabetes, and PCOS among females in KPK (Jazani et al., 2019).
    - Identify the most commonly used herbal remedies and their perceived effectiveness (Jazani et al., 2019).
3. **Traditional Knowledge and Beliefs:**

- Explore the traditional knowledge and cultural beliefs surrounding the use of herbal treatments for health conditions in KPK (Alghamdi., 2020).
- Understand the socio-cultural factors influencing the preference for herbal remedies over conventional medical treatments (Alghamdi., 2020).

4. **Effectiveness and Safety:**
    - Assess the effectiveness of herbal treatments in managing obesity, diabetes, and PCOS based on user experiences and clinical outcomes (Ding et al., 2020).
    - Evaluate the safety profile of commonly used herbal remedies in the context of managing these health conditions (Ding et al., 2020).
5. **Healthcare-seeking Behavior:**
    - Examine the healthcare-seeking behavior of females in KPK regarding obesity, diabetes, and PCOS, focusing on the utilization of herbal treatments (Simon et al., 2021).
    - Identify the factors influencing the choice between herbal remedies and modern medical interventions (Simon et al., 2021).
6. **Integration with Conventional Medicine:**
    - Explore the integration of herbal treatments with conventional medical approaches in managing obesity, diabetes, and PCOS (Nair et al., 2024).
    - Assess the perceptions of healthcare providers regarding the use of herbal remedies as complementary or alternative treatments (Nair et al., 2024).
7. **Policy Implications and Regulation:**
    - Investigate existing policies or regulations related to the use of herbal treatments for health conditions in KPK (Szczuko et al., 2021).
    - Provide recommendations for policy improvements or guidelines to ensure the safe and effective integration of herbal remedies into healthcare practices (Szczuko et al., 2021).
8. **Community Awareness and Education:**
    - Assess the level of awareness and knowledge among the community regarding the benefits and risks of herbal treatments for obesity, diabetes, and PCOS (Zeng et al., 2022).

- Develop strategies for community education and awareness programs to promote informed decision-making regarding healthcare choices (Zeng et al., 2022).

Methodology:

In order to document the usage of locally grown medicinal herbs, a sample research was carried out in a number of villages and forest areas in Pakistan's northern regions during the preceding three years (2020–2023). The survey was carried out year-round in order to gather as much data as possible. We probed them constantly to find out more about their knowledge, illness diagnosis, and therapeutic approaches. Details on the specific plant parts used, collecting methods, drug delivery methods, dosage administration, and intended applications were obtained. The medicinal uses of the native plants have been documented after data was gathered from the general population, informed elderly rural people, traditional herbal medicine practitioners, and nearby dealers of herbal medications. Local elders and knowledgeable tribal peoples were questioned and cross-questioned following the completion of the questionnaire (Khan et al., 2015). Regarding doses and administration, a thorough interview and cross-interview were carried out with local Hakeem and Sanaysi, who primarily deal with the prescription of ethno-medicine. Real specimens, books, journals, floras, and revisions were used in the collection and identification of the medicinal plant specimens (Akhter et al., 2016).

RESULTS AND DISCUSSION

The study's 35 plant species are grouped into 26 families, 12 of which are trees, 4 of which are roots, 2 of which are shrubs, 1 of which is a vine, and 12 of which are herbs. For certain tree species, the bark, leaves, and seeds are used; for certain herb species, the entire plant is used. The medicines have no unfavourable side effects. The plants are used either by themselves or in combination with other plants. The procedure for administration and planning is quite straightforward and efficient. The study found that indigenous healers discovered the components, doses, and uses of several ethno-medicinal plants by trial and error. Such knowledge may only be passed down orally from one generation to the next. Interestingly, only two families in the area know about this: Hakeem and Snayasi. They frequently cure a variety of ailments in the community, including problems with reproduction. Most of the time, they use both their own clinical experience treating diseases in people and the symptoms that the patients have described to make their diagnosis. Herbal medicine may be made in four basic ways: as a paste by applying plant parts; as a powder by grinding plant parts; as a decoction by decocting plant parts with water and other liquids. It has been found that various combinations including numerous plant components were also created by combining different methods of preparation. Some species only treat particular disorders, whereas most treat related conditions. Sometimes only a single part of these plants is utilised for therapy, while other times many parts are used. Medication is taken either as is or mixed with other meals or drinks, including milk, honey, or black pepper. Throughout the study, it was observed that most cases required a 7–21 day treatment period, and most drugs were administered early in the morning on an empty stomach.

Doses were frequently measured in teaspoonfuls or millilitres, depending on the patient's age, physical condition, and a variety of other factors. The healers do not farm medicinal plants; instead, they mostly use elements from woods. These plant species have long been used to treat gonorrhoea, syphilis, impotence, and problems associated with obesity, diabetes and reproductive disorders, in addition to gynaecological diseases. Tribes often use polyherbal concoctions even though studies have indicated that they often use a specific plant section. The current study emphasises a detailed description of the examined medicinal plants in the research location in order to produce potent drugs. This data might be utilised for pharmacological and active phytochemical screening in the future. According to Tariq et al. (2018), recent studies have looked at the phytochemical analysis and antibacterial qualities of C. difformis leaf extract, and the results point to it possibly being a valuable tool for the next generation of biomedicine.

The following list includes the scientific names, families, habits, diseases, and application methods of the taxa that have been studied for the treatment of obesity, diabetes, and reproductive abnormalities.

Table No: 1 Medicinal Plant used for the treatment of Obesity and Diabetes

Sr.No	Scientific Name	Habit	Family	Parts Used	Application
1.	Carica papaya L.	Herb	Caricaceae	Fruit	Unripe fruits are sliced after peeling and cooked along with ground coconut carnel, green chilly, onion and sufficient quantity of salt. Taken along with rice.
2.	Indigoferainctoria L.	Herb	Fabaceae	Whole Plant	Powder of plant parts are mixed with butter milk to drink

					orally.
3.	Tamarindusindica L.	Tree	Caesalpiniaceae	Tree Bark	Root bark is rubbed in cowís milk and taken.
4.	Aloe barbadensisMill.	Herb	Liliaceae	Leaves	The smooth gel of leaves is taken as such.
5.	VitexnegundoL	Shrub	Verbenaceae	Roots and leaves	Fresh roots and leaves are crushed and cooked along with rice in the form of porridge and taken daily.
6.	Alpinia officinarum Hanc	Roots	Zingiberaceae	Whole Plant	Boil it in one cup of water and then take it in hot form.
7.	Argyreia nervosa Bojer	Roots	Convolvulaceae	roots	Roots dried and then take its powder with water.
8.	Artemisia iwayomogi	Tree	Compositae	Whole plant	Powder plants parts and take it.
9.	Coleus forskohlii	Tree	Lamiaceae	Leaves and Flowers	Boil in water and then take that water daily for one month.

10.	Commiphora mukul	Shrub	Burseraceae	Gum and Resin	Gum and resin of this plant take at is with water.
11.	Garcinia cambogia	Tree	Guttifera	Fruit	Fruit extract take as it is.
12.	Gymnema sylvestre	Tree	Asclepiadaceae	Leaves	Tea of this plants leaves are used for weight loss as well as diabetic patients.
13.	Hemidesmus indicus	Shrub	Asclepiadaceae	Leaves and Flowers	Powder form used for treatment of obesity and diabetes with the Luke warm water.
14.	Hibiscus sabdariffa	Shrub	Malvaceae	Flowers and leaves	Tea of this shrubs flowers and leaves prepared and taken daily.
15.	Lagerstroemia speciosa	Tree	Lythraceae	Flowers and leaves	Powder of this tree used for the treatment of Diabetes and Obesity.
16.	Momordica charantia	Vine	Cucurbitaceae	Fruit	Juice of this fruit is prepared and then taken.

17.	Myristica fragrans	Tree	Myristicaceae	Fruit	Juice of this fruit is prepared and taken Daily.
18.	Panax ginseng	Herb	Aralioideae	Roots	Tea of this plant's roots prepared and taken.
19.	Panax japonicus	Herb	Aralioideae	Flowers and Leaves	Powder of their flowers and leaves used as it is or prepared tea and then consume.
20.	Piper nigrum	Shrub	Piperaceae	Seeds and fruit	Powder of their flowers and leaves used as it is or prepared tea and then consume.
21.	Plumbago zeylanica	Shrub	Plumbaginaceae	Whole plant	Powder of their flowers and leaves used as it is or prepared tea and then consume.
22.	Tamarindus indica	Tree	Fabaceae	Fruits and Leaves	Juice of this plant's fruit is prepared and taken daily.
23.	Zingiber officinale	Herb	Zingiberaceae	Roots	Tea and juice of their roots

					used daily.
24.	Adenophora triphylla Hara	Root	Campanulaceae	Whole plant	Powder of their flowers and leaves used as it is or prepared tea and then consume.
25.	Allium fistulosum Linn	Root	Liliaceae	Whole Plant	Powder form or as it is eaten in salad

In the Table No: 1, there are 25 different type of plants mentioned and their different parts are used for the treatment of Diabetes and obesity as these are worked to lower the weight of the patients and also helpful in lowering the blood glucose level of the patients. In the table there is a herb mention with the name of Papaya and its unripe fruit cooked and then taken as it so to lower the weight of the patients, next there is Indigoferaintoria L. herb mentioned and its whole plant powder is used for the treatment of diabetes and obesity, next there is Tamarindusindica L. mentioned whose tree bark is used for the treatment of this condition. Aloe barbadensisMill. Has smooth gel which is eaten for the lowering weight. VitexnegundoL has leaves and seeds which are cooked with rice and then consume as rices are taken in very low quantity, Next is Alpinia officinarum Hanc which is boiled and then taken that boiled water to reduce BMI, Blood glucose level and Overweight. Argyreia nervosa Bojer and Artemisia iwayomogi which are converted in the form of powder and then consume that powder. Coleus forskohlii which is used as a liquid form as first of all it boiled in water and then drink that water. The gum and rasin of Commiphora mukul is eaten to lower the Obesity and Diabetes. The fruit extract of Garcinia cambogia is used to lower the Diabetes and Obesity. The leaves of Gymnema sylvestre used for the treatment of Obesity and Diabetes. Leaves and Flowers of Hemidesmus indicus, Lagerstroemia speciose, Panax japonicus and Hibiscus sabdariffa are used for curing Diabetes and lowering Body Weight. Fruit of Momordica charantia, Myristica fragrans used for Diabetes lowering and Obesity reducing, whole plant of Adenophora triphylla Hara, Plumbago zeylanica, and Allium fistulosum Linn used for this above mentioned purpose. Tea is prepared from the Panax ginseng to lower the glycemia index and BMI.

Table No: 2 Medicinal plants used for the treatment of Polycystic Ovary Syndrome

Sr.No	**Scientific Name**	**Habit**	**Family**	**Part Used**	**Application**

1.	SpondiaspinnataKurtz	Tree	Anacardiacea e	Wood/root	Wood powder leucorrhoea and PCOS.
2.	SidarhombifoliaL.	Herb	Malvaceae	Whole Plant	Root paste (1 tea spoonful) mixed with milk isgiven once a day for 21 days to get relief from PCOS.
3.	NelumbonuciferaGaertn	Herb	Nymphaeceae	Rhizome	About 15 ml decoction of rhizomes of white flowered plant is taken by women in empty stomach for fifteen days.
4.	CocosnuciferaL	Tree	Arecaceae	Fruit and Fiber	The carnel in the form of paste mixed with cow milk is taken.The young bud is taken orally
5.	BoerhaaviadiffusaL	herb	Nyctaginacea e	Whole Plant	Decoction of plant (15ml) is given once a day in the early morning for fifteen days.
6.	MangiferaindicaL	Tree	Anacardiacea e	Leaves	Decoction of stem bark along with black Pepper is given to women continuously for 21 days in empty stomach to stop bleeding from uterus. Seed powder is also beneficial in PCOS.
7.	Asparagus racemosus Wild.	Herb	Liliaceae	Root	Root paste mixed with the root paste of

					Ankar (Alangiumsalvifolium), Palash (Butea monosperma), Amlaki (Emblicaofficinalis), Ramdantan (Smilax avalifolia) and make a common paste which is given for continuous 21 days early in the morning to cure PCOS.
8.	Amaranthusspinosus L	Herb	Amaranthacea e	Roots./Stem	Fresh juice of the root (two teaspoon full) is slightly warmed and is given twice daily in PCOS.
9.	Pterocarpus marsupium Roxb	Tree	Fabaceae	Bark	Paste of bark (1 tea spoonful) mixed with honey used to cure PCOS of women.
10.	SidaacutaBurm	Herb	Malvaceae	Leaf/Root/See d	Root paste (1 tea spoonful) mixed with milk isgiven once a day for 21 days to get relief from PCOS..

In the Table No: 2, The polycyctic ovary syndrome is a condition present in women during their repdroductive age and there are different herbal plants which are used for the treatment of this disorder so there are 10 plants which are used for this purpose, in which shrub, herbs, tree and roots are included. SpondiaspinnataKurtz has a root portion which is used for PCOS lowering purpose, SidarhombifoliaL whole plant used, NelumbonuciferaGaertn rhizome portion used, CocosnuciferaL fruit and fiber and BoerhaaviadiffusaL's whole plant used for maintaining the hormonal balance in females. Leaves of MangiferaindicaL, Roots of Asparagus racemosus Wild and Amaranthusspinosus L, Bark of Pterocarpus marsupium Roxb and root, leaf and stem even whole plant of SidaacutaBurm used for lowering the hormone imbalance condition in Females.

CONCLUSION

The health and treatment of rural women was the main emphasis of this study. In rural places where modern medical services are either nonexistent or limited, herbal remedies are a true godsend. But as more and more of the practitioners are elderly and the younger generation in rural areas shows little interest in herbal therapies, the knowledge about them is dwindling daily. It is imperative that further work be done to record this information before it disappears. The formulation must also undergo clinical pharmacological validation in order to verify its effectiveness. Further investigation is required about the extremely intriguing results regarding metabolic and reproductive disorders, and pharmacological confirmation of the effectiveness of the numerous traditional practices is necessary. Increased efforts are thus needed to record this traditional knowledge of the people in order to have a thorough account of it. Doing so will open up new avenues for local plant research and result in safe, affordable, and environmentally friendly ways to treat metabolic and reproductive problems. Given the paucity of knowledge now accessible on the chemical components of these plants, it is hoped that future study will identify the specific bioactive components for the treatment of reproductive and metabolic disorders.

Ethical Approval and Consent to Participate:

My research was ethically approved because there was no harmful or irrelevant material present, and I obtained permission from the Dar Ul Shifa Hospital, Pakistan, to conduct this research work.

Consent for Publication:

I give consent to publish my work in your journal and its open access to everyone.

Availability of data and Materials:

The data and material are available for everyone after publishing this research.

References:

Afolayan, A. J., & Mbaebie, B. O. (2010). Ethnobotanical study of medicinal plants used as anti-obesity remedies in Nkonkobe Municipality of South Africa. *Pharmacognosy Journal*, *2*(11), 368-373.

Alghamdi, S. A. (2020). Application of herbal medicines for obesity treatment in the polycystic ovarian syndrome women. *J. Pure Appl. Microbiol*, *14*, 1431-1435.

Arentz, S., Abbott, J. A., Smith, C. A., & Bensoussan, A. (2014). Herbal medicine for the management of polycystic ovary syndrome (PCOS) and associated oligo/amenorrhoea and hyperandrogenism; a review of the laboratory evidence for effects with corroborative clinical findings. *BMC complementary and alternative medicine*, *14*, 1-19.

Bautista, R. J. H., Mahmoud, A. M., Königsberg, M., & Guerrero, N. E. L. D. (2019). Obesity: Pathophysiology, monosodium glutamate-induced model and anti-obesity medicinal plants. *Biomedicine & Pharmacotherapy*, *111*, 503-516.

Birjees, M., Ahmad, M., Zafar, M., Nawaz, S., Jehanzeb, S., Ullah, F., & Zaman, W. (2022). Traditional knowledge of wild medicinal plants used by the inhabitants of Garam Chashma valley, district Chitral, Pakistan. *Acta Ecologica Sinica*, *42*(2), 19-33.

Ding, N., Yue, R., Wang, L., & Yang, H. (2020). Chinese herbal medicine on treating obese women with polycystic ovary syndrome: a systematic review and meta-analysis protocol. *Medicine*, *99*(49), e22982.

Hasani-Ranjbar, S., Jouyandeh, Z., & Abdollahi, M. (2013). A systematic review of anti-obesity medicinal plants-an update. *Journal of Diabetes & Metabolic Disorders*, *12*, 1-10.

Hosseinkhani, A., Asadi, N., Pasalar, M., & Zarshenas, M. M. (2018). Traditional Persian medicine and management of metabolic dysfunction in polycystic ovary syndrome. *Journal of traditional and complementary medicine*, *8*(1), 17-23.

Khan, A., Ali, S., Murad, W., Hayat, K., Siraj, S., Jawad, M., ... & Khan, A. (2021). Phytochemical and pharmacological uses of medicinal plants to treat cancer: A case study from Khyber Pakhtunkhwa, North Pakistan. *Journal of Ethnopharmacology*, *281*, 114437.

Khanage, S. G., Subhash, T. Y., & Bhaiyyasaheb, I. R. (2019). Herbal drugs for the treatment of polycystic ovary syndrome (PCOS) and its complications. *Pharm. Res*, *2*(1), 5-13.

Kumar, V., & Kumar, N. (2022). Therapeutic Effect of Herbal Medicinal Plants on Polycystic Ovarian Syndrome: A Review. *Asian Journal of Pharmaceutical Research and Development*, *10*(6), 153-160.

Majeed, Y., Shaukat, M. B., Abbasi, K. Y., & Ahmad, M. A. (2021). Indigenous plants of Pakistan for the treatment of diabetes: A review. *Agrobiological Records*, *4*, 44-63.

Manouchehri, A., Abbaszadeh, S., Ahmadi, M., Nejad, F. K., Bahmani, M., & Dastyar, N. (2023). Polycystic ovaries and herbal remedies: A systematic review. *JBRA assisted reproduction*, *27*(1), 85.

Marwat, S. K., Khan, E. A., Khakwani, A. A., Ullah, I., Khan, K. U., & Khan, I. U. (2014). Useful ethnophytomedicinal recipes of angiosperms used against diabetes in South East Asian Countries (India, Pakistan & Sri Lanka). *Pakistan journal of pharmaceutical sciences*, *27*(5).

Maya, J., Siegel, J., Cheng, T. Q., & Rousseau-Pierre, T. (2022). Prevalence and risk factors of polycystic ovarian syndrome among an ethnically diverse overweight/obese adolescent population. *International journal of adolescent medicine and health*, *34*(1), 20190109.

MN, R. and Ahmad M (2018) Dietary Patterns for the Reduction of Obesity Using Medicinal Plants in Northern Pakistan. *J Obes Weight Loss Ther*, *8*(364), 2.

Moini Jazani, A., Nasimi Doost Azgomi, H., Nasimi Doost Azgomi, A., & Nasimi Doost Azgomi, R. (2019). A comprehensive review of clinical studies with herbal medicine on polycystic ovary syndrome (PCOS). *DARU Journal of Pharmaceutical Sciences*, *27*, 863-877.

Mussarat, S., Ali, R., Ali, S., Mothana, R. A., Ullah, R., & Adnan, M. (2021). Medicinal animals and plants as alternative and complementary medicine in southern regions of Khyber Pakhtunkhwa, Pakistan. *Frontiers in Pharmacology*, *12*, 649046.

Nair, P. G., Nair, P. P., & Dixit, A. K. (2024). The Importance and Scope of Medicinal Plants Suggested in Traditional Medicine in the Holistic Care of Occupational Lifestyle Disorders with Special Mention to Insulin Resistance Associated Clinical Syndromes. In *Role of Herbal Medicines: Management of Lifestyle Diseases* (pp. 13-32). Singapore: Springer Nature Singapore.

Nyangono, N. M., Soppo, L., Nko'o, M., Benga, M., Maniepi, J., Obono, F., ... & Ngoa, L. E. (2022). Medicinal plants used by traditional practitioners for the treatment of diabetes, obesity and arterial hypertension in the Dja and Lobo Department of Cameroon. *Saudi J. Med. Pharm. Sci*, *8*, 704-719.

Pachiappan, S., Matheswaran, S., Saravanan, P. P., & Muthusamy, G. (2017). Medicinal plants for polycystic ovary syndrome: A review of phytomedicine research. *Int J Herb Med*, *5*(2), 78-80.

Rehman, S., Iqbal, Z., h Qureshi, R., & Younas, M. (2023). Ethnomedicinal study of medicinal plants used by the inhabitants of tribal District North Waziristan, Khyber Pakhtunkhwa, Pakistan. *Ethnobotany Research and Applications*, *26*, 1-32.

Saad, B. (2022). Prevention and treatment of obesity-related inflammatory diseases by edible and medicinal plants and their active compounds. *Immuno*, *2*(4), 609-629.

Sekhon-Loodu, S., & Rupasinghe, H. V. (2019). Evaluation of antioxidant, antidiabetic and antiobesity potential of selected traditional medicinal plants. *Frontiers in nutrition*, *6*, 53.

Simon, N. H., Akinola, A., & Samadi, F. (2021). Knowledge and Practice towards Weight Reduction among Women with Polycystic Ovarian Syndrome. *International Journal of Obstetrics, Perinatal and Neonatal Nursing*, *7*(1), 20-32.

Szczuko, M., Kikut, J., Szczuko, U., Szydłowska, I., Nawrocka-Rutkowska, J., Ziętek, M., ... & Saso, L. (2021). Nutrition strategy and life style in polycystic ovary syndrome—Narrative review. *Nutrients*, *13*(7), 2452.

Ullah, A., Hassan, N., Amin, R., Khan, A., Shi, L., & Li, M. (2018). Quantitative ethnobotanical survey of medicinal plants used as remedy in Mera, District Charsadda, KP, Pakistan. *J. Biol. Environ. Sci*, *12*(5), 163-173.

Yadav, K., Ghadge, P., Langeh, A., Kalbhare, S., Phadtare, P., & Bhoite, R. (2020). A review on herbal medicinal plant for treatment of polycystic ovarian syndrome (PCOS). *Asian Journal of Pharmaceutical Research and Development*, *8*(4), 83-87.

Zain-ul-Abidin, S., Khan, R., Ahmad, M., Bhatti, M. Z., Zafar, M., Saeed, A., & Khan, N. (2018). Ethnobotanical survey of highly effective medicinal plants and phytotherapies to treat diabetes mellitus II in South-West Pakistan.

Zeng, L. H., Rana, S., Hussain, L., Asif, M., Mehmood, M. H., Imran, I., ... & Abed, S. N. (2022). Polycystic ovary syndrome: a disorder of reproductive age, its pathogenesis, and a discussion on the emerging role of herbal remedies. *Frontiers in Pharmacology*, *13*, 874914.