



A Critical Review on *Bandhyatva* (Anovulation)

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Review Article

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Abstract

Infertility is defined as the failure to conceive after one year of regular intercourse without the use of contraceptive. The difficulty to conceive or subfertility constitutes a major social and psychological burden amongst couples. Premature ovarian insufficiency, polycystic ovarian syndrome, endometriosis, uterine fibroids, and endometrial polyps are all potential causes of female infertility, with ovulatory issues being the most common ones. Various factors including genetic disorders, advancing age, poor nutrition, environmental pollution, and increased stress in daily life, may all contribute to female infertility. Infertility is described as *Bandhyatva* in Ayurvedic literature. In Contemporary Science, treatment options mostly involve the use of hormone medications or injections, as well as Assisted Reproductive Technologies (ART). Ayurvedic treatment, on the other hand, comprises *Nidana Parivarjana* (removal of the cause), dietary control, *Samshamana* (pacificatory therapy), and *Samshodhana* (purification and cleansing). The aim of this study is to understand *Bandhyatva* along with Anovulation with Ayurveda and Modern Perspective.

Keywords: *Bandhyatva*; Infertility; Ayurveda

Introduction

Infertility is the inability of a couple to achieve pregnancy over an average period of one year (in a woman under 35 years of age) or 6 months (in a woman above 35 years of age) despite adequate, regular (3-4 times per week), unprotected sexual intercourse [1]. Infertility may also be referred to as the inability to carry a pregnancy to the delivery of a live baby. It affects approximately 10-15% of reproductive couples. About 40% of cases are due to female factors, 30% are due to male factors, 20% are a combination of both, and in about 10% the cause is unknown [2]. The increase

in the prevalence of infertility is due to at least four factors: delayed childbearing, alterations in semen quality due to habits such as cigarette smoking and alcohol, and changes in sexual behaviour. The WHO estimates the overall prevalence of primary infertility in India to be between 3.9 and 16.8 percent [3]. The most common cause of female infertility is ovulatory problems, which generally manifest themselves by sparse or absent menstrual periods [4]. There are various factors, including lifestyle changes, nutrition, disease, malformation of the uterus, increased stress, age, genetic factors, and environmental pollution, that may contribute to infertility. Moreover, in this era, women are becoming more

career-focused, which frequently causes a delay in marriages. Increased maternal age may also increase the chance of infertility [5]. It is a societal stigma in which the female partner is held accountable for creating marital discord. In Ayurveda, infertility is described as Bandhyatva.

Disease Review

According to WHO, infertility can be described as the inability to become pregnant, maintain a pregnancy, or carry a pregnancy to live birth [6]. A clinical definition of infertility by the WHO and ICMART (The International Committee for Monitoring Assisted Reproductive Technology) is “a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse” [7]. Infertility can be divided

into two types – Primary and Secondary Infertility.

- Primary Infertility: It refers to the inability to give birth either because of not being able to become pregnant, or carry a child to live birth, which may include miscarriage or a stillborn child [8].
- Secondary Infertility: It refers to the inability to conceive or give birth when there was a previous pregnancy or live birth [8].

Causes of Female Infertility

According to the FIGO manual (1990) causes are Tubal and Peritoneal Factors (25-35 %), Ovulatory Factor (30-40 %) and Endometriosis (1-10 %) [9] (Table 1).

Ovulation dysfunction (30-40%)	Oligoovulation, Anovulation, Corpus luteum deficiency
Tubal abnormalities (25-35%)	Tubal block may be due to infection, pelvic adhesions etc.
Uterine abnormalities (10%)	Thin endometrium, endometritis, uterine fibroids, Synechiae, congenital abnormalities
Cervical factors (5%)	Cervicitis, cervical polyps, cervical erosion, cervical malignancy
Vaginal Factors	Vaginal atresia, vaginal septum, Narrow introits, Vaginitis and purulent discharge

Table 1: Cause of infertility in female [9].

Management

Depending on the cause it falls into two main categories:

- Medications or Surgery Fertility drugs (clomiphene citrate or FSH and LH hormone injections) for women with ovulation disorders [2]. These treatments may also be used with an intrauterine sperm injection (IUI), which is when sperm is injected directly into the uterus. Surgery may also be an option when the cause of infertility is blocked fallopian tubes or endometriosis.
- Use Assisted Reproductive Technologies (ART) These technologies include egg and embryo donation, in vitro fertilization, and intracytoplasmic sperm injection (the direct injection of a sperm into an egg).

Anovulation

Ovulation refers to the physical act of rupture of the follicle with the extrusion of the Oocyte. When the follicle does not rupture then ovulation fails and it is called Anovulation. Anovulatory Cycles are Characterised as Menstrual bleeding without Ovulation and Corpus luteum formation.

Causes of Anovulation

- Persistent Oestrogen Secretions [10]

- Abnormal Oestrogen clearance and Metabolism
- Extra Glandular Oestrogen Production
- Loss of Stimulation
- Polycystic Ovarian Disease
- Hyper Thyroidism
- Hyper – Prolactinemia
- Premature Menopause
- Hyper Insulinaemia and Hyper Androgenism
- Discontinuation of OCP.
- Genetic Considerations etc

Treatment for Anovulation

Clomiphene Citrate is the drug of Choice for Ovarian Induction. Other management includes Human Gonadotrophins, Gonadotrophin releasing hormone therapy etc.

Ayurvedic Review

Bandhyatva is described since *Samhita kala* in *Brihattreya* as well as *Laghuttreya*. *Acharya Charaka* and *Acharya Vagbhata* have referred *Bandhya* due to abnormality of *Bijamsa* [11,12] and mentioned as the *Upadrava* of *Yoni vyapada* [13]. According to *Acharya Charaka*, Abnormality in any one out of *Shadbhawas (Matraj, Pitraj, Atma, Satwa,*

Satmya, Rasa) will cause the failure to conceive [14]. In *Sushruta Samhita*, *Bandhyatva* has been described under *Bandhya Yonivyapada*, which is included amongst twenty *Yonivyapadas* [15]. *Acharya Bhela* says that due to the abnormalities of *Bija* of mother and father, non-consumption of congenital *Rasas* and disorders of *Yoni*, the women become *Bandhya* [16]. *Bhavprakash* has mentioned *Bandhya* in *Yonirogadikara* and mentioned *Artavanasha* as one among the 80 *Vatajananatmaja Vikara* [17]. In *Harita Samhita*, *Acharya Harita* has described *Bandhyatva* as a disease, in eighty *Vataja vyadhi*. He has defined *Bandhyatva* as a failure to achieve a child rather than pregnancy, because he has included *Garbhasravi*, *Mritavatsa* also under the classification. The definition of *Bandhyatva* is not mentioned but the types and prognosis of the *Bandhyatva* individuals has been described [18]. In *Kashyapa Samhita* under chapter of *Jatiharani* one is "*Pushpaghni*", which can be related with anovulatory cause of infertility and other various types of disease mentioned which leads to childlessness [19]. In *Ayurveda*, Anovulation refers to *Abeejotsarga*. The Term

Utsarga means to expel or to leave. So, Expulsion of matured ovum from the *Beejagranthi* means *Beejotsarga*. As *Utsarga* is a *Karma* of *Vata* so Vitiolation of *Apana Vata* dosha causes *Abeejotsarga*. *Abeejotsarga* is symptom as well as a disease caused due to vitiolation of *Vata* and *kapha doshas* as they do *Marga-Avarodha* to *Artavaha Strotas* leading to *Abeejotsarga* [20]. According to *Acharya Kashyapa*, the women having amenorrhoea, Scanty menstruation, non-ovulation or useless ovulation (ovum with minimal or absence of capacity of fertilization) should be treated with *Anuvasana Basti* [21].

Classification

The classification of *Bandhyatva* has not been given separately in any classics except *Harita Samhita*, *Rasa Ratna Samucchaya* and *Bandhya Kalpdrum*. *Acharya Charaka* has mentioned *Sapraja*, *Apraja* and *Bandhya* in three different contexts. *Sapraja* means infertility occurs after conceiving one or more children, *Apraja* resembles curable infertility and *Bandhya* resembles incurable sterility [22] (Table 2).

Harita Samhita (Ha.Tritiya Sthana 48)	Rasa Ratna Samucchaya (A.32/1-3)	Bandhya Kalpdrum (Stri Chikitsa Sammucchaya)
Kakavandhya	Adivandhya	Tripakshi
Anapatya	Vataja	Subhrati
Garbhasrav	Pittaja	Sajja
Mritavatsa	Kaphaja	Trimukhi
Balakshaya	Sannipataja	Vyaghrini
Garbhakosa bhanga	Bhutaja	Baki
	Daivaja	Kamili
	Raktaja	Vyaktini
	Abhicharaja	

Table 2: Classification of *Bandhyatva*.

Nidana: While describing *Nidanas* for *Bandhyatva*, the *acharas* has mentioned the important factors as constituents of *Garbha* which included *Ritu* (appropriate time), *Kshetra* (healthy Uterus and passage), *Ambu* (proper nutrition of mother), *Bija* (healthy ovum and sperm), normalcy of *Hridaya* or Psychology, properly functioning *Vayu* and *Shadbhavas*; abnormality in one of these can cause infertility [23-25]. *Acharya Charaka* has clearly described the *Nidanas* of *Bandhyatva* which are nearly identical to the causes of infertility according to modern science. Abnormality of *Yoni*, psychology (*Manobhigata*), *Shukra*, *Asrik*, diet and mode of life (*Shukra-artava, Ahara - Vihara dosha*), coitus at improper time (*Akala Samyoga*) and loss of *Bala* (*Balakshaya*) have been included, in the causes of delay in achieving conception

by an otherwise fertile or *Sapraja* woman by *Charaka* [26].

Specific Nidanas of Anovulation: There are other scattered references to anovulation, including *Beejopaghata*, *Pushpopaghata*, and *Abeejatva*. Several circumstances with their *Nidanas*, which appear to be associated with *Abeejotsarga* and result in *Bandhyatva*, are being described here [27].

- *Pushpaghni Revati Jataharini- Acharya Kashyapa* described *Pushpaghni* as a *Jataharini*, a woman who menstruates on a regular basis but is unable to conceive. *Pushpaghni*, like *Jataharini*, is curable. It most likely refers to infertility caused by decreased ovarian hormones, resulting in the absence of ovulation. A slight

increase in hormone secretion from the adrenal cortex causes hirsutism, or facial hair. *Adharma*, which can be interpreted as an infection, is the cause of *Revati's* initiation. Infection causes *Sanga* in the *Srotasa*, which transforms into *Vikruti*, similar to anovulation.

- *Ashtartava dushti*- According to *Acharya*, if *Ashtartava dushti* is left untreated or improperly treated, it creates *Abeejata*, i.e., the inability to do *prajotpadana*. *Acharyas* have not provided a detailed explanation for the origin of these eight menstruation diseases. It can be claimed that certain circumstances responsible for the aggravation of particular *Doshas*, in conjunction with non-observance of reproductive system regulations, are the causal factors. *Vata* gets aggravated, resulting in "*Dhatu- Kshaya*". Due to this *Dhatu Kshaya*, *Rasa Dhatu* diminishes, which ultimately results in the *Kshaya* of its *Updhatu*, namely *Artava* (Anovulation).
- *Artavavaha Sroto Vighata*- In this case, the *Viddha* of *Artavavahi Dhamanyas* indicates damage to the ovaries and ovarian veins, which impedes the normal ovulation process and finally causes *Artavanasha* (Anovulation). *Abhighata* vitiates *Vayu* as well. Therefore, once more, vitiating *Vayu* results in *Sanga* and *Dhatu Kshayatmaka sthiti* in *Artavavaha Srotasa*, followed by *Artavanasha* (anovulation).
- *Avarana*- According to *Sushruta* and *Vagbhata's* concept of *Artavanasha*, both *Vata* and *Kapha*, when aggravated, obstruct the path, and thus *Artava* is destroyed. *Artava* can be interpreted as *Antahpushpa*, or ovum, and its *Nasha* as *anovulation*. The *Kapha* and *Vata* obstruct the *Artava Vaha Srotas*, making *Artava* invisible (Ovulation does not occur). It is a *Sanga Pradhana Vikara* as well.
- *Bandhya Yoni Vyapad*: According to *Sushruta*, the *Artava* is destroyed at *Bandhya Yoni*. *Artava* might be interpreted as an ovum and *Bandhya* as an anovulatory menstrual cycle. Ovum is a microscopic structure; it was assumed to have existed in those days due to its involvement in conception. The root cause of *Bandhya Yonivyapada* is vitiating *Vata dosha*. Here, *Nashtartava* or anovulation is one of *Bandhya's* symptoms.
- *Anuvasana yoga - Abeejatva*: Here, *Nashta Beeja* directly indicates Anovulation.
- Use of *Tikshna Virechana* in *Mridukostha*: According to *Acharya Kashyapa*, when *Tikshna Virechana* is administered to a *Mridukostha* woman, *Vata* becomes worsened and induces *Beejopaghata*. Here, *Apana Vayu* is primarily responsible for *Beejopaghata* because it may inhibit the extrusion of the oocyte from the follicle.
- *Beeja dushti*: During the prenatal time, if the mother consumes *Vata Prakopaka Ahara* and *Vihara*, the *Vata* becomes inflamed and ruins the *Beeja* or *Beeja bhaga* or

Beejabhagavayava in the female child, causing congenital abnormalities of the female genital organ, known as *Bandhya*.

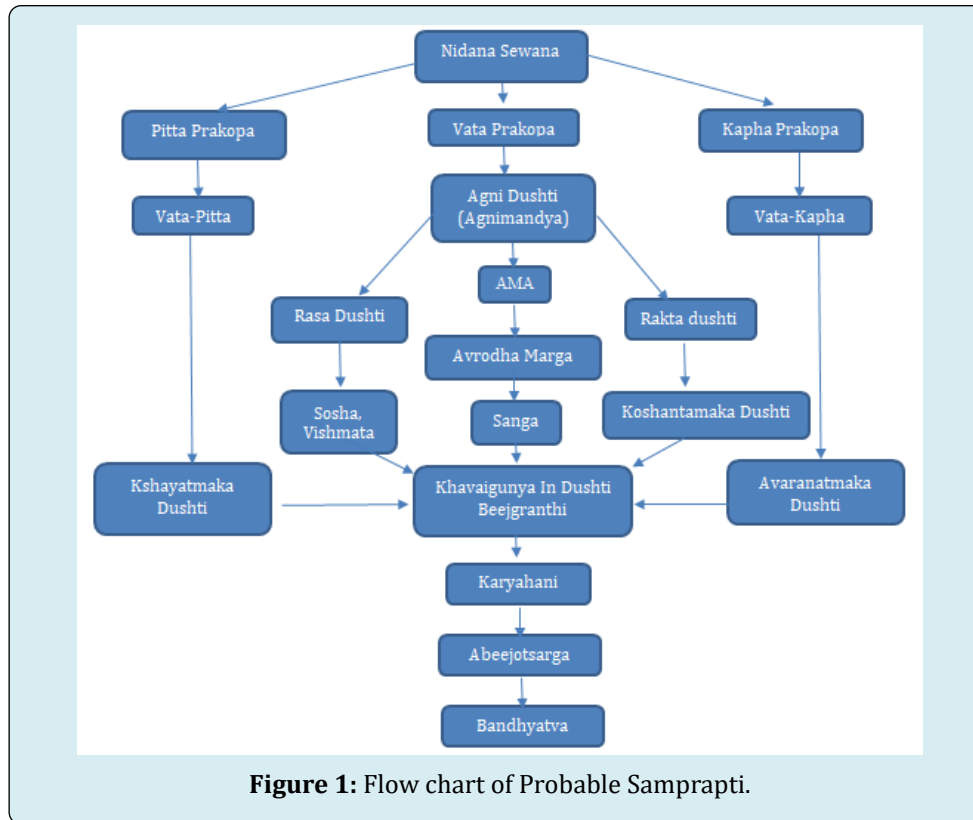
- *Asrik dosha*: The Word "*Asrik*" refers to both ovum and menstrual blood. Abnormalities of ovum and ovarian hormones produce infertility.
- *Dietetic habit*: In addition to these factors, poor dietary practises are a leading cause of anovulation. Because of, *Ati Ushna Annapana*, *Veerya*, *Artava*, *Beeja* becomes vitiated. Practicing improper dietary practises such as *Vishamashana*, *Adhyashana*, *Anashana*, and *Viruddha annapana* promotes *agnivaishamy* and *Rasadushti*, which culminates in *artava dushti* in the form of Anovulation.

Purvarupa [27]: In *Kashyapa Samhita*, *Acharya Kashyapa* has described "*Bandhya Yoni*" in context of *Vataja Nanatmaja Vyadhi*. *Avyakta Purvarupa* of *Vata Vyadhi* has been mentioned by *Charaka*. So, *Purvarupa* of *Bandhyatva* is not described by anyone, anywhere.

Rupa [27]: A woman, in whom *Artava* has been destroyed, is termed as *Bandhya*.

Probable Samprapti [28](Figure 1)

Due to *Nidana Sevana* (causative factors), *Dosha* (three humours- *Vata*, *Pitta*, *Kapha*) and *Agni* (biochemical transformers) get vitiating resulting into *Ama* (un-metabolized food) formation. The *Ama* formed adheres to *Srotasa* (channels) and causes *Avarodhatmaka Dushti* (improper functioning due to obstruction of channels). *Ama* spreads throughout the body, propelled by the vitiating *Vata* along the *Rasavaha Srotasa* (channels carrying the nutritional essence). Due to hypo functioning of *Jatharagni* (gastrointestinal metabolism), *Dhatvagni Mandya* (slow tissue metabolism) also occurs. Due to *Mandagni* (slow digestion) and *Nidana Sevana*, *Rasa* (plasma), *Rakta* (blood) *Dhatu* (tissue) gets vitiating. Also, the *Dhatvagni Mandya* causes the *Kshayatmaka* (declining) effect on the *Artava* (ovum) i.e., the production of *Artava*, *Updhatu* (subsidiary or secondary tissue product) of *Rasa dhatu* or *Rakta dhatu* becomes less. Thus, it is the *Upadhatvatmaka Dushti* (malfunctioning of secondary tissue products). *Vishvamitra* has clarified that hair thin vessels fill the uterus for whole month to receive *Bija* (ovum) and due to *Rasa dushti*, *Poshanatmaka* (nourishment) *Dushti* can occur. The vitiating *Apana Vayu* (and *Kapha* when get mix can cause *Avaranatmaka Dushti* (malfunctioning due to occlusion. The vitiating *Vata* along with *Pitta* causes the *Artava kshaya* i.e., *Kshayatmaka Dushti*. All these factors may cause *Abeejotsarga* (anovulation) which may lead to infertility [28] (Table 3).



Dosha	Tridosha with predominant vata
Dhatu	Rasa, Rakta
Updhatu	Artava
Srotas	Artavavaha
Srotodusti	Sanga
Udbhavasthanana	Pakvasaya [mula sthana of vata]
Adhithana	Yoni
Vayadhisvabhava	Chirakari
Marga	Abhyantara (Garbhashaya as kosthanga)

Table 3: Samprapti Ghataka [28].

Management

The *Bandhyatva Chikitsa* includes-treating the underlying pathological condition of infertility, Avoiding the etiological factors (*Nidana parivarjana*), basic treatment methods of *Bandhyatva* by *Garbhaprada yogas* and following regimens indicated in *Garbhadhana* [29].

Nidana Parivarjana:

Infertility is a condition caused by different etiological factors. Identifying those causes and strictly avoiding them is the first and foremost thing in the treatment.

Treating the underlying pathology: Treatment of specific causes responsible for infertility such as all gynaecological disorders, disease of Shukra and Artava should be done because it is said that pregnancy occurs only in healthy reproductive organs (Ch. Chi. 30/125)

- Treatment for *Asrik dosha*
 - *Panchakarma- Doshanusara vamanadi prayoga*
 - *Sthanika Chikitsa- Kalka, Pichu, Yoni Prakshalana*
 - *Shukra dosha hara Chikitsa- Rasayana, Vajeekarana, Mutra roga hara dravyas*
- Treatment for *Yonivyapad* - After proper *Purvakarma, Panchakarma Chikitsa* should be given. As *Vata* is the prime cause for *Yonivyapad*, without vata vitiation no *Yoni rogas* will manifest, that should be controlled well. Application of *Lavana Taila, Swedana* with *Pinda sweda* and *Kumbhika sweda, Parisheka* with *Sukhoshna Jala, Vatahara ahara* and according to the condition after *Shodhana, Uttara Basti* can be administered.
- Treatment of *Anartava* - In a condition of *Artava nasha, Acharya Kashyapa* mentioned use of *Shatavari – Satapushpa* by use of this *Bandhya* or even *Shanda* can get a son.

Regimens indicated in *Garbhadhana*: As *Purva Samyoga Vidhi* some regimens are told, i.e., *Shodhana*, maintenance of *Sadvritta*, avoiding negative emotions. By proper purification

and *samskara yoni*, *Garbhashaya*, *beeja* and *manas* will remain unvitiated and are ensured leading to healthy pregnancy by perfect unification of *beeja*.

Panchakarma along with other basic methods in Bandhyatva (Anovulation)

- The infertile women should be prescribed *Vamana*, *Virechana* and *Asthapana Basti* by which she conceives positively.
- *Vamana*- *Vamana*, when given for *Kapha dosha nirharan*, performs the *Soumya Dhatu Shamana* and ignites the *Agni*. Thus, *Dhatu*s in the body, helps in *Pitta vrudhi* and ultimately increases the quantity and quality of *Artava* in the *Stree*.
- *Virechana*- According to *Kashyapa Samhita*, the best treatment for *Akarmanya Beeja*, also known as anovulation, is *Virechana*.
- *Basti* -
 - *Niruha Basti* is considered as *Amrutha* for an infertile woman.
 - *Anuvasana Basti* is an ideal treatment in *Beeja Dosha sambandhit Bandhyatva*.
 - In cases of *Beeja Dosha Bandhyatva*, like *Alpa dosha*, *Kashta Artava* and *Nashta Beeja*, *Anuvasana Basti* is ideal.
 - *Yapana Basti* is very ideal in *Stree Bandhyatva*. It performs both *Niruha Basti* and *Anuvasana Basti* which does both *Snehana* and *Shodhana karma*.
 - *Uttara Basti* removes the *Srotosangha* and corrects the *Artavagni* which regulates the menstrual cycle, thus resulting in ovulation
- *Nasya* - The medications administered through the nasal route reaches the *Shiras* and helps in pulsatile action of Gonadotrophin releasing hormones and promotes the ovulation. Thus, helping in treatment of infertility. *Lakshmana Kalka* with *Ghee* or milk for *Nasya* is indicated.
- *Ashwagandha siddha Ksheerapaka* every day in morning hours after *Rutu snana*
- *Lakshmana mula* uprooted in *Pushya nakshatra*, pounded with milk

Other yogas: *Narayana Taila*, *Shatavari Taila*, *Phala Ghrita*, *Lasuna Ghrita*, *Shatavari Ghrita*, *Kalyanaka ghrita*, *Kushmanda Avaleha*.

Discussion

In the ancient *Ayurvedic* texts, the *Acharyas* emphasized several essential factors that contribute to the formation of *Garbha* (embryo). These factors include *Ritu* (appropriate timing), *Kshetra* (healthy uterus and passage), *Ambu* (adequate nutrition for the mother), *Bija* (healthy ovum and sperm), normalcy of *Hridaya* or Psychology, and proper

functioning of *Vayu* and *Shadbhavas*. Any abnormalities in these factors can lead to infertility. Thus, it becomes crucial to ensure the health of the uterus, vagina, cervix, tubes, ovaries, ovum, and sperm, alongside maintaining a proper diet and psychological well-being of the mother, in order to achieve a healthy pregnancy. Conception occurs when a mature ovum is successfully fertilized by a qualified sperm and attaches to the uterine wall. However, unsuccessful fertilization and infertility can arise due to poor quality of the ovum, sperm, or both, along with other contributing factors. According to *Ayurveda*, *Vata* is considered the primary causative factor for female reproductive disorders, including infertility. Without *Vata*, the *Yoni* (female genital organs) never get spoiled [30]. Additionally, *Vayu* plays crucial roles in *Vibhajana* (cell division leading to ovum development in the ovary) and *Pravartana* (ovulation). *Vata* is responsible for completing the process of cell division for ovum formation, known as *Dhatu Vyuha Kara*. Moreover, *Apana Vayu* governs the process of *Pravartana* [31], indicating that ovulation is under the influence of *Vata*. Any imbalance or vitiation of *Apana Vata* can affect ovulation.

As per the teachings of *Charaka Samhita*, the primary factor contributing to the accumulation of *Ama* (toxins resulting from undigested food) is *Agni* (digestive fire), and all diseases arise due to imbalances in *Agni*. In the case of Anovulation, where the release of the ovum is hindered due to *Marga-avarodha* (blockage of the reproductive channels) caused by *Vata* and *Kapha*, it is crucial to address these *doshas* and eliminate the *Marga-avarodha*. This can be achieved through *Shodhana* (cleansing) and *Shamana* (pacifying) treatments. Thus, the first line of treatment includes *Nidana Parivarjana* (avoidance of causative factors), *Agni deepana* (enhancing digestive fire), and *Vatanulomana* (normalizing *Vata*).

In summary, the holistic approach of *Ayurveda* recognizes the importance of multiple factors in achieving a healthy pregnancy, including the balance of *doshas*, proper functioning of reproductive organs, nutrition, psychological well-being, and digestive fire. By addressing these aspects through appropriate treatments, *Ayurveda* aims to promote fertility and overcome infertility.

Conclusion

Infertility has increased tremendously in the past decade and this is due to the result of a combination of social, environmental, psychological, and nutritional factors. Today, the modern medicine has the ability to find out the causes of infertility in an individual through several diagnostic tests and examinations. Using these tests, the treatment focuses on correcting and treating the dysfunction. In *Ayurveda*, etiology, clinical features and treatment of *Bandhyatva* has

been described in scattered manner throughout the texts. It is described under the heading of *Yonivyapad*, *Artava dushti*, *Beeja dushti*, *Jataharini* and *Matrijhbavadusti*, which are comparatively as gynaecological disorders. Ayurveda addresses each body type and boosts the body systems involved in fertilisation, making it a great choice for fertilisation. Ayurveda builds Ojas, improves health, stimulates the hypothalamus and pituitary glands, and indirectly causes the ovaries to mature and release eggs by addressing internal balances and external stimuli. Ayurveda offers a non-invasive, low-cost, and non-iatrogenic alternative and complement to current western therapy for female infertility.

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