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Review Of Pumsavana Sanskara In Ayurveda: Classical Concepts and Modern Perspectives

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Abstract

Pumsavana Sanskara is an important prenatal practice described in classical *Ayurvedic* and Indian medical traditions. It is traditionally performed during the early stages of pregnancy and involves specific dietary, medicinal, nasal, and ritual procedures. Classical *Ayurvedic* texts describe *Pumsavana* primarily in relation to attaining healthy and desirable progeny and, in several passages, specifically associate it with the desire for a male child. Various preparations involving herbs, milk, curd, and other substances are described, with administration sometimes recommended orally or nasally. Classical literature also mentions performing certain procedures during *Pushya Nakshatra*.

This review examines the classical concept of *Pumsavana Sanskara* with reference to *Charaka Samhita* and *Ashtanga Hridaya* and explores its possible interpretation in light of modern reproductive biology, embryology, genetics, and epigenetics. Modern science establishes that chromosomal sex is determined at fertilisation by the sperm's sex-chromosome contribution, while subsequent gonadal and phenotypic differentiation involves a complex network of genes and hormones. The SRY-SOX9 pathway plays a major role in testicular differentiation, while several interacting pathways participate in ovarian development and sexual differentiation.

There is currently no scientifically validated evidence that a herbal preparation, nasal administration, dietary intervention, ritual, or timing according to a lunar constellation can change the chromosomal sex of an already conceived foetus. Therefore, the classical descriptions should be interpreted within their historical and cultural context. From a contemporary perspective, *Pumsavana* may be studied as a broader prenatal health concept involving maternal nutrition, psychological well-being, foetal development and the intrauterine environment. Further interdisciplinary research is required to evaluate the pharmacological properties and pregnancy safety of the herbs traditionally described under *Pumsavana*.

Keywords: *Pumsavana Sanskara*, *Pumsavana Karma*, *Ayurveda*, Pregnancy, Prenatal Care, Genetics, Foetal Development, Epigenetics

Introduction :

Ayurveda places considerable importance on preparing healthy progeny and on the mother's health before, during, and after pregnancy. Classical literature discusses conception, embryonic development, maternal diet and behaviour, foetal development, and measures intended to promote healthy offspring. Within this broader framework, **Pumsavana Sanskara** occupies an important position among prenatal practices.

The term *Pumsavana* is traditionally interpreted in relation to the development or attainment of *pums*, commonly understood as a male child. Classical descriptions, however, place it within a broader conceptual framework of praja-utpatti, garbhasthapana, fetal development, and the attainment of healthy progeny.

Ayurvedic literature generally associates Pumsavana with the early period of pregnancy. Different classical authorities describe different formulations and routes of administration, including oral administration and nasal instillation. Several formulations contain medicinal plants processed with milk, curd or water. Some procedures are specifically associated with **Pushya Nakshatra**, which is traditionally regarded as an auspicious period for medicinal and health-related activities.

The classical descriptions reflect the medical knowledge, reproductive concepts and sociocultural circumstances of their period. In particular, the desire for a male child was historically associated with lineage, inheritance and social responsibilities. Consequently, references to

male progeny in ancient texts need to be understood within their historical setting rather than interpreted as evidence of a modern scientific method of altering foetal chromosomal sex.

Modern reproductive biology provides a substantially different understanding of sex determination. In humans, chromosomal sex is established at fertilisation according to the sex chromosome carried by the fertilising sperm. Subsequent differentiation of the bipotential gonad involves an intricate genetic pathway in which SRY and SOX9 play major roles in testicular development, while other pathways support ovarian differentiation.

Therefore, this review examines *Pumsavana* from two complementary perspectives: first, as a classical Ayurvedic prenatal practice; and second, as a historical concept that can be critically discussed in relation to contemporary reproductive biology, genetics, foetal development, and maternal-foetal health.

Aim

To critically review the classical concept and procedures of *Pumsavana Sanskara* described in *Ayurveda* and examine their possible relevance to modern reproductive biology and prenatal health.

Objectives

1. To review the concept of *Pumsavana Sanskara* described in classical Ayurvedic texts.
2. To examine the formulations, methods of administration and timing described for *Pumsavana*.
3. To understand the traditional importance of *Pushya Nakshatra* in relation to *Pumsavana*.
4. To correlate the classical concept with modern embryology, genetics and foetal development.

5. To critically examine the traditional concept of sex determination in the light of current scientific knowledge.
6. To identify areas for future research concerning the pharmacological properties and safety of the herbs described in *Pumsavana*.

Materials And Methods :

The present study is a **narrative literature review** based on classical *Ayurvedic* literature and selected modern scientific literature.

We reviewed classical references on *Pumsavana Sanskara* from *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*, with particular attention to *Sharira Sthana* and descriptions of conception, pregnancy, and *foetal* development.

We reviewed modern literature on embryology, reproductive biology, genetics, *gonadal* differentiation, and epigenetic influences on *foetal* development to examine the classical concept from a contemporary scientific perspective.

The available literature was critically *analysed* under the following domains:

- Concept and definition of *Pumsavana*
- Timing of *Pumsavana*
- Classical formulations
- Routes of administration
- Role of *Pushya Nakshatra*
- Concept of desired progeny
- *Foetal* development
- Genetic mechanisms of sex determination
- Potential relevance to maternal-*foetal* health
- Safety and ethical considerations

The review does not attempt to establish the efficacy of *Pumsavana* in determining fetal sex.

Rather, it evaluates the classical descriptions in their historical context and identifies scientifically testable areas for future research.

Review Of Literature :

1. *Pumsavana* According to *Charaka Samhita*

Acharya *Charaka* describes *Pumsavana* in the context of early pregnancy and the desire for specific offspring characteristics. The procedure is described before the development of clearly *recognisable foetal* sex characteristics.

According to the cited passage of the *Charaka Samhita*, several preparations are described for a pregnant woman desirous of a male child. These include preparations involving the buds of the ***Vata (Ficus benghalensis)*** tree, particularly those associated with a cow shed, administered with curd during *Pushya Nakshatra*.

Another preparation involves **white mustard seeds processed with curd**. *Charaka* also describes other substances and procedures, including preparations involving small fish and liquids in which heated miniature figures made of metals such as gold, silver or iron have been cooled.

Certain medicinal preparations are also described using drugs identified traditionally as:

- *Jivaka*
- *Rishabhaka*
- *Apamarga*
- *Saireyaka/Sahachara*

These preparations are described as being administered orally in milk.

A nasal route is also described. In one procedure, water from cooked *Shali* rice is used for nasal administration through the right nostril.

These descriptions demonstrate that *Pumsavana*

was not a single fixed formulation but rather a group of procedures involving different substances and routes of administration.^[1]

2. Pumsavana According to Ashtanga Hridaya

Acharya Vagbhata also describes *Pumsavana* procedures.

According to the cited passage of *Ashtanga Hridaya*, the root of ***Brihati (Solanum indicum)*** processed with milk is administered through the right nostril to a pregnant woman desirous of a male child. A corresponding procedure involving the left nostril is described for a female child. Similarly, ***Lakshmana (Ipomoea sepiaria)*** processed with milk and preparations involving *Vata* sprouts are mentioned among the procedures associated with *Pumsavana*.^[2]

These descriptions indicate that *Ayurvedic* authors considered medicinal substances, their processing media, route of administration, and timing important components of the procedure.

3. Pushya Nakshatra and Pumsavana

Pushya, traditionally also known as *Tishya*, occupies an important place in classical Indian astrological and *Ayurvedic* traditions. It is traditionally regarded as an auspicious *Nakshatra* for various medicinal and religious activities. In the context of *Pumsavana*, several classical descriptions recommend administering particular preparations during *Pushya Nakshatra*.

From a traditional *Ayurvedic* perspective, collecting and administering medicinal substances at the right time was considered an important part of therapeutic practice. The preference for fresh plant material collected under prescribed

environmental conditions may also reflect an effort to ensure the quality of the medicinal material. However, from a modern scientific perspective, claims regarding a specific lunar constellation increasing the efficacy of a medicinal preparation require controlled experimental evidence. Such claims should therefore be regarded as traditional concepts unless supported by reproducible pharmacological or clinical research.^[3]

4. Classical Procedures Described Under Pumsavana^{[4][5][6][7][8][9][10]}

The literature reviewed describes several procedures, including:

4.1 Vata Bud Preparation

The literature describes combining tender *Vata* buds or sprouts with curd and other ingredients and administering them orally.

4.2 Medicated Milk

Milk processed with drugs traditionally classified under *Jivaniya* or related groups is described for maternal consumption.

4.3 Nasal Administration

Certain preparations are administered through the nostril, representing a form of *Nasya* or nasal drug administration.

4.4 Preparations Involving Small Fish

Classical descriptions also mention small fish or *Matsyaka* in connection with *Pumsavana*. Such descriptions should be understood as historical textual documentation and should not be translated directly into modern clinical recommendations without appropriate safety evaluation.

4.5 Metal-Associated Procedure

A preparation involving miniature figures made from gold, silver or iron, heated and subsequently

cooled in milk or water, is described. The physiological or pharmacological basis of this procedure remains unclear based on current biomedical knowledge. Its interpretation requires historical and pharmaceutical investigation rather than assuming a demonstrated biological mechanism.

4.6 Post-procedure Diet

After administration of the prescribed preparations, classical literature recommends nourishing dietary measures, including milk and preparations associated with the *Jivaniya* group of herbs. The dietary component of *Pumsavana* is particularly relevant to modern prenatal health because maternal nutritional status has an established relationship with *foetal* growth and pregnancy outcomes, although this does not validate the traditional claim of altering *foetal* sex.

5. *Pumsavana* and the Concept of Healthy Progeny

An important aspect of *Pumsavana* is that it should not be examined exclusively through the question of *foetal* sex.

Ayurvedic prenatal concepts repeatedly emphasise:

- Healthy conception
- Proper development of the embryo
- Maternal nutrition
- Appropriate conduct during pregnancy
- Psychological well-being
- Prevention of congenital abnormalities
- Development of healthy progeny

Thus, *Pumsavana* may be considered within the broader *Ayurvedic* philosophy of ***garbha pariposhana*** and maternal-*foetal* care.

The classical descriptions of desired progeny can

consequently be separated into two conceptual domains:

Historical objective: attainment of desired sex or characteristics of the offspring.

Broader prenatal objective: promoting healthy *foetal* development and healthy progeny.

The second domain provides a more appropriate basis for contemporary research.

6. Modern Understanding of *Foetal* Sex Determination

Modern embryology demonstrates that human sex determination and sexual differentiation are complex biological processes.

Chromosomal sex is established at *fertilisation*. In the conventional XX/XY system, the ovum contributes an X chromosome, while the sperm contributes either an X or Y chromosome. Thus, the chromosomal complement is established at conception. Subsequent *gonadal* differentiation involves a network of genes rather than a single isolated mechanism. In an XY embryo, SRY expression initiates a molecular cascade involving **SOX9** and other genes that promote testicular differentiation. Other pathways involving genes such as **WNT4, RSP01, and FOXL2** support ovarian development and maintenance.^[11]

Gonadal differentiation begins early in embryonic development, after the bipotential gonad forms. The genital system subsequently undergoes further differentiation under the

influence of genetic and hormonal pathways. Therefore, modern biology does not support the proposition that administration of a herbal preparation after conception can change the chromosomal sex of the *foetus*.

7. *Pumsavana* and Molecular Biology

The *Pumsavana* might influence sex determination through molecular mechanisms involving genes such as SRY, SOX9, DAX1, WNT4 and other developmental genes. This is an interesting **hypothesis for scientific investigation**, but it should not be presented as an established mechanism. Modern molecular biology demonstrates that sexual differentiation involves a highly regulated network of transcription factors, *signalling* pathways and hormones. SRY initiates testicular differentiation in the typical XY pathway, with SOX9 being a major downstream regulator. Currently, evidence is insufficient to establish that any classical *Pumsavana* preparations can modify this pathway in a human embryo in a way that changes chromosomal sex. Therefore, the relationship between *Pumsavana* and molecular genetics should presently be described as a **research hypothesis rather than a demonstrated pharmacological mechanism.**^{[12] [13] [14]}

8. *Pumsavana* and Epigenetics

Epigenetics concerns changes in gene expression and regulation that do not require alteration of the underlying DNA sequence. Nutritional status, environmental exposures, hormones and other intrauterine factors can influence developmental processes and gene expression. This provides an interesting area for future investigation of *Ayurvedic* prenatal practices. However, we must maintain an important distinction.

Epigenetic influence on foetal development is not equivalent to changing chromosomal sex.

A maternal dietary or medicinal intervention may

potentially influence physiological development without changing whether the embryo has an XX or XY chromosomal complement.

Consequently, future research into *Pumsavana* should focus on measurable outcomes such as:

- Maternal nutritional status
- Maternal stress and psychological well-being
- Foetal growth
- Placental function
- Birth weight
- Developmental parameters
- Safety biomarkers
- Gene-expression patterns
- Epigenetic markers

rather than assuming an ability to change foetal chromosomal sex.

Observations :

Scientific Interpretation Of *Pumsavana* :

Classical concept	Possible contemporary area of investigation	Present scientific status
Maternal dietary recommendations	Maternal nutrition and fetal growth	Scientifically plausible area for study
Administration of medicinal herbs	Pharmacological and toxicological effects	Requires experimental evidence
Nasal administration	Drug delivery and pharmacokinetics	Requires specific pharmacological studies

Classical concept	Possible contemporary area of investigation	Present scientific status
<i>Pushya Nakshatra</i>	<i>Chronobiology/cultural practice</i>	No established evidence of sex determination
Desire for male progeny	Historical <i>sociocultural</i> concept	Not supported as a method of changing chromosomal sex
Healthy progeny	Maternal-fetal health	Relevant contemporary research area
Herbal influence on fetal development	Developmental biology/ <i>epigenetics</i>	Requires controlled experimental research
Change in fetal sex after conception	Genetic sex determination	No validated evidence for <i>Pumsavana</i>

Discussion :

Pumsavana Sanskara represents an important and distinctive prenatal concept in classical *Ayurveda*. Its descriptions combine medicinal administration, dietary measures, timing, ritual practice and the desire for healthy progeny. Classical *Ayurvedic* authors describe *Pumsavana* particularly in relation to the early period of pregnancy. The use of oral and nasal routes suggests that ancient physicians considered the route of administration an important determinant of therapeutic action. The repeated association with *Pushya Nakshatra* also demonstrates the integration of medical practice with the broader cosmological and ritual framework

of classical Indian culture. A significant issue in interpreting *Pumsavana* is the classical objective of obtaining a male child. This should be recognised as part of the historical *sociocultural* context. Modern science does not provide evidence that *Pumsavana* preparations can alter the chromosomal sex of an established pregnancy.

At the same time, the broader *Ayurvedic* concern with healthy progeny, maternal diet and fetal development deserves independent consideration. The classical recommendations for nourishing foods, milk preparations and maternal care may be investigated separately from the historical concept of sex selection.

Modern genetics provides a clearer understanding of the biological processes involved in sex determination. In humans, chromosomal sex is established at *fertilisation*, while subsequent sexual differentiation is controlled by an interacting network of genetic and hormonal pathways. SRY and SOX9 play major roles in testicular development in the typical XY pathway, while ovarian differentiation involves several other interacting pathways.

Accordingly, the statement that *Pumsavana* can change *foetal* sex should not be presented as an established scientific fact.

Similarly, statements suggesting that specific *Ayurvedic* herbs act on SRY, SOX9 or other sex-determining genes should be considered speculative unless supported by experimental evidence.

The modern scientific value of studying *Pumsavana* therefore lies in identifying **which components of the traditional practice may measurably affect maternal or foetal health.**

For example, selected medicinal plants described in *Pumsavana* could be subjected to:

1. *Pharmacognostic* identification.
2. *Phytochemical* analysis.
3. Toxicological evaluation.
4. Reproductive toxicity studies.
5. Animal studies under appropriate ethical standards.
6. Molecular studies of gene expression.
7. Pharmacokinetic investigations.
8. Controlled clinical research where safety has been established.

Pregnancy presents a particularly sensitive physiological state, and therefore traditional use alone cannot be regarded as sufficient evidence of safety. Some herbs that are relatively safe in non-pregnant adults may have different pharmacological effects during pregnancy.

The discussion of *Pumsavana* should also be situated within India's contemporary ethical and legal framework. The **Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act, 1994**, prohibits sex selection and regulates prenatal diagnostic practices, including communication of *foetal* sex.^[15]

Consequently, contemporary academic discussion of *Pumsavana* should focus on **maternal-foetal health and healthy progeny**, rather than promoting sex selection.

Limitations Of The Study :

The present review has several limitations.

1. It is primarily a narrative literature review and does not constitute a systematic review or meta-analysis.

2. Many classical formulations described under *Pumsavana* have not been evaluated using contemporary pharmacological and toxicological methods.
3. Exact botanical identification of some classical drugs remains uncertain.
4. Classical descriptions reflect the medical and *sociocultural* framework of their historical period.
5. There is insufficient clinical evidence to establish the efficacy of *Pumsavana* in influencing *foetal* sex or specific *foetal* characteristics.
6. Modern molecular explanations concerning possible effects of *Ayurvedic* preparations remain hypothetical unless experimentally demonstrated.
7. The safety of several traditional preparations during pregnancy requires systematic evaluation.

Future Research Perspectives :

Future research on *Pumsavana* may be directed towards scientifically measurable aspects rather than attempting to validate sex-selection claims.

1. *Pharmacognostic* studies

Accurate botanical identification and authentication of all herbs mentioned in classical *Pumsavana* formulations should be undertaken.

2. *Phytochemical* studies

Identify and *characterise* the active constituents of traditionally used plants.

3. Safety studies

Reproductive toxicity, *teratogenicity* and maternal safety should be evaluated before considering clinical use of any traditional formulation during

pregnancy.

4. Molecular studies

Experimental studies may investigate whether selected plant extracts influence pathways involved in fetal growth, cellular differentiation, oxidative stress or other developmental processes.

5. Epigenetic research

Researchers may explore the potential influence of selected dietary or medicinal components on epigenetic markers, provided they use appropriate experimental models and controls.

6. Maternal health research

Future clinical research could examine outcomes such as maternal nutritional status, stress, sleep, quality of life and pregnancy-related well-being.

7. Fetal development

Where ethically and scientifically appropriate, research may evaluate *foetal* growth and neonatal outcomes rather than *foetal* sex modification.

Conclusion :

Pumsavana Sanskara is an important prenatal concept described in classical *Ayurveda* and represents the ancient emphasis on healthy progeny, maternal care and appropriate prenatal practices. Classical texts describe a variety of medicinal, dietary, nasal and ritual procedures, frequently performed during the early stages of pregnancy and sometimes associated with *Pushya Nakshatra*.

Classical literature also describes *Pumsavana* in connection with the desire for a male child. Such descriptions should be understood within their historical and *sociocultural* context. Modern reproductive biology establishes that chromosomal sex is determined at *fertilisation* and that

subsequent sexual differentiation involves a complex network of genetic and hormonal mechanisms, including *SRY*, *SOX9* and other interacting developmental pathways.

At present, there is **no validated scientific evidence that *Pumsavana* or its traditional herbal preparations can change the chromosomal sex of a *foetus* after conception.**

Therefore, claims of sex modification should not be presented as established scientific effects.

The more productive contemporary interpretation of *Pumsavana* is as a historical *Ayurvedic* prenatal-health concept encompassing maternal nutrition, medicinal care, *foetal* development and preparation for healthy progeny. The traditional formulations offer an interesting field for pharmacological, toxicological, developmental, and molecular research, provided such research follows modern scientific and ethical standards.

Future interdisciplinary research involving *Ayurveda*, *pharmacognosy*, obstetrics, embryology, genetics, molecular biology and reproductive medicine may help determine whether particular components of traditional prenatal practices possess clinically useful effects on maternal or fetal health. Such research should clearly distinguish between traditional textual claims, plausible biological hypotheses, **and experimentally demonstrated effects.** Thus, *Pumsavana Sanskara* may be studied as a valuable subject in the history and philosophy of *Ayurvedic* prenatal care, while evidence-based research evaluates its potentially beneficial components without interpreting it as a scientifically established method of *foetal* sex selection.

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Declaration :

Conflict of Interest : None

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