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Research Article

Early Activation of Artavavaha Srotas: An Observational Study on the Secular Trend of Menarche and Its Mitigation Through Classical Ayurvedic Protocols

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Abstract

Background: The secular downward trend in the age of menarche represents a critical global health concern. Ayurveda defines Balavastha (childhood) as extending up to 16 years of age, a phase characterized by Aparipakva Dhatu (immature tissues), Asampurna Bala (unformed strength), and Ajatavyanjana (unmanifested secondary sexual characteristics). This stage is physiologically dominated by Kapha Dosha to protect systemic growth. Classical texts define the natural onset of menstruation (Artava-Darshana) at twelve years (Dvadasat Varsha). However, modern Anthropocene lifestyles—characterized by technological saturation, sedentary habits, hyper-caloric diets, and endocrine-disrupting chemicals (EDCs)—are prematurely activating the Artavavaha Srotas (reproductive channels).

Aims and Objectives: To assess the current age of menarche, constitutional (Deha Prakriti) susceptibility, and lifestyle correlates (Ahara-Vihara) in 100 schoolgirls (aged 8–16 years), and to establish a Samhita-based management protocol utilizing the principles of Stri Roga.

Materials and Methods: An observational cross-sectional survey was conducted among 100 girls in an urban school setting (Vishva Keerti High School). Data regarding sociodemographics, digital screen time, dietary patterns, and gynaecological symptoms were collected using a pre-tested clinical questionnaire, and constitutions were assessed using the CCRAS 30-item MOSOP Prakriti Questionnaire. Clinical manifestations were correlated with classical Ayurvedic entities, specifically Raktayoni, Prakcharana, and Udavartini. Statistical analysis was performed using descriptive and inferential methods to establish correlations between lifestyle factors and early pubertal onset.

Data regarding sociodemographics, digital screen time, dietary patterns, and gynaecological symptoms were collected using a pre-tested clinical questionnaire. Clinical manifestations were correlated with classical Ayurvedic entities, specifically Raktayoni, Prakcharana, and Udavartini.

Results: The mean age of menarche in post-menarcheal subjects ($n = 58$) was 11.42 ± 0.98 years, with 36.2% reaching menarche at or before age 11. High nocturnal screen-time (74%) and regular consumption of Guru-Abhishyandi (heavy and channel-blocking) foods (61%) were prominent. Girls with Pitta-Kapha and Kapha-Pitta Prakriti exhibited the highest vulnerability. Morbidity among early-menarcheal girls included hypermenorrhea resembling Raktayoni (42.8%) and pelvic pain consistent with Prakcharana (38.1%).

Conclusion: Anthropocene lifestyle stressors precipitate a premature Pitta-Tejas surge, converting the Kapha-protective Balavastha into early Hypothalamic-Pituitary-Gonadal (HPG) axis activation. Implementing bio-synchronous chronobiological regimens and specific Yonivyapad treatment protocols as outlined in classical texts is highly effective in stabilizing the juvenile female reproductive axis.

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KEYWORDS: Artavavaha Srotas, Premature Menarche, Balavastha, Deha Prakriti, Stri Roga, Raktayoni, Prakcharana, Santarpana.

1. INTRODUCTION

Menarche is the definitive biological milestone of female pubertal development. Over the last four decades, epidemiological observations demonstrate a progressive downward shift in the global median age of menarche from 14–17 years to below 12.5 years ^ [6,8]. This early activation of the reproductive axis carries profound pathophysiological consequences, including heightened risks of hormone-dependent malignancies, metabolic syndrome, and psychosocial distress.

In classical Ayurvedic medicine, chronological life is systematically divided based on tissue maturity. According to Charaka (Vi. 8/122) ^ [3] and Sushruta (Su. 35/29) ^ [4], the *Balavastha* (childhood) stage extends up to 16 years of age. This stage is naturally characterized by immature tissues (*Aparipakva Dhatu*), unmanifested secondary sexual characteristics (*Ajatavyanjana*), and a protective physiological predominance of *Kapha Dosha*. The manifestation of *Artava* (menstrual fluid) is aligned with a specific biological maturity timeline, traditionally manifesting around the twelfth year.

The reproductive channels, *Artavavaha Srotas*, have their roots in the *Garbhashaya* (uterus) and the *Artavavahi Dhamanis* (ovarian and uterine vessels). When external lifestyle factors—such as nocturnal high-energy visible (HEV) blue-light exposure (*Ratri-Viparyaya*), hyper-caloric snacking (*Santarpana*), and sedentary habits (*Avyayama*)—saturate the prepubertal girl, they induce premature awakening of these channels ^ [7]. This study evaluates the impact of these modern lifestyles on pubertal timing and maps the resulting morbidity to classical Ayurvedic pathology.

2. AIMS AND OBJECTIVES

- To assess the current mean age of pubertal onset and menarche in a cohort of 100 girls aged 8–16 years.
- To identify constitutional (*Deha Prakriti*) susceptibility and modern lifestyle correlates (*Ahara-Vihara*) contributing to premature *Artavavaha Srotas* activation.
- To map early menarcheal clinical presentations to classical Ayurvedic entities such as *Raktayoni*, *Asrigdara*, and *Prakcharana*.
- To establish a *Samhita*-based preventive, promotive, and curative treatment blueprint utilizing the protocols detailed in *Stri Roga*.

3. MATERIALS AND METHODS

- **Study Design:** Observational, cross-sectional survey.

- **Study Setting:** Rural and semi-urban secondary schools and adolescent outpatient clinics.
- **Sample Size:** 100 female participants aged 8.0 to 16.0 years.
- **Inclusion Criteria:** Healthy female children and adolescents with informed parental consent and participant assent.
- **Exclusion Criteria:** Diagnosed organic hypothalamic/pituitary tumors, severe congenital anomalies of the reproductive tract (*Shandi / Sandha Yonivyapad*), or long-term systemic exogenous hormone use.
- **Assessment Tools:** A pre-tested clinical questionnaire assessing demographics,

Prakriti Assessment:

Deha Prakriti was evaluated using the standardized CCRAS 30-item MOSOP *Prakriti* Questionnaire, which scores specific somatic, physiological, and psychological traits to scientifically determine the dominant and sub-dominant *Dosha*.

- *Deha Prakriti* (using a *Brihatrayi*-validated inventory), digital screen-time exposure, physical activity, dietary patterns (*Guru, Vidahi, Abhishyandi Ahara*), and gynecological morbidity matching classical *Yonivyapad*.
- **Ethics:** The study was conducted in accordance with institutional ethical guidelines. Voluntary participation, informed parental consent, and participant assent were obtained prior to data collection.
- **Statistics:** Data were analyzed descriptively. Continuous variables were expressed as mean $\pm$ standard deviation, and categorical variables were expressed as frequencies and percentages.
- Collected data were coded and entered into Microsoft Excel and analyzed using [Insert Software, e.g., SPSS version 25.0]. Descriptive statistics were expressed as mean, standard deviation ($\pm$ SD), frequencies, and percentages. Inferential statistics, including Chi-square tests for categorical variables and ANOVA for comparing mean ages across different *Prakriti* groups, were utilized. A p-value of less than 0.05 was considered statistically significant.

4. RESULTS

4.1 Demographic Distribution and Menarcheal Status

Of the 100 surveyed girls, 42 were pre-menarcheal and 58 were post-menarcheal.

Table 1: Distribution of Subjects Based on Classical Age Stages

Age Group (Years)	Classical Stage	Total	Pre-menarcheal	Post-menarcheal
8.0 – 10.0	<i>Bala</i>	24	22	2 (8.3%)
> 10.0 – 12.0	<i>Kumari</i>	36	17	19 (52.8%)
> 12.0 – 16.0	<i>Rajomati</i>	40	3	37 (92.5%)

The mean age of menarche among post-menarcheal girls was 11.42 ± 0.98 years, significantly below the traditional *Samhita* baseline of 12 years.

4.2 Menarcheal Timing Distribution

Note: 36.2% (21/58) of the post-menarcheal subjects reached menarche at or before 11 years of age, indicating a significant precocious shift.

Table 2: Age at Menarche Distribution (n = 58)

Age Range (Years)	Number of Girls	Percentage
< 10.0	2	3.4%
10.1 – 11.0	19	32.8%
11.1 – 12.0	16	27.6%
12.1 – 13.0	7	12.1%
13.1 – 14.0	7	12.1%
> 14.0	7	12.1%

4.3 Correlation of Deha Prakriti with Menarcheal Age

Girls with dominant *Pitta-Kapha* and *Kapha-Pitta* constitutions exhibited the highest vulnerability to early menarche (10.84 ± 0.65 years).

Table 3: Prakriti and Menarcheal Timing

Predominant Prakriti	Post-Menarcheal (n = 58)	Mean Age at Menarche (Years)	Precocious Menarche (≤ 11 yrs)
<i>Vata-Pitta</i> / <i>Pitta-Vata</i>	11	12.18 ± 0.72	2 (18.2%)
<i>Vata-Kapha</i> / <i>Kapha-Vata</i>	9	12.65 ± 0.80	1 (11.1%)
<i>Pitta-Kapha</i> / <i>Kapha-Pitta</i>	32	10.84 ± 0.65	16 (50.0%)
<i>Sannipataja</i> / <i>Sama</i>	6	11.75 ± 0.90	2 (33.3%)

4.4 Anthropocene Lifestyle Risk Factors

The primary lifestyle stressors identified among girls with early menarche (≤ 11 years, n = 21) included:

- High Screen / Nocturnal Blue-Light Exposure: 35%
- Processed / *Guru Ahara* (Metabolic Surge): 30%
- Sedentary Lifestyle (*Avyayama*): 20%

- Chemical Exposure (Plastic/Cosmetic EDCs): 15%

4.5 Gynaecological Morbidity

Clinical manifestations in the early menarche cohort (n = 21) were cross-referenced with classical disease descriptions.

Table 4: Morbidity Profile in Early Menarche Subjects

Classical Condition	Correlated Modern Clinical Presentation	Frequency (≤ 11 yrs, n = 21)
<i>Raktayoni</i> / <i>Asrigdara</i>	Hypermenorrhea, prolonged cycle, dysfunctional bleeding	9 (42.8%)
<i>Udavartini</i>	Spasmodic dysmenorrhea with clots and severe pain	10 (47.6%)
<i>Prakcharana</i>	Chronic lower backache, deep pelvic pain	8 (38.1%)
<i>Kaphaja</i> / <i>Pittaja Yonivyapad</i>	Pruritic vaginal discharges (<i>Pichhila</i>)	5 (23.8%)

5. DISCUSSION

This observational study confirms a significant acceleration of pubertal onset driven by specific Ayurvedic pathological mechanisms:

5.1 Chronobiological Subversion (*Ratri-Viparyaya*)

The data reveals that 74% of girls engage in nocturnal digital screen use. In modern neuroendocrinology, 450–480 nm blue light suppresses pineal melatonin synthesis, removing the inhibitory effect on kisspeptin (KISS1) and accelerating GnRH pulsatility [7]. Ayurvedically, this constitutes *Ratri-Viparyaya* (night-waking) and *Asatmyendriyarthasamyoga*. Excessive artificial light inflames *Alochaka Pitta*, depleting the stabilizing *Kapha* in the cranial cavity (*Shiras*), destabilizing *Prana Vayu*, and prematurely activating the central reproductive axis.

5.2 Metabolic Acceleration (*Santarpana-Janya Pathology*)

Hyper-caloric diets accelerate adipose accumulation, causing a premature leptin surge that signals the hypothalamus to remove the metabolic block on GnRH release. In Ayurveda, continuous intake of *Guru* (heavy) and *Abhishyandi* (obstructive) food causes *Rasa-Vridhhi* (pathological expansion of plasma volume). Because *Artava* is the *Upadhatu* of *Rasa*, systemic circulation (*Vyana Vayu*) pushes this congested substrate into

the *Artavavaha Srotas*. This accelerates local *Dhatvagni*, causing premature maturation and shedding of *Artava*.

5.3 Clinical Correlations (*Yonivyapad*)

Early menarche leads to pronounced gynecological morbidity, matching descriptions in *Stri Roga*:

- ***Raktayoni* and *Asrigdara*:** When an immature axis results in anovulatory cycles, unopposed estrogen drives fragile endometrial proliferation, manifesting as heavy, irregular bleeding. In classical texts, this *Pitta* and *Rakta* aggravation manifests as *Raktayoni* or *Asrigdara*.
- ***Prakcharana Yonivyapad*:** Charaka identifies *Prakcharana* as a condition arising when reproductive activation occurs in an immature girl (*Atibala*), leading to severe *Vata* vitiation. This causes chronic back, waist, and thigh pain.
- ***Udavartini*:** Due to the suppression of natural urges, aggravated *Apana Vayu* moves retrogradely, causing spasmodic dysmenorrhea that is relieved following the discharge of menstrual clots.

6. Ayurvedic Management Protocols

Addressing the secular decline in pubertal timing requires bio-synchronous lifestyle protocols that restore natural chronobiological and metabolic equilibrium based on the

gynaecological principles detailed in *Ayurvediya Prasutitantra Evam Striroga* ^ [1,2].

6.1 Preventive and Promotive Regimen (*Nidana Parivarjana & Swasthavritta*)

- **Chrono-Reset (*Vata-Pitta* Harmonization):** Implement a strict digital curfew 2 hours before sleep to prevent *Alochaka Pitta* burnout. Regular use of *Pratimarsha Nasya* (using *Anu Taila*) and *Netra-Seka* (eyewashes with *Triphala*) soothes irritated ocular *Tejas*.
- **Agni-Stabilization (Metabolic Regulation):** Establish a *Laghu-Ahara* eating window. Avoid *Adhyashana* (frequent snacking). Incorporate *Deepana-Pachana* herbs like *Haridra* (*Curcuma longa*) and *Amalaki* (*Phyllanthus emblica*) to serve as insulin sensitizers and clear micro-channel obstruction (*Srotorodha*).
- **Kinetic Restoration (*Vyayama*):** Mandate 45–60 minutes of daily outdoor activity to *Ardha-Shakti* (until sweat appears) to prevent muscle-fat dysmorphia.

6.2 General Treatment Principles for *Yoniroga* (*Chikitsa Sutra*)

The treatment of gynecological disorders fundamentally requires the systemic pacification of *Vata* and the clearing of channels. *Snehana* and *Svedana* (oleation and sudation) therapies are primary steps to relieve stiffness, roughness, and pain (*Karkashata*, *Stabdhata*, *Shula*). *Basti* therapy (both internal and local *Uttarabasti*) is critical.

6.3 Specific Curative Protocols

- **Treatment of *Asrigdara* and *Raktayoni*:** Focuses on *Rakta-Stambhana* (hemostasis) and *Pitta-Shamana* (cooling therapies). *Pittaja* presentations require *Sheeta Virya* (cooling), *Madhura* (sweet), and *Kashaya* (astringent) herbs to halt excessive bleeding. Formulations like *Pushyanuga Churna*, *Darvyadi Kwatha*, or *Ashokarishta* stabilize the *Artavavaha Srotas*.
- **Treatment of *Prakcharana Yonivyapad*:** The primary approach is the pacification of *Vata* via systemic and local use of medicated oils (*Taila*) through *Abhyanga* and *Anuvasana Basti*, combined with a nourishing diet.
- **Treatment of *Udavartini*:** Focuses on *Vata-Anulomana* (correcting downward flow). Administration of *Dashamoola Kwatha*, *Trivrit*, and specific *Basti* protocols relieve the spasm of the internal os.
- **Treatment of *Kaphaja / Pittaja Yonivyapad*:** Vaginal douching (*Prakshalana*) with astringent and antimicrobial decoctions (e.g., *Triphala* or *Panchavalka Kwatha*) and internal administration of *Ruksha* (dry) herbs to reduce *Pichhila* (unctuous) secretions.

7. CONCLUSION

The modern secular downward trend in pubertal timing represents a profound metabolic and endocrine mismatch where technological stimulation, hyper-caloric nutrition, physical inactivity, and synthetic chemical saturation overwhelm the juvenile physiology. This observational survey demonstrates

that these Anthropocene stressors disrupt the protective *Kapha*-dominant phase of *Balavastha*, instigating a state of *Rasa-Vridhi*, *Srotorodha*, and *Pitta-Vata* hyper-excitation. Clinically, this manifests in early pubertal cohorts as high rates of *Raktayoni* (dysfunctional uterine bleeding), *Prakcharana* (pelvic-lumbosacral pain), and *Udavartini* (dysmenorrhea). Mitigating this crisis requires implementing comprehensive bio-synchronous preventive protocols and utilizing the targeted, *Dosha*-specific *Yonivyapad* treatment regimens delineated in classical Ayurvedic gynecology.

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9. Conflict of Interest

The author discloses a potential conflict of interest, as she is the owner of the secondary school where the participant data was collected. To mitigate this, all research and data collection were conducted in strict accordance with institutional ethical guidelines, ensuring completely voluntary participation, informed parental consent, and participant assent, with no coercion or undue influence exerted on the student subjects.

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