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Dietary and Lifestyle Correlates of Myopia in Primary School Children from Nagpur: A Survey Based Assessment through Lens of Ayurveda

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Abstract: **Background**: Myopia among children is rising worldwide. In India, projections indicate nearly half the population becoming myopic by 2050 [2]. Though genetic predisposition such as heredity is a known risk, environmental and lifestyle factors like prolonged screen exposure and reduced outdoor activity play a significant role. **Aim & Objective**: This survey in Nagpur (Maharashtra-India), pointing primary-school children aged 10–12 years, aims to explore dietary and lifestyle factors associated with paediatric myopia through the lens of *Ayurvedic* principles (*Deha-prakriti*, *Agni, Samyak anna parinaman*, *Asatmya indriyartha samyoga* etc.). **Material & Methods**: A structured questionnaire assessed ocular symptoms, familial history, nutritional patterns, mealtime and digestive comfort, physical activity, bowel habits, screen exposure, sleep patterns, study posture and lighting, sunlight exposure, frequency of allergies, and *Ayurvedic* phenotype *(vata / pitta / kapha*) and *samata and Niramata* of tongue (Coated tongue). Children were categorized as myopic or non-myopic, and analyses were performed to identify correlation with *Ayurvedic* and conventional lifestyle factors. **Results**: Preliminary analysis indicates correlations between myopia and reduced outdoor activity, higher screen time, positive family history, and lifestyle / dietary patterns suggestive of *Agnimandya* and *Saamata* (e.g. irregular meals, low energy, digestive discomfort, coated tongue). **Conclusion**: The cross-sectional Study provides novel insight by bridging *Ayurvedic* constitutional and lifestyle variables with recognized risk factors for myopia in Indian children. Findings support incorporating *Ayurvedic*-informed preventive strategies, such as diet regulation, digestive health, daily routines, and outdoor exposure in broader myopia control initiatives. Further prospective and regionally diverse studies are recommended.

Keywords: Myopia, School children, Lifestyle factors, Dietary habits, *Ayurveda*.

I.INTRODUCTION

Myopia, commonly known as near-sightedness, is a vision condition where a person can see nearby objects clearly, but objects farther away appear blurry. It occurs when the anteroposterior diameter of the eye increases, or when the cornea has too much curvature. This causes light to focus in front of the retina instead of directly on it. It typically begins in childhood and may progress during school years, increasing risks for retinal detachment, myopic maculopathy, glaucoma and cataract later in life [1].

Myopia has reached epidemic proportions globally, with recent estimates showing that over ⅓ of children and adolescents are affected worldwide and projections indicating that nearly ½ of the world's population (including 740 million children) will be affected by 2050, a marked increase from 23% prevalence observed at the start of the millennium [2]. Particularly high rates are seen in East and Southeast Asia, where rates in urban school children can exceed 80-90% and a similar rising trend is evident in both developed and developing nations [3].

The etiology of myopia is multifaceted, encompassing genetic susceptibility, environmental influences, and lifestyle choices [1]. No robust evidence supports a role for specific vitamins, minerals, or macronutrients in preventing or slowing myopia. Observed associations, such as lower serum vitamin D in myopic children [4] or higher refined carbohydrate intake [5] are considered as confounding factors. Less hyperopic refraction at a young baseline age, parental myopia, extended periods of near work, lack of outdoor time and physical activity are some lifestyle related risk factors [6].

Myopia can be correlated in *Ayurveda* with *Timira,* a condition characterized by progressive loss of vision, originating from the vitiated *doshas* affecting the *Drishti Mandala* i.e. visual apparatus. Several causative factors are described such as; sudden immersion in water after prolonged exposure to heat, frequent eye strain due to viewing distant or minute objects, irregular sleeping habits, excessive crying, emotional stress, excessive physical strain, trauma, excessive sexual activity, consumption of incompatible or sour-fermented foods, suppression of natural urges, overexposure to smoke or steam, improper or excessive emesis, suppression

of emotions [7]. These influences disrupt ocular physiology by affecting *Alochaka Pitta, Tarpaka kapha* and *Mamsa-Majja Dhatu* leading to visual impairment akin to myopia in its early manifestations.

While several epidemiological studies have examined dietary and environmental factors influencing myopia, limited research has investigated these aspects through the integrative lens of *Ayurveda*. Understanding this connection could guide preventive strategies blending modern public health with *Ayurvedic* principles. Conventional treatments primarily focus on correction rather than prevention or reversal, and carry limitations, especially for children. Exploring dietary and lifestyle correlates through *Ayurvedic* principles offers a holistic understanding and potential preventive strategies for myopia in children.

II. AIM AND OBJECTIVES-

Aim- To investigate the dietary and lifestyle related factors in school going children to find their association with myopia.

Objectives-

1. To evaluate the prevalence of myopia and related eye symptoms in the study population.
2. To analyse relation between dietary and lifestyle factors with myopia prevalence through *Ayurveda* perspective.
3. To identify key modifiable risk factors to guide holistic preventive recommendations.

III. MATERIALS AND METHODS-

- **Study Design and Setting –** Observational-Cross-sectional, survey study among primary school children aged 9-12 in Nagpur after obtaining necessary permissions from school authorities.
- **Study Population-** Participants were selected from Govt. aided primary school from Nagpur in order to include subjects from diverse socioeconomic backgrounds. Out of total 77 students, aged 9-12 years, 36 had confirmed myopia and 36 had normal vision. 5 students were excluded due to incomplete ocular data.
- **Data collection tool**- After assessing visual acuity by ophthalmologist using standard Snellen's chart at a distance of 6 meter and confirming the visual acuity; Data collection was done with the help of a structured questionnaire; covering- eye related symptoms, family history, dietary profile, lifestyle factors, general health indicators. Physical assessment based on *Ayurvedic* parameters was done.
- **Data analysis**- Collected data were entered into Microsoft excel and analysed using Minitab. Descriptive statistics in the form of percentage were used to summarize data.

Chi-square tests were calculated to assess association between potential risk factor and prevalence of myopia, at p-value <0.05.

IV. RESULTS-

The following table shows % of symptoms associated with every student, blurred vision being the highest followed by watering and burning of eyes.

Symptoms	Watering	Dryness	Blurred vision	Burning of Eyes	Itchiness	Retrobulbar pain	None
Myopia Symptom %	24.68	15.58	28.57	24.68	22.08	11.69	1.30
Normal vision Symptom %	0.00	1.30	0.00	2.60	0.00	1.30	42.68

A total of 77 school children aged 10 to 12 years participated in the study. Statistical analysis (Chi-square test) revealed significant associations between certain dietary, lifestyle, and health parameters with myopia.

Parameter	DF	p-value	Association	Co-relation
Family history and myopia	3	0.1	Weak	Positive
Meal frequency and myopia	2	0.83	No	
Finishing tiffin and myopia	1	0.02	Yes	Positive
Fresh cooked food and myopia	1	0.81	No	
Junk food and myopia	2	0.01	Yes	Positive
Sweets and myopia	2	0.02	Yes	Positive
Non-veg diet and myopia	2	0.5	No	
Water intake and myopia	1	0.46	No	

Green leafy vegetables and myopia	1	0.6	No	
Fruits and myopia	2	0.03	Yes	Positive
Sports and myopia	2	0.05	Yes	Positive
Prakriti and myopia	2	0.4	No	
Bowel habits and myopia	1	0.59	No	
Jihva samata and myopia	2	0.86	No	
Spots on cheeks and myopia	2	0.1	Weak	Positive
Energy level and myopia	2	0.08	No	
Eye book distance and myopia	1	0.8	No	
Bedtime and myopia	2	0.03	Yes	Positive
Scalp oiling and myopia	2	0.65	No	
Sun exposure and myopia	2	0.18	No	
Cough/Cold/Sinuses and myopia	2	0.018	Yes	Positive
Allergy and myopia	2	0.05	Yes	Positive
Light exposure and myopia	1	0.64	No	

Significant Associations ($p < 0.05$):

- **Dietary factors:**
    1. Finishing tiffin daily ($p = 0.02$, positive correlation)
    2. Junk food frequency ($p = 0.01$, positive correlation)
    3. Sweets consumption ($p = 0.02$, positive correlation)
    4. Fruits and Vitamin A-rich food intake ($p = 0.03$, positive correlation)
- **Lifestyle factors:**
    1. Sports and exercise ($p = 0.05$, positive correlation)
    2. Bedtime ($p = 0.03$, positive correlation — later bedtime linked to higher myopia incidence)
- **Health/Environmental factors:**
    1. Cough, cold, and sinus issues ($p = 0.018$, positive correlation)
    2. Allergic eye conditions ($p = 0.05$, positive correlation)

Non-significant Associations: Those did not show statistically significant correlations.

- Family history
- Meal frequency
- Fresh cooked food
- Leafy vegetable consumption
- *Prakriti*
- Bowel habits
- Scalp oiling
- Sun exposure
- Lighting
- Water intake
- Reading distance
- Non-vegetarian diet
- Tongue coating
- Energy levels

V. DISCUSSION-

The present study highlights several dietary and lifestyle patterns significantly associated with myopia among school-going children in Nagpur.

1. **Dietary Influences:**

Increased junk food and sweets consumption were positively correlated with myopia. From an Ayurvedic perspective, such *guru* (heavy), *snigdha* (oily), and *amla/lavana rasa* (sour/salty) dominant foods may impair *agni*, contribute to *ama* formation, and disturb *pitta* and *kapha dosha* balance, potentially affecting ocular tissues *(drishti)*. Interestingly, higher fruit consumption also showed a positive association, which could reflect increased intake of sweet-tasting fruits without an adequate balancing diet, or confounding with other lifestyle variables.

2. **Lifestyle and Routine:**

Later bedtimes were linked to higher myopia incidence, possibly due to insufficient *nidra* (sleep), known in Ayurveda to aggravate *vata* and cause ocular strain. Reduced sports participation was also associated with myopia, supporting modern evidence that outdoor activity protects against refractive errors via increased light exposure and reduced near-work strain.

3. **Health Conditions:**

Children with recurrent respiratory or allergic conditions showed higher myopia prevalence. In *Ayurveda*, chronic *kapha* aggravation in *urdhva jatrugata* (upper body) can affect *netra* through *srotorodha* (channel obstruction) and local inflammation.

4. **Non-significant Variables:**

Factors such as leafy vegetable consumption, milk intake, sun exposure, and *prakriti* did not reach statistical significance in this cohort. This may be due to overall uniformity in the school population's habits, or the relatively small sample size.

VI. INTEGRATION OF MODERN AND *AYURVEDIC* PERSPECTIVES:

These results resonate with modern ophthalmology's emphasis on reducing screen time, encouraging outdoor play, and maintaining a balanced diet. *Ayurvedic* principles further refine prevention by stressing *ahara-vihara* tailored to the child's constitution, promoting *Dinacharya* (daily regimen) and addressing early signs of *Ama* or *Dosha* imbalance before ocular pathology develops.

VII. CONCLUSION-

The study demonstrates that specific dietary and lifestyle factors are significantly associated with the occurrence of myopia in school going children aged 10 to 12 years. Increased consumption of junk foods and sweets, irregularity in finishing meals, late bedtime habits, reduced physical activity, and recurrent allergic or respiratory complaints were found to be positively correlated with myopia. These variables reflect both modern lifestyle irregularities and disturbances in *Ahara-vihara* described in *Ayurveda*.
From an *Ayurvedic* viewpoint improper diet and lifestyle lead to *Agni-mandya* (weak digestion) and *Ama* formation causing *dosha* imbalance particularly of *pitta* and *vata* which may contribute to early onset refractive errors. Encouraging balanced nutrition, timely meals, adequate sleep, regular outdoor play, and adoption of *Dinacharya* practices may serve as preventive strategies in childhood ocular health.
Thus, integrating *Ayurvedic* principles into everyday routines along with modern eye care awareness could play a pivotal role in reducing the risk of early myopia among children. Further longitudinal studies with larger sample sizes are warranted to establish causal relationships and to develop evidence-based *Ayurvedic* preventive guidelines for paediatric eye health.

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