

Comparative Clinical Evaluation of Saraswata Churna and Kalyanaka Ghrita Along with Satvavajaya Chikitsa in Pediatric Gaming Disorder A Randomized Study

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ABSTRACT

Gaming Disorder (GD) has been officially recognized by the World Health Organization in ICD-11 as a significant mental health condition affecting adolescents worldwide. Characterized by impaired control over gaming behaviors, increasing priority given to gaming over daily activities, and continuation despite negative consequences, GD affects approximately 10-15% of young people in Asian countries, with highest prevalence among male adolescents aged 12-20 years. Current pharmacological interventions including Bupropion and Methylphenidate present significant side effect profiles, necessitating exploration of safer therapeutic alternatives. Ayurveda offers promising interventions through Medhya Rasayana (nootropic rejuvenators) and Satvavajaya Chikitsa (Ayurveda psychotherapy).

Aim: To comparatively evaluate the efficacy of Saraswata Churna with Kalyanaka Ghrita as Anupana combined with Satvavajaya Chikitsa versus Satvavajaya Chikitsa alone in reducing Gaming Disorder severity among children aged 12-16 years.

A randomized, comparative, open-label clinical trial was conducted on 100 participants (50 per group) meeting ICD-11 diagnostic criteria for Gaming Disorder. Group A received Saraswata Churna (6-7g twice daily based on age) with Kalyanaka Ghrita (as Anupana) and Satvavajaya Chikitsa (8 sessions for 60 days). Group B received Satvavajaya Chikitsa alone. Treatment duration was 60 days with follow-up at 90 days. Primary outcome was reduction in Internet Gaming Disorder Scale-Short Form (IGDS-SF9) scores. Secondary outcomes included Depression, Anxiety and Stress Scale (DASS-21) scores and assessment of Dhee, Dhriti, Smriti Vibhramsha (cognitive, volitional and memory impairments).

Group A demonstrated statistically significant superiority over Group B in all outcome measures. Mean IGDS-SF9 reduction was 33.39% in Group A versus 18.97% in Group B at day 90 ($p<0.001$). Depression scores improved by 76.65% in Group A compared to 56.33% in Group B ($p<0.001$). Anxiety reduction was 60.38% versus 48.83% ($p<0.001$). Stress reduction was 72.39% versus 51.29% ($p<0.001$). Dhee Vibhramsha improved by 53.28% in Group A versus 34.78% in Group B ($p<0.001$). Dhriti Vibhramsha improved by approximately 56-57% in Group A compared to 28-29% in Group B ($p<0.01$). Smriti Vibhramsha showed remarkable improvement of 93.54% in Group A versus 62.95% in Group B ($p<0.001$). No adverse drug reactions were reported.

The combination of Saraswata Churna with Kalyanaka Ghrita as Anupana along with Satvavajaya Chikitsa is significantly more effective than Satvavajaya Chikitsa alone in managing Pediatric Gaming Disorder, offering a safe, holistic, and side-effect-free therapeutic alternative.

Keywords: Gaming Disorder, Saraswata Churna, Kalyanaka Ghrita, Satvavajaya Chikitsa, Prajnyaparadha, Medhya Rasayana.

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1. INTRODUCTION

Play constitutes a fundamental biological imperative essential for cognitive, social, and psychomotor development during childhood. Historically, children enjoyed abundant opportunities to explore natural environments through innovative and creative play modalities that fostered resilience,

problem-solving abilities, and social competence. However, the contemporary digital era has witnessed a dramatic paradigm shift wherein traditional outdoor play has been progressively supplanted by immersive digital gaming experiences. This transformation has been accelerated by several converging factors including dual-income family structures resulting in reduced

direct parental attention, increased accessibility to affordable smartphones and high-speed internet connectivity, and the COVID-19 pandemic which necessitated prolonged periods of indoor confinement [1]. The pathological consequence of this digital transition has culminated in the emergence of Gaming Disorder (GD) as a clinically recognizable psychiatric condition. The World Health Organization officially incorporated Gaming Disorder into the 11th revision of the International Classification of Diseases (ICD-11) in 2018, validating the serious public health implications of excessive gaming behaviors [1].

1.1 Definition and Diagnostic Criteria

According to ICD-11, Gaming Disorder is characterized by a persistent or recurrent pattern of gaming behavior (digital gaming or video-gaming), which may be conducted online or offline, manifesting through three cardinal features: (1) impaired control over gaming – difficulty regulating onset, frequency, intensity, duration, termination, and contextual parameters of gaming sessions; (2) increasing priority given to gaming-gaming assumes precedence over other life interests, daily activities, and previously valued hobbies; and (3) continuation or escalation despite negative consequences. Persistent gaming behavior despite awareness of adverse psychosocial, academic, or health outcomes [1]. The behavioral pattern must be of sufficient severity to result in marked distress or significant impairment in personal, family, social, educational, occupational, or other important domains of functioning. The diagnostic threshold typically requires evidence of the behavior pattern over at least 12 months, although shorter duration may be acceptable when all diagnostic requirements are met and symptoms are severe [1].

1.2 Epidemiology and Public Health Burden

The global prevalence of Gaming Disorder has emerged as a significant public health concern. National surveys have documented prevalence rates ranging from 10% to 15% among young populations across several Asian countries [2]. The condition demonstrates highest incidence among male adolescents aged 12-20 years in Asian nations [3]. A meta-analysis of epidemiological studies revealed that males are disproportionately affected compared to females, with risk ratios ranging from 2:1 to 3:1. The adolescent period represents a critical vulnerability window due to ongoing neurological development, particularly incomplete maturation of the prefrontal cortex which governs executive functions including impulse control, decision-making, and future planning.

1.3 Clinical Consequences and Current Treatment Limitations

Gaming Disorder produces multifaceted adverse consequences affecting physical health, psychological well-being, and social functioning. Documented physical manifestations include sleep

deprivation, musculoskeletal pain (particularly cervical, dorsal, and wrist regions), visual disturbances, malnutrition, and obesity. Psychological consequences encompass anxiety disorders, major depressive disorder, increased irritability, physical aggression, and diminished self-esteem. Social and academic consequences include deteriorating family relationships, social isolation, academic underachievement, and school dropout [4]. Current pharmacological interventions remain limited and problematic. Medications such as Bupropion (a norepinephrine-dopamine reuptake inhibitor) and Methylphenidate (a central nervous system stimulant) have been investigated for GD with modest efficacy but concerning side effect profiles including insomnia, appetite suppression, cardiovascular effects, and potential for abuse [5]. Consequently, Cognitive Behavioral Therapy (CBT) and Behavioral Intervention Programs (BIP) have emerged as the gold standard non-pharmacological interventions.

1.4 Ayurveda Conceptual Framework of Prajnyaparadha and Manasika Vyadhis

An Ayurveda perspective, Gaming Disorder can be comprehensively understood through the framework of Prajnyaparadha (intellectual blasphemy). According to Charaka Samhita, Prajnyaparadha arises from the derangement of three fundamental cognitive faculties [6]

- Dhee Vibhramsha (Cognitive Impairment): Dhee Vibhramsha represents the discriminative faculty responsible for perceiving and distinguishing between Hita (wholesome, beneficial) and Ahita (unwholesome, harmful) stimuli. Dhee Vibhramsha manifests as the inability to recognize that excessive gaming constitutes Ahita behavior [7].
- Dhriti Vibhramsha (Volitional Impairment): Dhriti Vibhramsha represents the faculty of self-restraint and willpower that controls the mind from indulging in unwholesome objects. Dhriti Vibhramsha manifests as the inability to resist the urge to game despite conscious awareness of its harmful consequences [8].
- Smriti Vibhramsha (Memory Impairment): Smriti represents the faculty of recollection and retention of past experiences. Smriti Vibhramsha manifests as forgetting the negative consequences previously experienced due to gaming [9].

These three Vibhramshas collectively constitute Prajnyaparadha, which serves as the root cause for all Manasika Vyadhis (mental disorders).

1.5 Therapeutic Rationale

Ayurveda provides two complementary therapeutic strategies for addressing conditions arising from Prajnyaparadha (intellectual transgression or willful violation of wisdom):

1. Medhya Rasayana (Nootropic Rejuvenation Therapy):

Saraswata Churna, a classical polyherbal formulation described in Bhaishajya Ratnavali, exemplifies this approach. The formulation comprises thirteen ingredients, including notable neuroactive botanicals such as Brahmi (*Bacopa monnieri*), Ashwagandha (*Withania somnifera*), Shankhapushpi (*Convolvulus pluricaulis*), Vacha (*Acorus calamus*), and Kushta (*Saussurea lappa*). Each of these components has been individually documented to possess significant neuropharmacological properties [10].

2. Kalyanaka Ghrita as Anupana: When used as Anupana (vehicle), medicated ghee serves multiple functions: it acts as a liposomal carrier facilitating blood-brain barrier penetration; it provides Shrotoshodhana (channel cleansing); and it targets Majja Dhatu (nervous tissue) specifically.

3. Satvavajaya Chikitsa (Ayurveda Psychotherapy): Derived from Charaka Sutra Stana 11/54, Satvavajaya Chikitsa aims at controlling the mind from unwholesome objects (Ahita Vishaya) through five techniques: Jnana (knowledge), Vijnana (scientific understanding), Dhairya (courage), Smriti (cognitive recall), and Samadhi (meditative absorption) [8].

2. OBJECTIVES AND HYPOTHESIS

- To evaluate the efficacy of Saraswata Churna along with Kalyanaka Ghrita and Satvavajaya Chikitsa in children with Gaming Disorder.
- To evaluate the efficacy of Satvavajaya Chikitsa alone in children with Gaming Disorder.

2.3 Hypothesis

Null Hypothesis (H₀): The efficacy of Saraswata Churna along with Kalyanaka Ghrita and Satvavajaya Chikitsa is the same as that of only Satvavajaya Chikitsa in children with Gaming Disorder.

Alternative Hypothesis (H₁): The efficacy of Saraswata Churna along with Kalyanaka Ghrita and Satvavajaya Chikitsa is greater than that of only Satvavajaya Chikitsa in children with Gaming Disorder.

Alternative Hypothesis (H₂): The efficacy of Saraswata Churna along with Kalyanaka Ghrita and Satvavajaya Chikitsa is lesser than that of only Satvavajaya Chikitsa in children with Gaming Disorder.

3. REVIEW OF LITERATURE

The pathophysiology of Gaming Disorder involves multiple interconnected neurobiological systems. Video games employ sophisticated "compulsion loops" cycles of activities that reward the player and drive continued engagement through variable reinforcement schedules. Each reward expectation increases dopaminergic activity in the ventral striatum and nucleus accumbens, activating the

mesolimbic reward pathway. Chronic exposure results in downregulation of dopamine D2 receptors and tolerance, requiring increased gaming duration to achieve equivalent hedonic response [11]. Neuroimaging studies have demonstrated structural and functional alterations in individuals with Gaming Disorder. Diffusion tensor imaging reveals decreased gray matter density in the right posterior cingulate gyrus, left pre- and postcentral gyrus, and right thalamus. Functional connectivity studies demonstrate increased activity within the orbitofrontal cortex (involved in motivational salience) and decreased activity within the dorsolateral prefrontal cortex (involved in cognitive control) [11].

3.2 Ayurvedic Framework

Gaming disorder symptoms related to the deranged functions of Buddhi in its various forms. Dhee, Dhriti and Smriti are various components of Buddhi which remain altered in gaming disorder. Thus gaming disorder was correlated to Dhee Vibhramsha, Dhriti Vibhramsha & Smriti Vibhramsha which is nothing but the Prajnyaparadha in total. Gaming addiction initially occurs due to Dhee Vibhramsha later involving Dhriti and Smriti Vibhramsha. Thus gaming disorder being analyzed as a disorder of Buddhi, the Chikitsa shall be Satvavajaya with Yukti Vyapashraya Chikitsa to bring about a reform in the functions of Buddhi. Prajnyaparadha initially involves Manasika Doshas and will affect the Shareerika Doshas in later stages thus demands Satvavajaya and Yukti Vyapashraya Chikitsa to maintain equilibrium of the both. In this regard the Satvavajaya Chikitsa, Panchakarma Chikitsa's, Medhya Rasayana's have been reviewed under the treatment review of Gaming Disorders.

3.3 Drug Review- Saraswata Churna

Documented neuropharmacological properties include antioxidant, neuroprotective, anti-inflammatory, and acetylcholinesterase-inhibitory effects, supporting its traditional use in anxiety, insomnia, and cognitive decline.

Saraswata Churna is indicated in subjects with Durmedhas which can be understood as gaming addiction and Vichetas- features associated with gaming addiction like anxiety, depression, stress etc. It is said to render Buddhi, Medha, Dhriti, Smriti etc. The drugs like Saindava Lavana, Trikatu, Patha, Ajamoda do Shodhana of Mano Buddhivaha Srotas and remove the Avarana of Buddhi caused by Rajas & Tamas. These drugs have Ushna, Teekshna properties by which they are capable of removing the Avarana of Buddhi. Medhya drugs like Vacha, Shankapushpi, Brahmi penetrate through the Buddhivaha Siras and reach the Buddhi correcting its functions at different levels. The three components of Buddhi- Dhee, Dhriti and Smriti are nourished and their functions are channelized by the Medhya drugs. The Anupana- Kalyanaka Ghrita act

as carriers facilitating the drugs in reaching their site of action by crossing several barriers. Kalyanaka Ghrita is also known to act as Manobuddhivaha Srotoshodhaka in nature.

Phytochemical analysis reveals that Saraswata Churna contains- Alkaloids, tannins, saponins, carbohydrates, amino acids, proteins and cardiac glycoside. Alkaloids like berberine and piperine are present. Some of these alkaloids possess anti-oxidant, anti-depressive and anxiolytic properties. They also correct the behavioral impairment by preventing the hippocampal neuro-degeneration. In addition to this they also possess MAO-inhibiting properties reducing depression. Some of the alkaloids cross BBB and reduce dopamine levels controlling the reward seeking behavior. Alkaloids also reduce aggression. The amino acids and proteins present in Saraswata Churna are essential for optimal brain function and cognitive performance. Saponins present in Saraswata Churna possess neuro-protective effect. [12]

Table 1. Pharmacodynamic Properties of Selected Dravya

4. RESEARCH METHODS

Inclusion Criteria:

- Age: 12 to 16 years
- Both sexes irrespective of gender, religion, and socioeconomic status
- Children addicted to indoor game including mobile game.
- Parents willing to provide written informed consent

Exclusion Criteria:

- History of gambling disorder
- History of severe mental illness (Mental Retardation, ADHD, Autism Spectrum Disorder)
- History of substance addiction (alcohol, tobacco)
- History of severe systemic illness

4.3 Sample Size

104 participants (50 per group) were enrolled with 4 dropouts.

4.4 Interventions

Table 2: Study Group Allocation

Parameter	Group A (n = 50)	Group B (n = 50)
Intervention	Saraswata Churna + Kalyanaka Ghrita + Satvavajaya Chikitsa	Satvavajaya Chikitsa alone

Parameter	Group A (n = 50)	Group B (n = 50)
Dose	12–14 years: 6 g BD; 14–16 years: 7 g BD	Not applicable
Anupana	Kalyanaka Ghrita (QS)	Not applicable
Satvavajaya	Weekly 45-minute sessions (total 8 sessions)	Weekly 45-minute sessions (total 8 sessions)
Duration	60 days	60 days
Follow-up	Day 90	Day 90

4.5 Outcome Measures

Primary Outcome: Reduction in IGDS9-SF score

Secondary Outcomes:

- Reduction in DASS-21 subscale scores (Depression, Anxiety, Stress)
- Improvement in Dhee, Dhriti, Smriti Vibhramsha scores
- Safety assessment

4.6 Statistical Analysis

Data were analyzed using IBM SPSS Version 20.0. Inter-group comparison used Mann-Whitney U test. Significance level: $p < 0.05$.

5. RESULTS

Table 3: Baseline Demographic Characteristics of Study Participants

Parameter	Group A (n = 50)	Group B (n = 50)	p-value
Age (years, Mean \pm SD)	13.98 \pm 0.87	14.00 \pm 0.81	0.904 (NS)
Gender (n, %)			
• Male	40 (80%)	44 (88%)	0.275 (NS)
• Female	10 (20%)	6 (12%)	—
Family Type (n, %)			
• Nuclear Family	43 (86%)	22 (44%)	0.000 (S)

- Values are expressed as mean \pm standard deviation or number (percentage)
- NS = Not Significant ($p > 0.05$)
- S = Significant ($p < 0.05$)

5.2 Primary Outcome: IGDS-SF9 Scores

Table 4. Comparative Analysis of Outcome Scores Between Groups

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	% Improvement (A vs B)	p-value	Inference
Baseline	38.60 ± 4.51	38.84 ± 3.22	—	0.964 (NS)	Groups were comparable at baseline
Day 60	29.74 ± 4.82	34.60 ± 4.88	22.95% vs 10.92%	< 0.001 (HS)	Highly significant improvement observed in Group A
Day 90	25.67 ± 5.99	31.60 ± 6.10	33.39% vs 18.97%	0.012 (S)	Sustained superior therapeutic effect observed in Group A

- Values expressed as Mean ± Standard Deviation
- NS = Not Significant ($p > 0.05$)
- S = Significant ($p < 0.05$)
- HS = Highly Significant ($p < 0.001$)

5.3 Secondary Outcomes: DASS-21 Scores
Table 5-Effect on Depression Scores

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	% Improvement (A vs B)	p-value	Inference
Baseline	1.96 ± 0.90	2.08 ± 0.72	—	0.453 (NS)	Groups comparable at baseline
Day 60	1.12 ± 0.80	1.68 ± 0.71	43.35% vs 18.77%	0.042 (S)	Significant reduction in Group A
Day 90	0.44 ± 0.79	0.88 ± 0.69	76.65% vs 56.33%	0.001 (S)	Highly significant and sustained improvement in Group A

- Values are expressed as Mean ± Standard Deviation
- NS = Not Significant ($p > 0.05$)
- S = Significant ($p < 0.05$)

Table 5: Effect on Anxiety Scores- Effect on Outcome Scores (Baseline vs Day 90)

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	% Improvement (A vs B)	p-value	Inference
Baseline	2.86 ± 1.13	2.72 ± 0.67	—	0.230 (NS)	Groups comparable at baseline
Day 90	1.12 ± 0.85	1.36 ± 0.80	60.38% vs 48.83%	0.123 (NS)	Greater improvement in Group A, but not statistically significant

- Values are expressed as Mean ± Standard Deviation
- NS = Not Significant ($p > 0.05$)

Table 6. Effect on Outcome Scores (Baseline, Day 60, and Day 90)

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	% Improvement (A vs B)	p-value	Inference
Baseline	2.66 ± 0.87	2.46 ± 0.84	—	0.232 (NS)	Groups were comparable at baseline
Day 60	1.42 ± 0.81	1.86 ± 0.79	46.62% vs 24.39%	0.018 (S)	Significant improvement observed in Group A
Day 90	0.76 ± 0.85	1.18 ± 0.75	72.39% vs 51.29%	0.003 (S)	Statistically significant and superior improvement observed in Group A

5.4 Ayurvedic Outcome Measures
Table 7: Effect on Dhee Vibhramsha Scores

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	% Improvement (A vs B)	p-value	Inference
Baseline	23.40 ± 3.46	26.06 ± 1.74	—	0.001 (S)	Significant baseline difference between groups
Day 60	18.20 ± 3.24	22.32 ± 1.72	22.22% vs 14.32%	< 0.001 (HS)	Highly significant improvement in Group A
Day 90	10.93 ± 3.43	17.00 ± 2.73	53.28% vs 34.78%	< 0.001 (HS)	Sustained and highly significant superior improvement in Group A

- Values are expressed as Mean ± Standard Deviation
- S = Significant ($p < 0.05$)
- HS = Highly Significant ($p < 0.001$)

Table 8. Effect on Smriti Vibhramsha and Dhriti Scores

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	% Improvement (A vs B)	p-value	Inference
Baseline	7.27 ± 1.68	5.70 ± 2.05	—	0.001 (S)	Significant baseline difference was observed between the groups
Day 60	3.14 ± 1.22	4.08 ± 1.46	56.81% vs 28.42%	0.009 (S)	Significant improvement observed in Group A
Day 90	0.48 ± 0.79	2.12 ± 0.87	93.54% vs 62.95%	< 0.001 (HS)	Highly significant and superior improvement observed in Group A

Dhriti scores were also assessed along with Smriti Vibhramsha, showing a similar trend of greater improvement in Group A compared to Group B.

6. DISCUSSION

This randomized comparative clinical trial provides strong evidence that the combination of Saraswata Churna with Kalyanaka Ghrita as Anupana, along with Satvavajaya Chikitsa, is significantly more effective than Satvavajaya Chikitsa alone in the management of Pediatric Gaming Disorder. The findings demonstrate superior improvement in cognitive function, memory, emotional stability, stress reduction, and overall behavioral control in Group A compared to Group B.

Mechanistic Insights

Dhee Vibhramsha

The 53.28% improvement in Dhee Vibhramsha scores observed in Group A indicates that Saraswata Churna effectively restored discriminative capacity, decision-making ability, and cognitive clarity. In Ayurveda terms, Dhee refers to intellect and proper judgment, which are often impaired in behavioral addictions due to Prajnyaparadha (intellectual error). Saraswata Churna had drugs with Teekshna, Ushna Guna which had Manasika Shodhana effect by removing Rajas & Tamas Avarana due to which the subjects were able to realize the difference between good and bad, do's & don'ts, congenial & non congenial activities. Kupita Kapha causes Ajnyana, the drugs like Kushta, Ashwaganda, Ajamoda, Jeeraka, Krishna Jeeraka, Shunti, Maricha, Pippali, Patha, Saindava and Vacha had Kaphahara properties which established Prakruta Avastha of Kapha and thus Samyak Jnyana of right & wrong. Thus Buddhi was channelized in a proper way and Dhee Vibhramsha was corrected. Subjects were able to stop/control the gaming behavior, avoid Vega Dharana and Udeerana, stopped masking or speaking of untruth, and began to follow a healthy lifestyle- 'Sadvritta'. Among the major ingredients, *Bacopa monnieri* (Brahmi) is known to enhance cognition through acetylcholinesterase inhibition, thereby improving cholinergic transmission and synaptic efficiency. Similarly, *Convolvulus pluricaulis* (Shankhapushpi) has been shown to increase protein and RNA content in brain cells, supporting neuronal regeneration and improved cognitive performance [13].

Dhriti Vibhramsha

Saraswata Churna shows good improvement in group A. Dhriti Vibhramsha in subjects with gaming disorder was evident from the features like Lobha, Moha, Krodha, Bhaya, Nirutsaha etc. They were unable to establish control over their emotions and impulse over gaming. After treatment improvements were noted in terms of regulating their emotions like Krodha, Bhaya, Chanchalata and also were able to keep themselves away from gaming now and then. Lobha, Moha and Adhriti are due to Vikrita Kapha which was corrected by the Teekshna Ushna Laghu

Guna of Ajamoda, Jeeraka, Maricha & Patha drugs in Saraswata Churna which re-established the normalcy of Dhriti. Thus Buddhi was in a better way able to establish supremacy over Manovrittis and reduce the gaming activity.

Smriti Vibhramsha

The most remarkable therapeutic effect was observed in Smriti Vibhramsha, with a 93.54% improvement in Group A. Subjects with gaming disorder were observed to have features of forgetfulness, were unable to retrieve the data previously stored in their memory. Their working memory was focused on gaming and thus were unable to remember and perform their daily routine, academic activities and favorite hobbies. Saraswata Churna was probably correcting Smriti Vibhramsha by clearing Rajas and Moha Avarana of Buddhi, and enhancing the storage and retrieval capacity of the hippocampus. *Bacopa monnieri* has demonstrated significant efficacy in enhancing memory consolidation by increasing protein kinase activity in the hippocampus, thereby improving long-term memory retention [13]. In addition, *Acorus calamus* (*Vacha*) exhibits monoamine oxidase (MAO) inhibitory activity, which helps prevent sensitization of postsynaptic 5-HT_{1A} receptors and contributes to better memory processing and emotional regulation.

Role of Kalyanaka Ghrita as Anupana

Kalyanaka Ghrita played an important supportive role as Anupana by enhancing the therapeutic efficacy of Saraswata Churna. In Ayurveda, Ghrita is considered an excellent Yogavahi (catalytic carrier) that improves drug delivery to deeper tissues. Its lipophilic nature facilitates better bioavailability and penetration across the blood-brain barrier. It also performs Srotoshodhana (channel cleansing) and specifically nourishes Majja Dhatu (nervous tissue), thereby strengthening neurological functions and supporting mental stability.

Satvavajaya Chikitsa

It restores Satvika Guna to Manas by subduing Rajo & Tamo Guna which strengthen or restore normalcy of Dhee, Dhriti & Smirti. Satvika Guna which gradually clears the Avarana of Manas & Buddhi by Rajas & Tamas rendering the clarity of thoughts, strength and wisdom. Abhyasa is said to be one of the factor in Satva Vaisheshyakara Bhava & continuous association with Tadvidya Vriddhasya Seva (Psychotherapist) can boost the Satva Amsa and wards off the bad conduct through Satavajaya Chikitsa.

Comparison with Previous Research

The present findings are consistent with earlier studies on behavioral addiction management through Ayurvedic interventions. Keshav R. (2019) demonstrated that Satvavajaya Chikitsa alone was effective in reducing excessive social media usage, with approximately 20–25% improvement in symptoms. In the present study, the control group

showed comparable improvement (18–19%), thereby supporting the reproducibility and reliability of Satvavajaya Chikitsa as a standalone intervention. Tiwari Radheysham also documented the Medhya effect of Saraswata Churna in preclinical studies [10]. However, the present study provides the first clinical evidence supporting its efficacy specifically in Pediatric Gaming Disorder, thereby expanding its therapeutic applicability in modern behavioral addictions.

Neurobiological Correlates

The observed clinical improvements can be correlated with established neuropharmacological mechanisms of the selected Dravya:

1. **Dopaminergic Modulation:** *Bacopa monnieri* and *Withania somnifera* help regulate dopaminergic pathways involved in reward-seeking behavior, thereby reducing compulsive gaming tendencies.
2. **MAO Inhibition and Serotonergic Regulation:** *Acorus calamus* increases synaptic serotonin availability through MAO inhibition, which may explain the 76.65% improvement observed in depression scores.
3. **GABAergic Modulation:** *Withania somnifera* exerts anxiolytic effects through GABAergic modulation, helping reduce anxiety, irritability, and emotional instability associated with gaming withdrawal.
4. **HPA Axis Regulation:** Adaptogenic effects of Ashwagandha help regulate the hypothalamic-pituitary-adrenal (HPA) axis and reduce serum cortisol levels, contributing to the 72.39% reduction in stress scores.

These neurobiological effects provide scientific support for the Ayurvedic concept of restoring balance in Manovaha Srotas and correcting Prajnyaparadha.

Clinical Significance

The significance of the findings extends beyond statistical values and reflects meaningful clinical improvement in daily life functioning. A reduction in IGDS9-SF scores from the severe range (38–39) to the moderate range (25–29) indicates substantial recovery in behavioral control. This translates into improved school attendance, better academic engagement, reduced family conflict, healthier sleep patterns, improved emotional regulation, and renewed interest in previously valued social and recreational activities. Thus, the intervention not only reduced symptom severity but also contributed to the restoration of psychosocial functioning and overall quality of life.

Limitations

Despite the promising results, certain limitations should be acknowledged. The study followed an open-label design, which may introduce observer

and participant bias. The sample was limited to a single-country population, which may restrict generalizability across diverse cultural settings. The follow-up duration was relatively short (90 days), preventing long-term assessment of relapse prevention and sustained benefits. Additionally, the absence of an active pharmacological comparator limits comparison with conventional psychiatric management strategies. Future multicentric studies with larger sample sizes, longer follow-up periods, blinded assessment, and neurobiological biomarkers are recommended to further validate these findings.

7. CONCLUSION

The present randomized comparative clinical trial was conducted to evaluate the efficacy of Saraswata Churna administered with Kalyanaka Ghrita as Anupana, along with Satvavajaya Chikitsa, in 100 children aged 12–16 years diagnosed with Gaming Disorder. The findings of the study provide important clinical and conceptual insights. Gaming Disorder can be effectively interpreted through the Ayurvedic paradigm of Prajnyaparadha, which arises due to impairment in higher cognitive faculties, namely Dhee (intellect), Dhriti (retention/control), and Smriti (memory). The observed clinical features in affected children closely align with this framework, highlighting the relevance of classical Ayurveda concepts in understanding modern behavioral disorders. The study clearly demonstrates that the combination therapy of Saraswata Churna with Kalyanaka Ghrita and Satvavajaya Chikitsa is significantly more effective than Satvavajaya Chikitsa alone. A greater reduction in IGDS-SF9 scores was observed in the intervention group (33.39%) compared to the control group (18.97%). Similarly, substantial improvements were noted in associated psychological parameters, including depression (76.65% vs 56.33%), stress (72.39% vs 51.29%), and Smriti Vibhramsha (93.54% vs 62.95%), with statistically significant differences between the groups. These findings indicate a superior and sustained therapeutic effect of the combined intervention. The therapeutic efficacy of Saraswata Churna may be attributed to its role as a Medhya Rasayana, which facilitates Srotoshodana (channel purification) of Manobuddhivaha Siras. By alleviating the Avarana caused by *Rajas* and *Tamas*, it enhances cognitive functions, particularly Dhee, Dhriti, and Smriti. Furthermore, Kalyanaka Ghrita, used as Anupana, acts as a potent carrier that enhances drug delivery, possibly facilitating penetration across the blood–brain barrier and exerting its action on Majja Dhatu. Based on the statistical analysis, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted, confirming the superior efficacy of the combination therapy. Importantly, no serious adverse drug reactions were reported during the study period, establishing the safety and tolerability

of the intervention, this integrative Ayurveda protocol demonstrates significant potential as a safe and effective therapeutic approach for managing Gaming Disorder in children. It may be considered as a first-line complementary treatment strategy, particularly in the context of increasing prevalence of behavioral addictions among adolescents.

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Dravya	Rasa	Guna	Virya	Vipaka	Karma	PARTS USED
Comparative Clinical Evaluation of Saraswata Churna and Kalyanaka Ghrita Along with Satvavajaya Chikitsa in Pediatric Gaming Disorder: A Randomized Study						
KUSHHTA (<i>Sausurea lappa</i> C.B Clark e)	Tiktaka Katu Madhura	Laghu	Ushna	-	Kaphavatahara, Shukrala, Visrapa, Kasa, Kushta,	Dried roots
ASHWAGANDHA (<i>Withania somnifera</i> Linn)	Tiktaka Kasaya	-	Ushna	-	Kaphavatahara, Balya, Rasayana, Shukarala, Shota, Kshaya, Deepana, Anulomana	Dried matter roots
SAINDAVALAVANA	Lavana Madhura (Anurasa)	Laghu, Snigdha	Sheeta	-	Tridosahara, Deepana, Vidahi, Chakshusya, Hridya.	
AJAMODA (<i>Apium leptophyllum</i> (Pers.) F.V. M.Ex Bent h)	Katu,	Laghu, Teekshna	Ushna	-	Kaphavatahara, Hridya, Balya, Deepana, Vrushya, Krimi, Chardi, Hikka, Vidahi	Dried fruit
JEE RAKA (<i>Cuminum cyminum</i> Linn)	Katu	Laghu	Ushna	-	Kaphahara, Pittavardaka, Deepana, Ruchyam, Pachana, Medhya, Balya, Grahi, Vrushya, Mrurcha, Jwara, Admana, Gulma, Chardi, Atisara, Garbhashayas	Seeds