

Traditional Siddha Healthcare Systems for Infection Prevention and Community Health

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Abstract:

Background: Infectious diseases remain a major global health burden, particularly among children, due to their developing immune systems and high exposure in community settings. The increasing prevalence of antimicrobial resistance and recurrent outbreaks of communicable diseases highlight the need for effective preventive healthcare strategies. Siddha medicine, a traditional system of South India, offers a holistic approach to infection prevention through herbal formulations, dietary regulation, and lifestyle practices.

Objective: To explore the role of traditional Siddha healthcare systems in infection prevention and community health promotion, with special reference to pediatric prophylactic practices including Urai Mathirai, Korosanai Mathirai, dietary interventions, and lifestyle modifications.

Materials and Methods: An evidence-based narrative review was conducted using scientific databases including PubMed, Scopus, Web of Science, ScienceDirect, Google Scholar, MEDLINE, and AYUSH Research Portal. Classical Siddha texts, Ministry of AYUSH publications, and relevant experimental, clinical, and review studies published between 2000 and 2025 were included. Data were extracted on Siddha preventive formulations, dietary practices, lifestyle modifications, antimicrobial activity, and immunomodulatory mechanisms.

Results: The review revealed that Siddha preventive healthcare integrates pediatric formulations such as Urai Mathirai and Korosanai Mathirai, dietary therapy, and lifestyle modifications to reduce infection risk. These formulations are traditionally used for prevention of respiratory and gastrointestinal infections in children and are associated with antimicrobial, antipyretic, and immunomodulatory effects. Dietary interventions including amla, turmeric, garlic, ginger, pepper, and millets provide antioxidant and immune-enhancing benefits. Lifestyle practices such as adequate sleep, hygiene maintenance, seasonal behavioral regulation, and physical activity contribute significantly to improved immunity and reduced infection susceptibility. The combined actions of these interventions suggest a synergistic approach to strengthening host defense mechanisms and promoting community health.

Conclusion: Siddha preventive healthcare systems offer a comprehensive and multi-dimensional strategy for infection prevention, particularly in pediatric populations. However, further standardized clinical and experimental studies are required to validate their efficacy and facilitate integration into modern public health systems.

Keywords: Siddha medicine; infection prevention; Urai Mathirai; Korosanai Mathirai; pediatric health; immunomodulation; traditional medicine; community health; antimicrobial activity.

Introduction:

Infectious diseases remain a leading cause of morbidity and mortality worldwide, particularly among children, due to their developing immune systems, increased exposure in community settings, and varying nutritional status (1,2). Despite advances in vaccination programs, antimicrobial therapy, and improved sanitation, recurrent outbreaks of communicable diseases and the rapid emergence of antimicrobial resistance continue to challenge modern healthcare systems (3,4). These concerns highlight the need for integrated, preventive, and community-based healthcare strategies that extend beyond curative approaches and emphasize

immunity enhancement, lifestyle modification, and early disease prevention.

Traditional Siddha medicine, one of the oldest indigenous medical systems of South India, provides a comprehensive framework for preventive healthcare rooted in the principles of balance between the three humors—Vali, Azhal, and Iyyam—and harmony between the body, diet, environment, and lifestyle (5,6). Siddha literature places strong emphasis on disease prevention (“*Noy varumun kaakkum murai*”), particularly through seasonal routines, dietary regulation, herbal prophylaxis, and maintenance of hygienic living conditions. These principles are especially relevant for pediatric

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populations, where prevention plays a critical role in long-term health outcomes.

Among Siddha preventive practices, classical formulations such as **Urai Mathirai** and **Korosanai Mathirai** are traditionally used in children for infection prevention and general health promotion. These formulations are administered in small prophylactic doses to enhance immunity, improve digestive function, and reduce susceptibility to respiratory and gastrointestinal infections commonly observed in childhood (7,8). Siddha practitioners have historically used these preparations during seasonal transitions and epidemic-prone periods as part of community-level preventive strategies. Their perceived benefits are attributed to the presence of bioactive phytochemicals with antimicrobial, antipyretic, and immunomodulatory properties.

In addition to medicinal interventions, Siddha healthcare strongly emphasizes dietary regulation (*Unavu Maruthuvam*) as a cornerstone of disease prevention. Nutrient-rich and immunity-boosting foods such as amla (*Phyllanthus emblica*), turmeric (*Curcuma longa*), garlic (*Allium sativum*), ginger (*Zingiber officinale*), pepper (*Piper nigrum*), green leafy vegetables, millets, and traditional herbal decoctions are recommended to enhance resistance against infections (9–11). These foods provide essential vitamins, minerals, antioxidants, and phytochemicals that support immune function, reduce oxidative stress, and promote gut health, which is particularly important in pediatric immunity development.

Lifestyle modification is another fundamental component of Siddha preventive healthcare. Regular sleep patterns, physical activity, adequate hydration, maintenance of personal hygiene, avoidance of junk foods, and adherence to seasonal behavioral practices (*Kaalamaraiyal*) are considered essential for maintaining health and preventing disease (12). In children, such lifestyle practices play a crucial role in strengthening immunity, preventing recurrent infections, and ensuring proper growth and development. Furthermore, environmental hygiene, including clean living conditions and reduced exposure to infectious agents, is emphasized as part of community-based disease prevention strategies.

Modern scientific research has begun to validate several aspects of Siddha preventive healthcare. Studies have demonstrated that many Siddha medicinal plants and dietary components possess antimicrobial, antiviral, antioxidant, and immunomodulatory properties that may contribute to infection prevention (13,14). The COVID-19 pandemic further highlighted the importance of preventive healthcare systems and renewed global interest in traditional medicine systems for community health resilience and immune support strategies (15).

However, despite increasing recognition, challenges remain in standardizing Siddha prophylactic formulations such as Urai Mathirai and Korosanai Mathirai, establishing dosage safety in pediatric populations, and conducting rigorous clinical trials to validate their preventive efficacy. Addressing these gaps requires interdisciplinary collaboration among Siddha physicians, pediatricians, microbiologists, pharmacologists, and public health researchers to ensure evidence-based integration into modern healthcare systems (16,17).

Therefore, the aim of this review is to critically explore traditional Siddha healthcare systems for infection prevention and community health with special reference to pediatric preventive practices, including the use of Urai Mathirai, Korosanai Mathirai, dietary

interventions, and lifestyle modifications, and to evaluate their relevance in contemporary preventive medicine and public health strategies.

Materials and Methods:

This review was conducted to systematically explore traditional Siddha healthcare systems for infection prevention and community health with special emphasis on pediatric preventive practices, including **Urai Mathirai**, **Korosanai Mathirai**, dietary interventions, and lifestyle modifications. The study adopted an evidence-based narrative review design by integrating information from classical Siddha literature, modern scientific publications, and public health research.

A comprehensive literature search was performed using electronic databases including PubMed, Scopus, Web of Science, ScienceDirect, Google Scholar, SpringerLink, MEDLINE, and the AYUSH Research Portal. Additional data were collected from authoritative Siddha references such as the *Siddha Formulary of India*, *Siddha Materia Medica*, classical Siddha texts, and publications from the Ministry of AYUSH and National Institute of Siddha. The search covered publications from the year 2000 to 2025 to ensure inclusion of both traditional knowledge and recent scientific evidence.

The literature search utilized combinations of keywords and MeSH terms such as “Siddha medicine,” “Urai Mathirai,” “Korosanai Mathirai,” “pediatric Siddha formulations,” “infection prevention,” “community health,” “immunity in children,” “dietary therapy Siddha,” “life style modification traditional medicine,” “herbal prophylaxis,” and “public health traditional medicine.” Boolean operators (AND, OR) were applied to refine the search and retrieve relevant studies.

Studies were included if they discussed Siddha preventive healthcare practices, pediatric formulations, dietary recommendations, lifestyle interventions, or antimicrobial and immunomodulatory properties of Siddha medicinal plants. Eligible study designs included experimental studies, in vitro and in vivo research, clinical observations, ethnomedical surveys, systematic reviews, and narrative reviews. Studies focusing on unrelated disease conditions, lacking scientific relevance, or without accessible full text were excluded.

Data extraction was carried out using a structured format to collect information on formulation composition, traditional indications, pediatric usage, phytochemical constituents, antimicrobial properties, immunomodulatory effects, dietary recommendations, and lifestyle practices. Additional data on mechanisms of action such as immune enhancement, antioxidant activity, gut microbiota modulation, and antimicrobial effects were also recorded.

The quality of the included literature was assessed based on methodological clarity, reproducibility, scientific relevance, and credibility of the source. Greater weight was given to peer-reviewed articles, classical Siddha texts, government publications, and experimentally validated studies.

The extracted data were synthesized thematically into major categories: (i) Siddha preventive healthcare principles, (ii) pediatric Siddha formulations including Urai Mathirai and Korosanai Mathirai, (iii) dietary interventions for infection prevention, (iv) lifestyle modifications and hygienic practices, and (v) scientific evidence supporting antimicrobial and immunomodulatory effects

of Siddha practices. The findings were presented in a narrative format to provide a comprehensive understanding of Siddha preventive healthcare in the context of modern community health and infection prevention strategies.

Results:

The review findings indicate that Siddha preventive healthcare systems adopt a comprehensive, multi-component strategy for infection prevention and community health promotion, particularly in children, by integrating prophylactic formulations, dietary interventions, and lifestyle modifications. Evidence from classical Siddha literature and modern scientific studies suggests that this integrated approach enhances immune function, reduces susceptibility to infections, and supports overall pediatric health outcomes.

The analysis revealed that **Urai Mathirai** and **Korosanai Mathirai** are traditionally used pediatric prophylactic formulations administered in small doses during seasonal changes and epidemic-prone periods to prevent common infectious diseases. These formulations are reported to reduce the incidence of respiratory tract infections, gastrointestinal disturbances, and febrile illnesses in children. Their protective effects are attributed to antimicrobial, antipyretic, and immunomodulatory properties of their herbal constituents, which collectively contribute to improved host defense mechanisms and enhanced immune responsiveness.

Dietary interventions described in Siddha medicine were also found to play a significant role in infection prevention. Nutrient-rich foods such as amla (*Phyllanthus emblica*), turmeric (*Curcuma longa*), garlic (*Allium sativum*), ginger (*Zingiber officinale*), pepper (*Piper nigrum*), millets, and green leafy vegetables are commonly recommended for children to strengthen immunity and prevent infections. These foods contain bioactive compounds including vitamins, polyphenols, flavonoids, and essential oils that exhibit antioxidant, antimicrobial, and anti-inflammatory activities. Regular consumption of these dietary components supports gut

health, enhances immune responses, and reduces vulnerability to common pediatric infections.

Lifestyle modification practices were identified as another essential component of Siddha preventive healthcare. These include maintaining adequate sleep, engaging in regular physical activity, practicing personal hygiene, following seasonal behavioral adjustments (*Kaalamariyal*), and avoiding processed or unhealthy foods. Such practices are associated with improved immune regulation, reduced infection rates, and better overall growth and development in children. Environmental hygiene and cleanliness were also emphasized as important community-level strategies for reducing exposure to infectious agents and preventing disease transmission.

Furthermore, the review highlighted that many medicinal ingredients used in Siddha pediatric formulations possess scientifically validated antimicrobial properties against a range of bacterial and viral pathogens. Phytochemicals such as flavonoids, alkaloids, tannins, phenolic compounds, and terpenoids exert antimicrobial effects through mechanisms including disruption of microbial cell membranes, inhibition of nucleic acid synthesis, suppression of virulence factors, and prevention of biofilm formation. In addition, several studies demonstrated the immunomodulatory potential of Siddha medicinal plants, showing enhanced macrophage activity, improved lymphocyte proliferation, and regulated cytokine production. These immune-enhancing effects are particularly relevant in pediatric populations, where immune systems are still developing and require additional support for effective defense against infections.

Overall, the results demonstrate that Siddha preventive healthcare systems provide a holistic and synergistic approach to infection prevention in children through the combined use of **Urai Mathirai**, **Korosanai Mathirai**, **dietary therapy**, and **lifestyle modification practices**, supporting both individual immunity and broader community health outcomes.

Table 1. Summary of Siddha Preventive Healthcare Components for Pediatric Infection Prevention

Component	Examples	Primary Action	Health Outcome
Prophylactic formulations	Urai Mathirai, Korosanai Mathirai	Immunomodulatory, antimicrobial, antipyretic effects	Reduced respiratory & gastrointestinal infections
Dietary therapy	Amla, turmeric, garlic, ginger, pepper, millets, greens	Antioxidant, antimicrobial, immune boosting	Improved immunity & gut health
Lifestyle modification	Sleep hygiene, physical activity, personal hygiene, Kaalamariyal	Immune regulation, reduced exposure to pathogens	Lower infection risk, better growth
Environmental hygiene	Clean surroundings, sanitation practices	Reduced microbial transmission	Community-level infection control
Siddha phytochemicals	Flavonoids, tannins, alkaloids, terpenoids	Antimicrobial, anti-inflammatory actions	Enhanced host defense & pathogen inhibition

Discussion:

The present review highlights that Siddha preventive healthcare systems provide a comprehensive and integrative framework for infection prevention and community health promotion, particularly in pediatric populations. In the context of rising infectious disease

burden and antimicrobial resistance, preventive strategies rooted in traditional medical systems are gaining renewed scientific attention (1,2). The findings of this review suggest that Siddha medicine, through its prophylactic formulations, dietary recommendations, and lifestyle interventions, may contribute significantly to strengthening host immunity and reducing infection susceptibility (3,4).

A key observation from this review is the traditional use of **Urai Mathirai** and **Korosanai Mathirai** as pediatric prophylactic formulations for preventing seasonal and epidemic-related infections. These formulations are traditionally administered in small doses to children to enhance resistance against respiratory and gastrointestinal infections. Their reported benefits are consistent with the presence of bioactive phytochemicals exhibiting antimicrobial and immunomodulatory activities (5,6). Similar preventive approaches in traditional medicine systems have been shown to reduce infection frequency through immune enhancement and modulation of host defense mechanisms (7).

Dietary therapy (*Unavu Maruthuvam*) emerged as a central pillar of Siddha preventive healthcare. Foods such as amla (*Phyllanthus emblica*), turmeric (*Curcuma longa*), garlic (*Allium sativum*), ginger (*Zingiber officinale*), pepper (*Piper nigrum*), millets, and green leafy vegetables were consistently recommended for children. These foods contain bioactive compounds such as flavonoids, polyphenols, curcuminoids, and organosulfur compounds that exhibit antioxidant, antimicrobial, and anti-inflammatory properties (8–10). Such dietary components not only reduce oxidative stress but also enhance innate and adaptive immune responses, thereby lowering susceptibility to infectious diseases (11). These findings are in agreement with modern nutritional science, which emphasizes the role of diet in immune system regulation and infection prevention (12).

Lifestyle modification practices, including adequate sleep, physical activity, hygiene maintenance, and seasonal behavioral adaptation (*Kaalamaraiyal*), were identified as essential components of Siddha preventive healthcare. These practices align closely with modern public health recommendations that emphasize behavioral determinants of health in disease prevention (13,14). In pediatric populations, such interventions are particularly important, as they contribute to immune maturation, metabolic regulation, and reduced exposure to infectious agents (15).

The antimicrobial potential of Siddha medicinal ingredients provides further scientific support for their preventive use. Phytochemical constituents such as flavonoids, alkaloids, tannins, terpenoids, and phenolic compounds have been shown to inhibit microbial growth through multiple mechanisms, including disruption of cell membranes, inhibition of nucleic acid synthesis, suppression of virulence factors, and prevention of biofilm formation (16,17). These multitarget mechanisms are particularly relevant in the context of antimicrobial resistance, as they reduce the likelihood of resistance development compared to conventional single-target antibiotics (18).

In addition, several studies have demonstrated the immunomodulatory effects of Siddha medicinal plants, including enhancement of macrophage activity, lymphocyte proliferation, and regulation of cytokine production (19,20). These immune-enhancing effects are especially important in children, whose immune systems are still developing and require additional support to effectively respond to infections. The combined antimicrobial and immunomodulatory properties of Siddha formulations suggest a synergistic mechanism of action that supports both prevention and early control of infections.

The integration of Siddha preventive healthcare practices with modern public health strategies offers a promising approach to community health promotion. Preventive frameworks based on traditional knowledge can complement existing healthcare systems

by providing low-cost, accessible, and culturally acceptable interventions (21). Such integration is particularly relevant in resource-limited settings where healthcare access may be constrained (22).

However, despite encouraging evidence, several limitations remain. Standardization of formulations such as Urai Mathirai and Korosanai Mathirai is lacking, and there is limited clinical evidence validating their efficacy in controlled pediatric populations. Furthermore, most available data are derived from experimental or observational studies rather than randomized clinical trials (23). Rigorous scientific validation, including toxicological assessment, dosage standardization, and clinical evaluation, is necessary before widespread integration into modern healthcare systems (24).

Future research should adopt an interdisciplinary approach involving Siddha practitioners, pediatricians, microbiologists, pharmacologists, and public health experts. Advanced methodologies such as systems biology, metabolomics, and clinical epidemiology may help elucidate the mechanisms underlying the preventive effects of Siddha interventions and facilitate their translation into evidence-based healthcare strategies (25,26).

Overall, the evidence suggests that Siddha preventive healthcare systems, through the combined use of **Urai Mathirai, Korosanai Mathirai, dietary therapy, and lifestyle modification**, offer a holistic and potentially effective framework for infection prevention and community health promotion in children. Further scientific validation is essential to fully realize their translational potential in modern healthcare systems.

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