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## SURVEY AND ASSESSMENT OF MEDICINAL PLANTS IN SRM UNIVERSITY FOR PRIMARY HEALTH CARE OF STUDENTS

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### Abstract

The use of medicinal plants for primary health care has been a part of traditional medicine systems for centuries. Recently, there has been a renewed interest in using medicinal plants as an alternative to modern medicines due to their accessibility, low cost, and fewer side effects. In this context, a study was conducted to identify and assess medicinal plants on the SRM University campus for primary healthcare students. The study identified sixteen common primary health conditions of students and prioritized ten of them, including Cold, Cough, Fever, Headache, Body pain, Constipation, Menstrual complaints, Mental stress, Stomach pain, and Sleeplessness for further investigation. The study identified 64 medicinal plants in the MHS area on campus, and after processing and preserving them as herbarium sheets, 16 medicinal plants were prioritized for use in students' primary health care after a rapid assessment. The study highlights the potential of medicinal plants in providing primary health care services to students in a cost-effective and accessible manner.

**keywords:** Medicinal plants, Primary health care, Traditional medicinal, Rapid assessment

## 1. Introduction

Pollution, unhealthy lifestyles, and environmental contaminants can have negative impacts on human health. The overuse or misuse of allopathic drugs has also become a serious concern in modern healthcare[1]. To address this issue, the World Health Organization (WHO) launched the 'WHO Traditional Medicine Strategy 2014-2023' in 2013, emphasizing the importance of integrating traditional and complementary medicine to provide universal healthcare while ensuring its safety, quality, and effectiveness [2].

The practice of traditional medicine provides a diverse range of accessible and affordable treatment options for individuals from various backgrounds [2]. The World Health Organization (WHO) has reported that India boasts one of the most ancient, diverse, and extensive medical traditions globally.

The AYUSH system, which stands for Ayurveda, Yoga and Naturopathy, Unani, Siddha, and Homeopathy, is a key component of traditional medicine in India. There are around 50,000 to 80,000 plant species that form the foundation of traditional medicine in India [3] [4]. The use of traditional medicine is especially relevant in developing countries where healthcare systems are limited, and access to modern medicine is often a challenge. Moreover, traditional medicine systems are known for their holistic approach, which focuses on the overall well-being of an individual rather than just treating specific symptoms.

The importance of using plant materials for medicinal purposes has grown in recent times due to various factors such as population growth, inadequate drug supply, expensive treatment options, and the side effects of synthetic drugs. The World Health Organization has reported that about 80% of the global population uses herbal remedies to address their healthcare needs. [5]. India's traditional medicinal system, AYUSH, has codified approximately 8,000 herbal medicines. Plant-based medications are estimated to account for up to 80% of all drugs consumed in rapidly growing nations like India, and more than 30% of all plant species have been utilized medicinally at some point. Herbal remedies are considered relatively safe, environmentally friendly, and locally accessible due to their natural origin [6] [7] [8] [9].

Traditional medicine knowledge is commonly transmitted through a hierarchical system that involves family members, neighbours, village elders, and traditional healers and is frequently used as primary healthcare prior to seeking allopathic medicine. To document the medicinal plants available on campus and to provide students with access to this undocumented knowledge, an ethnobotanical survey was conducted at SRM University. The survey included information about the major ailments affecting the students, and the resulting data can be used to formulate traditional medicinal plants for primary healthcare purposes. Additionally, the gathered information can be passed down to future generations.

## **2.Literature review**

Ayurveda, a medical system that has its roots in India since 5000 years ago, believes in the importance of maintaining harmony between mind, body, and spirit to achieve good health. The word Ayurveda is derived from two Sanskrit words, "Ayus" meaning life, and "Veda" meaning knowledge. [10]. Natural remedies, such as herbal medicines, dietary adjustments, and lifestyle changes, are used in Ayurveda to prevent and cure illnesses. The system has gained popularity globally due to its holistic approach to healthcare, which emphasizes individualized treatment that considers each person's unique physical and mental characteristics. Ayurveda has been utilized to treat a variety of illnesses, including chronic diseases, stress, and anxiety [11] [12] [13].

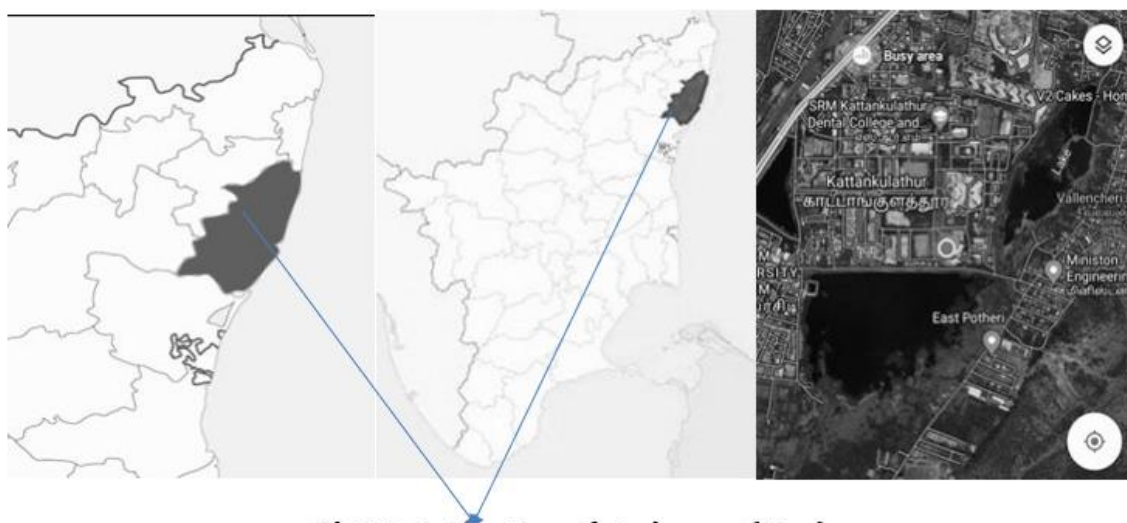
The Siddha medical system is an ancient healthcare system that has its roots in South India and is closely related to Ayurveda. The system focuses on achieving a balance between matter and energy, represented by Siva and Sakthi, respectively, to promote optimal health and well-being. It emphasizes a holistic approach that includes natural remedies, dietary modifications, and lifestyle changes. The system has been extensively practiced in South India and has become an integral part of Tamil culture. The use of natural substances and herbs to treat various illnesses and diseases is a hallmark of Siddha medicine.[14] [15].

The Unani medical system, evolved from ancient Greece and advanced by pioneers such as Hippocrates (460-377 BC) and Galen (130-201 AD), revolves around the idea of balance and harmony between the four fundamental elements of Earth, Air, Water, and Fire, and the four humors including blood, phlegm, black bile, and yellow bile, within the human body. The main aim of the Unani system is to maintain this balance through natural remedies, lifestyle adjustments, and dietary modifications. Its holistic approach to

healthcare has made it increasingly popular globally, especially in regions such as South Asia and the Middle East. [16] [17].

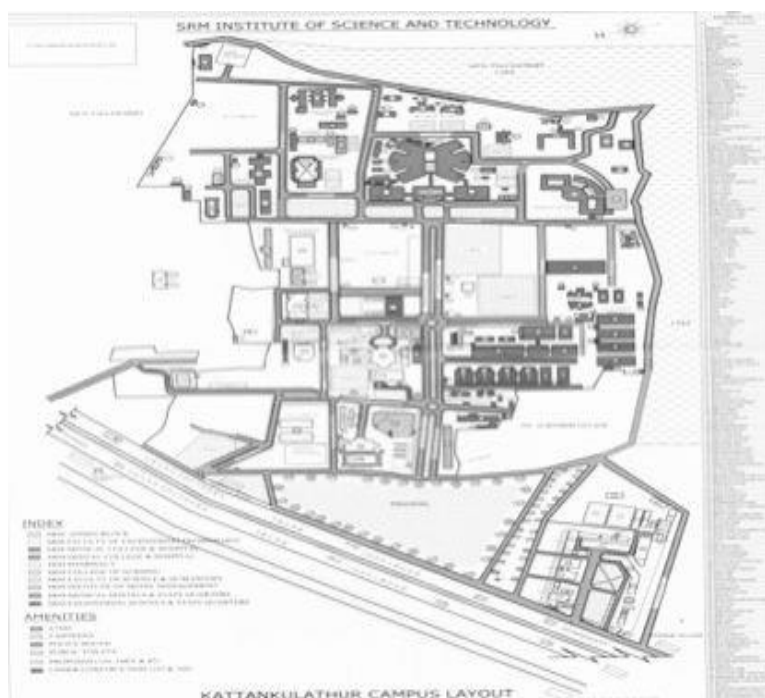
### 3.Methodology

The study area for the ethnobotanical survey was Chengalpattu district in Tamil Nadu, India. The district is located on the Northeast Coast of Tamil Nadu and is adjacent to the Bay of Bengal and Chennai city. It is bounded in the west by Kancheepuram & Tiruvannamalai District, in the North by Chennai district, in the South by Villupuram district, and in the East by Bay of Bengal. The latitude and longitude of the study area are 12° 40' 54.97"N and 79° 59' 19.83"E, respectively as shown in the Figure 1. The study design was qualitative and exploratory, with a sample size of 50 SRM University students. The data obtained from a Google questionnaire was analysed to prioritize primary student ailments based on uniqueness and clarity. An exploratory study was conducted at MHS campus, SRM University Wellness Program to identify medicinal plants on campus, assess their safety and efficacy, and create a booklet on campus medicinal plants and easy formulations [18]. For the survey, expert botanists helped with plant identification, collection, and preservation in the form of herbarium sheets. The study's major objective was to produce a booklet on medicinal plants that may be discovered on campus and simple recipes that students can post on social media to promote wellness and raise awareness. The survey provided important data and insights into students' primary healthcare, and it can be used as a template for similar surveys in other educational institutions.

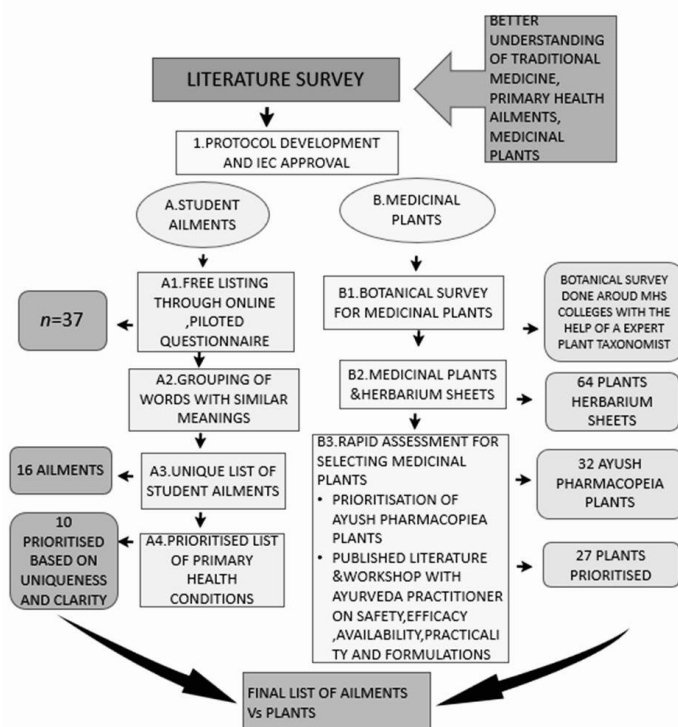


**Figure 1:** Location of study area (Map)

The study focused on the SRMIST (Sri Ramaswamy Memorial Institute of Science and Technology) campus, which is in Chengalpattu district, The campus spans about 250 acres and is located approximately 35 km away from the city of Chennai, as shown in the figure 2.



**Figure 2: SRM Campus Map**



**Figure 3: Conceptual framework of this study**

## **4.Data collection**

### ***4.1 Student ailments***

Data was collected on primary healthcare ailments through an online, open-ended questionnaire circulated randomly among students of various departments in SRMIST Kattankulathur campus.

Link for the google questionnaire: <https://forms.gle/ca9a6JHaYxY8cNWs8>.

### ***4.2 Specimen (Medicinal plants) collection to suggest for the common ailments***

As part of the exploratory study on medicinal plants on campus, a field exploration was carried out inside the SRM University Campus in June [19]. The exploration took almost 3 days to cover the entire campus. Expert botanists were consulted for their guidance and assistance in identifying and collecting plants. The survey was carried out based on common plant names frequently used by the common people and the availability of plants inside the campus. The field walk started from the Medical College, located at (Lat- 12.821243°, Long- 80.047655°), and proceeded to survey the Dental College, Engineering College, Arts College, Law College, Tech Park, Staff Quarters, SRM Hospital, and SRM Hostel. During the exploration, plants were examined based on their unique features such as colour of the flowers, fruits, peculiar smell, and taste. The collected plants were both natural and cultivated. The identified and collected plants were documented by their common name, family name, binomial name, habit, habitat, distribution, and uses. To preserve the collected plants for future reference and study, they were preserved in the form of herbarium sheets following the guidelines [20].

## **5.Results:**

### ***5.1 Data analysis of ailments***

As part of the exploratory study on medicinal plants on campus, data was obtained from Google questionnaires to identify common student ailments. The sample size was 50 though the saturation is achieved, but only 37 responses were obtained as 13 did not wish to answer. The responses were then analysed and grouped together if they had a similar meaning. This

resulted in 16 unique lists of student ailments. To make the results more manageable, the lists were prioritized based on uniqueness and clarity, and eventually, they were shortlisted to 10 primary student ailments (Table 1).

**Table:1** List of prioritized Ailments and No. of respondents

S. No	Frequency of symptoms	Compiled response
1	Anxiety <sup>11</sup>	Mental stress
2	Body Pain <sup>4</sup>	Headache
3	Cold <sup>13</sup>	Cold
4	Constipation <sup>2</sup>	Sleeplessness
5	Cough <sup>10</sup>	Anxiety
6	Fever <sup>7</sup>	Cough
7	Headache <sup>14</sup>	Fever
8	Mental stress <sup>21</sup>	Period complaints
9	Period complaints <sup>4</sup>	Body pain
10	Sleeplessness <sup>12</sup>	Constipation

## 5.2 Data analysis of medicinal plants

64 plants were identified and collected, then dried, processed, and preserved as herbarium sheets. These sheets contained comprehensive information such as common and local name (Tamil name), binomial names, family, habit, habitat, uses, and parts of the plant used. This documentation preserves the knowledge of the medicinal properties of these plants for future research and use, while promoting cultural and linguistic diversity and preserving traditional knowledge [19], [20].

## 5.3 Prioritization of Medicinal Plants

After the documentation of 64 medicinal plants, desk research was conducted to prioritize them based on the AYUSH pharmacopeia, namely API, UPI, and SPI, for standardization. This process resulted in the prioritization of 32 plants generally regarded as safe (GRAS) (Table 2).

**Table:2 List of prioritized medicinal plants with AYUSH reference**

S. No	Tamil name	Binomial name	Family	Parts of the plant used	Data sources
1	Vellai Karisalankanni	Eclipta prostrata (L.) L.	Asteraceae	Leaves, Root, Whole plant	API PART 1 VOL 2 (pp 21); [21]
2	Keezhanelli	Phyllanthus amarus Schumach. & Thonn.	Phyllanthaceae	root, stem, leaves	API PART 1 VOL 1(pp 190); [21]
3	Puliyarai	Oxalis corniculata L.	Oxalidaceae	Leaves, Whole plant	API PART 1 VOL 3 (pp 62); [21]
4	Saranai	Trianthema portulacastrum L.	Aizoaceae	leaves, root	API PART 1 VOL 4 (pp 2); [21]
5	Tulasi	Ocimum sanctum L.	Lamiaceae	leaves, seeds	API PART 1 VOL 2 (pp 242); [21]
6	Seendal	Tinospora cordifolia (Willd.) Hook.f. & Thomson	Menispermaceae	Root, Stem, Leaves	API PART 1 VOL 1 (pp 70); [21]
7	Vemmu	Azadirachta indica A. Juss.	Meliaceae	bark, leaf, flower, seed, fruit	API PART 1 VOL 2 (pp 187); [21]
8	Mookarattai	Boerhaavia diffusa Linn.	Nyctaginaceae	roots, whole plant, seed	API PART 1 VOL 1 (pp 163); [21]
9	Kupaaimeni	Acalypha indica L.	Euphorbiaceae	Whole plant	API PART 1 VOL 6 (pp 117); [21]
10	Pungam Maram	Pongamia pinnata (L.) Pierre	Fabaceae	Root bark, Seed	SPI PART 1 VOL 1 (pp 181); [22]
11	Sarakkondrai	Cassia fistula L.	Fabaceae	root, bark, leaf,	API; 2(I): (pp 10-12); [21]



				flower, fruit pulp	
12	Sotru Katraazhai	Aloe vera (L.) Burm.f.	Asphodelaceae	root, leaf	UPI PG- (pp 30,14) and Indian medicinal plants (pp 36); [23]
13	Karivempu	Murraya koenigii (L.) Spreng.	Rutaceae	leaf, root, bark	API Part I Vol VI (pp 63); [21]
14	Arugam Pullu	Cynodon dactylon (Linn.) Pers.	Poaceae	root, stem	API Part I Vol III (pp 22); [21]
15	Manjal	Curcuma longa L.	Zingiberaceae	Rhizome	API Part I Vol I (pp 30); [21]
16	Mudakkathan	Cardiospermum halicacabum L.	Sapindaceae	Root, Leaf, Seed	API Part 1 Vol V (pp 31); [21]
17	Kanda Tippili	Piper longum L.	Piperaceae	Root, Fruit	API Part I Vol II (pp 60); [21]
18	Nellikai, Nelli	Phyllanthus emblica L.	Euphorbiaceae	Fruit	API Part I Vol I (pp 4); [21]
19	Madhulai	Punica granatum Linn.	Punicaceae	Fruit, Bark, Root, Seed, Rind	API Part I Vol II (pp 14); [21]
20	Maruthaani	Lawsonia inermis L.	Lythraceae	Fruit, Root, Bark, Leaf, Flower, Seed	API PART 1 VOLUME 4 (pp 9); [21]
21	Sembaruthi	Hibiscus rosa- sinensis L.	Malvaceae	flowers, leaves	API PART 1 VOL 1; [21]
22	Lavangapattai	Cinnamomum zeylanicum Blume.	Lamiaceae	bark	SPI PART 1 Vol. 1 (pp 62); [22]

23	Pudeenaa	Mentha viridis (L.) L.	Lamiaceae	Leaves, Whole plant	API Part I Vol. V (pp 66); [21]
24	Adathodai	Adhatoda vasica Nees	Acanthaceae	Leaves	API Part I Vol I (pp 76), Vol IV (pp 65); [21]
25	Atthi	Bauhinia racemosa Lamk.	Caesalpiniaceae	nil	API PART 1 Vol. 6 (pp 213); [21]
26	Vatta tiruppi	Cissampelos pareira L.	Menispermaceae	roots	API PART 1 VOL 1 (pp 157); [21]
27	Nilavembu	Andrographis paniculata (Burm.f.) Nees	Acanthaceae	aerial parts, roots and whole plant	API Part I Vol I (pp 47); [21]
28	Ammanpatcharisi	Euphorbia hirta L.	Euphorbiaceae	Seeds	API PART 1 VOL 6 (pp 57); [21]
29	Mullangi	Raphanus sativus	Brassicaceae	Seeds, Leaves, Roots	API PART 1 VOL 2 (pp 165); [21]
30	Erukku	Calotropis gigantea (AIT) R. Br.	Asclepiadaceae	Leaves, Flowers, Seeds, Roots	API PART 1 VOL 1 (pp 18); [21]
31	Vasambu	Acorus calamus L.	Acoraceae	rhizome	API PART 1 VOL 1 (pp 207); [21]
32	Perandai	Cissus quadrangularis L.	Vitaceae	Stem, leaves, Roots	API Part I Vol III (pp 11); [21]

#### 5.4 Participatory Rapid Assessment Workshop for Plant Shortlisting

Understanding Rapid Assessment: Rapid Assessment is a participatory approach that assesses traditional health practices through a process of dialogue and consensus involving

traditional practitioners, and scientific experts. This process includes documentation of health practices, desk research to gather scientific data on these practices, and assessment workshops to prioritize and select practices for promotion [24].

After conducting a literature survey, a Participatory Rapid Assessment Workshop was organized to further shortlist the plants based on safety, efficacy, practicality, and availability. The workshop included experts in Ayurveda and botany. Each plant was scored on a scale of 0-12, based on which 5 plants were considered unsafe, and 27 plants were deemed safe for further consideration. Further prioritization was done based on the highest scores, with a cut-off at 12 and 11, resulting in the shortlisting of 16 plants.

### 5.5 Mapping of Student Ailments and Medicinal Plants

After prioritizing 10 student ailments and 16 medicinal plants, mapping of ailments and plants were done. Based on the uses of the plant, simple formulations were suggested for students to manage their primary health conditions with the help of desk research as well as ayurvedic practitioner. The Binomial name, Tamil name and formulation were given for each student ailment (Table 3).

**Table:3 List of prioritized plants with Ayurvedic Formulation Name**

S.No	Bionomial name	TAMIL NAME	Total (max 12)	Parts of the plant used	Ailments	Plant formulation
1	<i>Phyllanthus amarus</i> Schumacher & Thonn.	Keezhanelli	11	root, stem, leaves	Acidity of stomach, Respiratory tract infection, Urinary tract infection, treat kidney stones and liver-related disorders such as jaundice and hepatitis.	Keezhanelli powder or juice ; Part 1, Volume 2
2	<i>Oxalis corniculata</i> L.	Puliyarai	10	Leaves, Whole plant	Treat various ailments including fever, diarrhea, pain, and microbial infections, digestion, constipation, cough, cold	Puliyarai extract with honey ; Part 1, Volume 2
3	<i>Ocimum sanctum</i> L.	Tulasi, Thulasi, Thiru Theezai	12	Leaves, Seeds	Fever, cough, digestion, ulcers and To manage stress and promote relaxation	Tulsi swarasa and Kalka ; Part 1, Volume 3

4	<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thomson	Guduchi	12	Root, Stem, Leaves	Boosting immunity, treating fever, cough, and respiratory problems.	Guduchi kashayam ; Part 1, Volume 3
5	<i>Azadirachta indica</i> A.Juss.	Vemmu, Veppu, Arulundi, Veppan	11	bark, leaf, flower, seed, fruit	Treatment of Inflammation, fever, and infections, Indigestion. It has antibacterial, antifungal, and antiviral properties	Nimba Kalka ; Part 1, Volume 2
6	<i>Boerhaavia diffusa</i> Linn.	Mookarat tai (Shihappu)	11	roots, whole plant, seed	Constipation, Stomach disorder, urinary disorder, pain, ulcer, muscular pain	Kalka ; Part 1, Volume 2
7	<i>Caasia fistula</i> L.	Sarakkon drai	10	root, bark, leaf, flower, fruit pulp	fever, constipation, pain, indigestion, and promote bowel movements,	Kashayam for oral and external use ; Part 1, Volume 1
8	<i>Aloe vera</i> (L.) Burm.f.	Sotru Katraazhai	10	root, leaf	Stomach disorders, dysentery, abdominal disorder, indigestion, menstrual bleeding	Kalka ; Part 1, Volume 3
9	<i>Cynodon dactylon</i> (Linn.) Pers.	Arugam Pullu	11	root, stem	Urinary problems, fever, menstrual pain, vomiting	Doorva swarasa ; Part 1, Volume 1
10	<i>Curcuma longa</i> L.	Manjal	12	Rhizome	Often used as a natural remedy for joint pain and arthritis, vomiting, cough, ulcer, fever, Skin disease.	Turmeric powder mix with honey and ginger ; Part 1, Volume 3
11	<i>Cardiospermum halicacabum</i> L.	Mudakkathan	11	Root, Leaf, Seed	Pain relief, managing respiratory issues, reducing stress and anxiety, Boosting immunity, Anti-inflammatory effects	Mudakkathan kashayam; Part 1, Volume 2
12	<i>Piper longum</i> L.	Kanda Tippili	10	Root, Fruit	Reproductive tract infection, Muscular pain, Cold, Urinary tract infection, Fever. Digestive benefits and is used to treat gastrointestinal issues such as bloating and constipation, natural remedy for respiratory issues such as coughs and asthma.	Mix Kandathipilli powder with honey; Part 1, Volume 1
13	<i>Phyllanthus emblica</i> L.	Nellikai, Nelli	11	Fruit	Vomiting, Constipation, Asthma, Respiratory tract infections, Fever, Cough, Improves Immunity, improving digestion, boosting the immune system, and promoting healthy skin and hair.	Amla fruit and juice can be taken in empty stomach for improving immunity and Amla powder mix with honey; Part 1, Volume 5

14	<i>Mentha viridis</i> (L.) L.	Pudeena	10	Leaves, Whole plant	Antispasmodic properties aid digestion, relieves respiratory problems, reduces headaches and stress, has antibacterial properties for skin problems, helps with menstrual cramps, and promotes oral health	Mint infused water, Mint tea ; Part 1, Volume 3
15	<i>Andrographis paniculata</i> (Burm.f.) Nees	Nilavembu	11	whole plant	Treat viral infections, Fever, treat indigestion, constipation, and diarrhea, inflammation.	Nilavembu Kashayam; Part 1, Volume 3
16	<i>Cinnamomum zeylanicum</i> Blume.	Lavangapattai	11	Bark	For Cold, Cough, Poor Digestion, benefits in regulating blood sugar levels, improving insulin sensitivity, and reducing inflammation, To manage dental pain and infection	Cinnamomum infused warm water; Part 1, Volume 5

(**Source:** Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy (AYUSH), Ministry of Health and Family Welfare, Government of India. (2016). The Ayurvedic Pharmacopoeia of India, New Delhi: Government of India Press.)

## 6. Discussion

The present study aimed to explore the potential use of medicinal plants in the treatment of common primary health conditions of students in the SRM University campus. The study identified 16 primary health conditions of students, out of which 10 were prioritized for investigation. The study documented 64 medicinal plants in the MHS area on campus, and 16 plants were shortlisted after a rapid assessment for use in the treatment of identified health conditions.

The findings of this study have significant implications for primary health care of students, as they provide evidence for the potential use of medicinal plants in the treatment of common health conditions. The prioritized plants can serve as a cost-effective and accessible alternative to modern medicines, which can have adverse effects on the human body. Additionally, the use of medicinal plants is consistent with traditional medicine systems, which are deeply rooted in the culture of the region.

The World Health Organization recognizes the significance of traditional medicine systems and encourages the integration of traditional and modern medicines in health care services. Medicinal plants can offer cost-effective and easily accessible health care options, particularly in developing countries. This study identified and prioritized medicinal plants for primary health care of students in the SRM University campus, and its findings can promote the use of medicinal plants for managing primary health conditions in the student community. Further research should concentrate on the pharmacological properties, efficacy, and safety of the identified plants in treating primary health conditions, and the integration of traditional and modern medicines can provide a comprehensive approach to primary health care of students.

The study serves as a helpful guide for students in managing common primary health conditions with affordable and accessible medicinal plants found on campus. These prioritized plants and formulations can be used as a cost-effective and potentially side-effect-free alternative or complement to modern medicines, alleviating the financial burden on students and promoting self-reliance in managing their health conditions. Additionally, the study highlights the importance of integrating traditional medicine systems with modern medicine in healthcare services, promoting a more holistic approach to healthcare and raising awareness of traditional medicinal practices among the student community.

For the larger community, the study has the potential to promote the use of locally available medicinal plants for primary health care, particularly in developing countries where access to modern medicines may be limited. This could reduce the cost burden on the healthcare system and promote sustainable health care practices. The identification and prioritization of medicinal plants for primary health care of students in the SRM University campus has significant implications for both the student community and the larger community in promoting a more holistic approach to healthcare.

## **7. Conclusion**

The study highlights the potential use of medicinal plants as an alternative and complementary treatment option for primary healthcare needs of students in SRM University. The identified medicinal plants can be used to develop a sustainable campus

health program that can reduce the financial burden on students and promote self-reliance in managing their health conditions. The study also emphasizes the importance of conserving and documenting traditional knowledge of medicinal plants to ensure the sustainability of primary healthcare. Further research on the chemical composition and pharmacological activities of the identified plants can lead to the discovery of new therapeutic agents. Future research should focus on the development of effective health programs and services that meet the specific needs of students while also conserving traditional knowledge related to medicinal plants. Overall, the manuscript provides valuable insights into the potential of medicinal plants in primary healthcare and calls for continued efforts in this field. Finally, we declare that there are no conflicts of interest regarding this manuscript.

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