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SHORT COMMUNICATION

Impact of *Ayurveda* Pre-monsoon Prophylaxis on Episodes and Severity of Fever, Cough and Cold in North Karnataka - A Cross-sectional Survey Study

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Abstract

Background: Though monsoons are a real gift of nature, it is a meteorological phenomenon which brings in lots of losses in terms of money and life through the upsurge of various infectious diseases in India. According to *Ayurveda*, immunity is comparatively lower during the monsoon season. So, it is in practice in our institute to provide pre-monsoon prophylaxis to all interested staff and students to boost immunity. **Objective:** The present retrospective cross-sectional study was planned to assess the impact of *Ayurveda* pre-monsoon prophylaxis on the severity and frequency of episodes of fever, cough and cold in healthy volunteers. **Methods:** After obtaining ethical clearance for the cross-sectional study, a survey using Google Forms was conducted. A Google form was created to assess the health condition as well as the frequency and severity of cough, cold and fever in the study subjects before and after prophylaxis. Detailed scrutiny of the respondents was carried out by the investigators. The google forms of people who participated in the prophylaxis and visited for follow-up six months after receiving monsoon prophylaxis were included in the analysis. The data was analysed using a paired t-test. **Results:** A total of 591 participants out of 806 met the inclusion criteria and participated in the study. A highly significant ($p<0.001$) reduction in the frequency of episodes and severity of fever, cold and cough was found in the study subjects after prophylaxis. **Conclusion:** So, it may be inferred that *Ayurveda* pre-monsoon prophylaxis is an effective practice to enhance overall health and thereby boost the immunity of individuals.

Keywords: *Amritarishta*, *Rithucharya*, Seasons, *Sudarshana ghanavati*

1. Introduction

Seasons are having a huge impact on human life as well as nature. Any subtle changes that are occurring in the environment are reflected in humans as well. We find lots of changes that are taking place in different seasons in the environment around us like the flowering of plants in spring, hibernation of animals in summer, and shedding of leaves in autumn and so does the human body. The relationship that exists between our body and environment is quite interesting and the latter plays a vital role in the causation of the disease as per the concept of epidemiology which had been explained in *Ayurveda* classics years ago[1]. The detailed concept of natural immunity variation that is occurring during each season, shows the in-depth knowledge of *Ayurveda* science in the field of immunology. Among the six seasons, monsoon is one in which the natural

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immunity is the least due to vitiation of all three body humour (*doshas*)[2].

Due to altered lifestyles and busy schedules, people are unable to undergo *Ayurveda* seasonal purification. Considering this and intending to provide prevention as well as to boost immunity before the onset of monsoons, our institute has a unique practice of providing pre-monsoon prophylaxis with *Sudarshana ghanavati* (2 tablets) and *Amritarishta* (30 ml) twice daily for three days to all interested staff and students[3,4]. This practice has been in vogue since 2014 and has been received well by both students and staff and it has been successful in preventing infections. The present survey was planned to know the extent of the impact and success of this prophylaxis programme.

2. Materials and Methods

2.1 Study design

A Cross-sectional retrospective survey study using google forms was carried out to assess the impact of pre-monsoon prophylaxis.

2.2 Setting

In KLE Shri B M Kankanawadi *Ayurveda* Mahavidyalaya, Karnataka, we have the practice of providing Ayurveda pre-monsoon prophylaxis to all the interested staff and students just before the monsoon sets in, i.e., in the first week of June, every year. This practice has been in vogue since 2014. As a part of this Ayurveda pre-monsoon prophylaxis, *Sudarshana ghanavati* (2 tablets) and *Amritarishta* (30ml) twice daily for three days were administered to all the healthy volunteers before the onset of monsoon in June 2019. To assess the impact of this monsoon prophylaxis a survey was conducted using google forms between April 19th 2020 to April 30th 2020.

2.3 Participants

All healthy volunteers of the institute including students and staff who had received prophylaxis and consented to fill out the google form were recruited for the study. A total of 591 volunteers participated in the pre-monsoon prophylaxis out of which 482 were students and 109 were staff members.

2.4 Variables

The survey form had questions related to the episodes and severity of fever, cough and cold before and after the prophylaxis and also questions related to general health.

2.5 Data Sources or Measurement

A structured google form with questions related to the frequency of the persons suffering from an episode of fever, cough and cold, before and after prophylaxis was circulated to all the staff and students of the institute for the collection of the data. The google forms of people who participated in the prophylaxis and visited for follow-up six months after receiving monsoon prophylaxis were included in the analysis. After that, detailed scrutiny of the google forms was carried out by the investigators.

2.6 Bias

The same investigators scrutinized the responses from the google form to avoid interviewer bias. The questions were also very specific which helped to reduce the bias.

2.7 Study Size

A total of 806 google forms were scrutinized by the investigators out of which 591 google forms met the inclusion criteria.

2.8 Statistical Analysis

Paired t-test was used to perform statistical analysis of episodes and severity of fever, cough and cold before and after the prophylaxis among the study subjects using SPSS version 26 (Statistical Package for the Social Sciences, IBM, Armonk, New York, USA).

2.9 Ethical Considerations

Ethical clearance was obtained for the retrospective cross-sectional study from the Institutional Ethical Committee of KAHER's Shri B M Kankanawadi Ayurveda Mahavidyalaya (KLE/BMK/MRC/650/2020).

3. Results

The key results are tabulated in Table 1.

3.1 Descriptive Data

After the scrutiny conducted by the investigators, a total of 591 out of 806 google forms met the inclusion

Table 1. Effect of *Ayurveda* pre-monsoon prophylaxis on the frequency of episodes and severity of fever, cold and cough

Parameter	Pre-test (mean±SD)	Post-test (mean±SD)	Level of significance
Frequency of episodes of fever	1.03±1.112	0.62±.934	0.000*
Frequency of episodes of cough	1.24±1.189	0.78±1.037	0.000*
Frequency of episodes of cold	1.55±1.311	0.93±1.165	0.000*
Severity of fever (VAS Score scale of 0-10)	2.19±2.319	1.16±1.748	0.000*
Severity of cough (VAS Score scale of 0-10)	2.55±2.377	1.38±1.838	0.000*
Severity of cold (VAS Score scale of 0-10)	2.87±2.350	1.53±1.932	0.000*
Frequency of recurrence of fever in a month(n=29)	4.24±0.435	2.66±1.758	0.000*
Frequency of recurrence of cough in a month(n=40)	4.20±0.405	2.45±1.679	0.000*
Frequency of recurrence of cold in a month (n=64)	4.22±0.417	2.61±1.549	0.000*
* - Statistically Significant SD - Standard Deviation VAS- Visual Analogue Scale			

criteria. The scrutiny of the google forms revealed that 94.2% felt healthy, 93.2% felt their respiratory health was maintained, 92.7% could recover faster from common ailments and 94.6% reported that the intensity of the disease suffered was much reduced after taking prophylaxis.

3.2 Outcome Data (Assessment of Variables in the Population)

Statistical analysis of data obtained from google forms was carried out using a paired t-test which showed that there is a highly significant ($p<0.001$) reduction in **(a)** frequency of the persons suffering from an episode of fever, cough and cold after prophylaxis ($p<0.000$) **(b)** severity of fever, cough and cold after prophylaxis assessed with a scale of 1-10 ($p<0.000$) **(c)** frequency of persons suffering from an episode of fever (n=29), cough(n=40) and cold (n=64) of those who had recurrence once in a month ($p<0.000$)**.** The analysis shows that after the pre-monsoon prophylaxis 375, 339 and 310 individuals did not suffer from an attack of fever, cough and cold respectively. Data analysis showed that out of the 591 participants, the frequency of the person suffering from an episode of fever, cough and cold after prophylaxis was increased only in 6, 12 and 9 study participants respectively. Data analysis showed that out of the 591 participants, the grade of severity of fever, cough and cold after prophylaxis was increased in only 36, 38 and 25 respectively. Data analysis showed that only 2 out of 591 participants had an increase in both frequencies of episodes and severity of fever, cough and cold.

4. Discussion

Monsoon is a vital meteorological phenomenon originating over the southern tip of Kerala which is having a tremendous impact on Indian agriculture, the economy as well as on hydroelectric power projects[5]. Though having a crucial role in the economic sector, it also brings in lots of losses in terms of money and life[6]. It is a meteorological phenomenon which brings in lots of losses in terms of money and life through natural disasters like floods and an upsurge in infectious disease conditions like respiratory infections, skin infections, eye infections, dengue fever, malaria, leptospirosis, diarrhoea, leishmaniasis, hepatitis and others which is a cause of concern in India[7,8].

The environment is one among the epidemiological triads and is also an important factor in the causation of the disease. For a disease to occur, proper interaction of agent, host and environment is required. Even though a disease-causing agent is present in a host, it will not lead to disease unless and until an appropriate/favourable environment is there in the host body[9]. It is well established that the environment responds differently during each season, the same is the case with the human body. There is significant evidence stating the changes that are happening in the biochemical composition of the body during each season. Studies have proved that there is a significant relationship between the seasons and immunity which had been well documented in *Ayurveda* years ago. It can be inferred that the results obtained from this study are quite similar to the concept mentioned in *Ayurveda*.

According to *Ayurveda*, monsoons are associated with vitiation of all three body humours *(doshas)* and immunity is the least which leads to the upsurge of infectious diseases. *Ayurveda* has clearly understood this and has mentioned the regimens to be followed during each season[1].

4.1 Monsoons and Infections

Fevers and respiratory infections are a prime concern for the Indian population during the rainy season. So, it is very essential to follow proper measures like pre-monsoon prophylaxis along with proper dietary and lifestyle modifications as per *Ayurveda* classics for the prevention of diseases and maintenance of health[8]. The factors influencing the distribution of infectious diseases are listed in Figure 1[10]. Infectious diseases tend to increase in cold weather conditions due to favourable conditions like higher relative humidity, cooler temperature, heavy seasonal clothing, reduced physical activity, poorly designed and ventilated conditions, lower levels of vitamin D and melatonin, weakened functioning of the immune system, enhanced infectivity of the certain pathogens due to environment as well as to social gathering/customs as a part of the culture. During rainy and cold seasons people tend to spend most of their time inside houses/crowded public places which also helps in the spread of diseases. The best example of the environment playing a key role in transmission is the spread of the influenza virus which tends to spread in the above-said condition[11]. Studies show that during *rithusandhi*, the transition period between two seasons is a state in which the body humour *(doshas)* is getting aggravated. If a person is not following the proper regimen during *rithusandhi kala*, then he will be afflicted by various diseases like fever, rhinitis and others. During every season, our body accumulates various toxins. To eliminate these toxins *Ayurveda* has also advised seasonal purification of the body during different seasons[2].

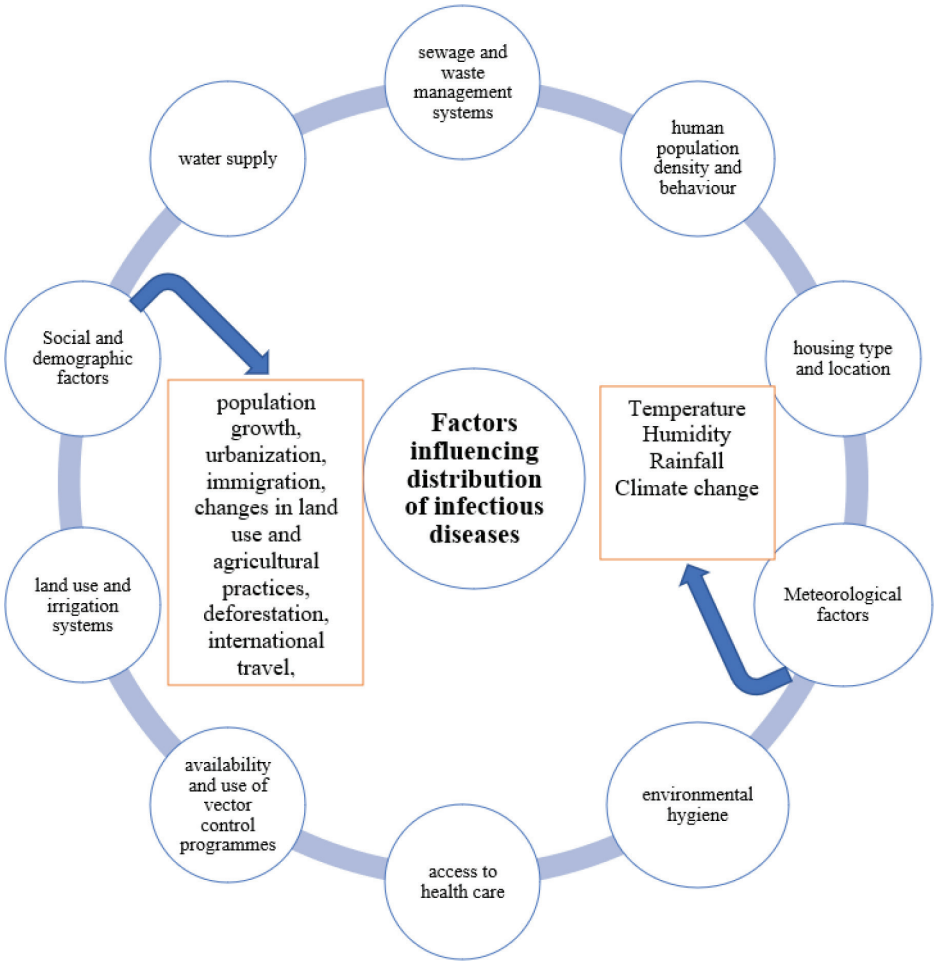

Figure 1. Factors influencing the distribution of infectious diseases.

4.2 *Amritarishta* and *Sudarshana ghanavati*

Amritarishta (Table 2) and *Sudarshana ghanavati* (Table 3) are polyherbal *Ayurveda* formulations widely practised among *Ayurveda* physicians to treat all types of fevers and infectious conditions and enhance immunity.

Recent studies show that *Sudarshana* powder can be used in the treatment of the present pandemic

Table 2. Ingredients of *Amritarishta* with *Ayurveda* uses

Drug	Botanical name	Useful part	*Ayurveda* uses[12]	Proven actions
Guduchi	*Tinospora cordifolia* (Willd.) Miers	Stem	*Jwara, Kasa, Ama*	analgesic, anti-inflammatory, antipyretic[13]
Gokshura	*Tribulus terrestris* L.	Plant	*Swasa, Kasa*	antipyretic, antinociceptive, sedative[14]
Gambhari	*Gmelina arborea* Roxb.	Root	*Jwara, Amadosha, Agnideepaka, Pachaka*	analgesic, antipyretic[15]
Prishniparni	*Uraria picta* (Jacq.) DC.	Plant	*Jwara, Swasa, Kasa, Trishna*	anti-inflammatory, antipyretic[16]
Shyonaka	*Oroxylum indicum* (L.) Kurz	Root	*Swedajanana, Jwara, Kasa, Aruchi*	antipyretic, bronchodilator[17]
Agnimantha	*Clerodendrum phlomidis* L.f.	Stem Bark	*Agni vardhaka, Jwara hara*	antinociceptive, anti-inflammatory, antipyretic[18]
Kantakari	*Solanum surattense* Burm. f.	Plant	*Jwarahara, Kasa, Swasa, Pratishyaya, Angamarda*	antioxidant, antipyretic[19]
Brihati	*Solanum nigrum* L.	Plant	*Jwara, Swasa, Kasa, Shoola, Agnimandya*	antinociceptive, anti-inflammatory and antipyretic effects[20]
Shalaparni	*Desmodium gangeticum* (L.) DC.	Whole Plant	*Jwara, Swasa, Kasa*	anti-inflammatory, antipyretic, analgesic[21]
Bilva	*Aegle marmelos* (L.) Corrêa	Stem Bark/Root	*Jwara, Amahara,*	anti-inflammatory, antipyretic, analgesic[22]
Patala	*Stereospermum chelonoides* (L.) f. DC.	Stem Bark	*Jwaraghna, Trishna*	analgesic, antipyretic[23]
Marica	*Piper nigrum* L.	Fruit	*Agnidipaka, Jwarahara, Shwasa, Shula,Swedajanana*	antidepressant, anxiolytic, antipyretic[24]
Nagakeshara	*Mesua ferrea* L.	Stamen	*Jwarahara, Trishna, Chardi*	antioxidant, antimicrobial, antiviral[25]
Musta	*Cyperus rotundus* L.	Rhizome	*Jwarahara, Agnidipaka, Pachaka, Trishna, Aruchi*	antiallergic, antihistamine, anti-inflammatory, antimalarial, antioxidant, antipyretic, antiviral[26]
Shunthi	*Zingiber officinale* Roscoe	Rhizome	*Pachaka, Shwasa, Kasa, Pratisyaya, Swarabhanga*	antiviral, anti-inflammatory, antioxidative, immunomodulatory[27]
Pippali	*Piper longum* L.	Fruit	*Jwarahara, Shwasahara, Kasahara, Agnimandya Hara*	effective against chronic bronchitis, asthma, cholera, chronic malaria, viral hepatitis, respiratory infections, cough[28]
Saptacchada	*Alstonia scholaris* (L.) R. Br.	Stem Bark	*Deepana, Shwasahara*	respiratory infections[29]
Katuka	*Picrorhiza kurroa* Royle ex Benth.	Rhizome	*Dipaka, Pachaka, Jwarahara, Shwasahara*	antioxidant, anti-inflammatory, antipyretic, immunomodulatory, anticancer, hepatoprotective[30]
Prativisha	*Aconitum heterophyllum* Wall. ex Royle	Root	*Deepana, Pachana, Jwarahara, Kasahara*	antihelminthic, anti-inflammatory, analgesic antipyretic[31]
Indrayava	*Holarrhena antidysenterica* (Roth) Wall. ex A.DC.	Seed	*Jwaraghna, Agnidipaka, Shwasahara*	chronic chest infection, asthma, bronchitis, antibacterial, antifungal, antimicrobial[32]

Table 2. Continued...

Drug	Botanical name	Useful part	*Ayurveda* uses[12]	Proven actions
Parpata	*Fumaria parviflora* Lam.	Plant	*Jwarahara, Trishna Hara, Dahahara*	antipyretic activity[33]
Svetajiraka	*Cuminum cyminum* L.	Fruit	*Agnidipaka, Jwarahara, Pachana, Ruchi Janaka*	antimicrobial, antibacterial[34]

Table 3. Ingredients of *Sudarshana ghanavati* along with *Ayurveda* uses

Drug	Botanical Name	Useful part	*Ayurveda* Uses[12]	Proven actions
Haritaki	*Terminalia chebula* Retz.	Pericarp	*Dipana, Jwarahara, Kasahara, Shwasahara, Swarabheda*	analgesic, antipyretic, antibacterial, cures respiratory diseases, antifungal, antiviral and anti-inflammatory activity, wound healing and immunomodulatory activity[35]
Bibhitaki	*Terminalia bellirica* (Gaertn.) Roxb.	Pericarp	*Jwara, Kasa, Swarabheda*	analgesic, antipyretic, anti-inflammatory, antioxidant and antimicrobial agents antibacterial activity[35,36]
Amalaki	*Emblica officinalis* Gaertn.	Pericarp	*Shwasa, Kasa, Pratishyaya*	analgesic. antipyretic anti-inflammatory, antioxidant and antimicrobial agents[35,37]
Haridra	*Curcuma longa* L.	Rhizome	*Dipana, Pratishyaya, Jwara, Kasa*	antiproliferative, anti-inflammatory, anticancer, antidiabetic, hypocholesterolemic, antithrombotic, antihepatotoxic, antidiarrheal, carminative, diuretic, antirheumatic, hypotensive, antimicrobial, antiviral, antioxidant, larvicidal, insecticidal, antivenomous[38]
Daruharidra	*Berberis aristata* DC.	Stem	*Dipana, Pachana, Jwarahara, Swedajanana*	antimicrobial, anti-inflammatory, analgesic, antipyretic, hepatoprotective[39]
Brihati	*Solanum indicum* L.	Plant	*Jwara, Swasa, Kasa, Shoola, Agnimandya*	antinociceptive, anti-inflammatory and antipyretic effects[20]
Kantakari	*Solanum surattense* Burm. f.	Plant	*Jwarahara, Kasa, Swasa, Pratishyaya, Angamarda*	antioxidant, anti- pyretic[19]
Kachura	*Curcuma zedoaria* (Christm.) Roscoe	Rhizome	*Dipana, Kasa, Shwasa, Jwara*	antipyretic, antimicrobial activity, antifungal, antibacterial, immunomodulatory effect, cardiotonic, antiviral, analgesic, anti-inflammatory[40]
Shunti	*Zingiber officinale* Roscoe	Rhizome	*Pachaka, Shwasa, Kasa, Pratisyaya, Swarabhanga*	antiviral, anti-inflammatory, antioxidative, and immunomodulator[27]
Maricha	*Piper nigrum* L.	Fruit	*Agni Dipaka,Jwarahara, Shwasa, Shula,Sweda Janana*	antidepressant, anxiolytic, antipyretic, and thrombolytic[24]
Pippali	*Piper longum* L.	Fruit	*Jwarahara, Shwasahara, Kasahara, Agnimandya Hara*	chronic bronchitis, asthma, cholera, chronic malaria, viral hepatitis, respiratory infections, cough[28]
Pippali moola	*Piper longum* L.	Root	*Dipana, Pachaka, Shwasa*	*analgesic, antipyretic,* cough suppressant hepatoprotective[41]
Guduchi	*Tinospora cordifolia* (Willd.) Miers	Stem	*Useful in Jwara, Kasa, Ama*	analgesic, anti-inflammatory and antipyretic[13]

Table 3. Continued...

Drug	Botanical Name	Useful part	*Ayurveda* Uses[12]	Proven actions
Dhamasa	*Fagonia cretica* L.	Whole plant	*Kasa, Trishna, Jwara*	immunomodulatory, anti-inflammatory, antimicrobial, hepatoprotective activity[42]
Katuki	*Picrorhiza kurroa* Royle ex Benth.	Root	*Dipaka, Pachaka, Jwarahara, Shwasahara*	antioxidant, anti-inflammatory, antipyretic, immunomodulatory, anticancer, hepato-protective[30]
Pitpapra (Shahtra)	*Fumaria indica* (Hausskn.) Pugsley	Whole plant	*Jwarahara*	analgesic, anti-inflammatory, neuropharmacological, antibacterial activities, hepatoprotective, antifungal[33]
Kutaja	*Holarrhena antidysenterica* (Roth) Wall. ex A. DC.	Stem bark	*Dipana, Pachana, Jwarahara, Atisarahara*	antipyretic, analgesic, antibacterial[43]
Yashtimadhu	*Glycyrrhiza glabra* L.	Root	*Kasa, Shwasa, Swarabhanga*	anti-inflammatory, antiviral, immunomodulatory, hepatoprotective, antimicrobial, antioxidant[44]
Musta	*Cyperus rotundus* L.	Rhizome	*Jwarahara, Agnidipaka, Pachaka, Trishna, Aruchi*	analgesic, antiallergic, anticandida, anticonvulsant, antidiarrheal, antiemetic, anti-helminthic, antihistamine, antihyperglycemic, antihypertensive, anti-inflammatory, antimalarial, antiobesity, antioxidant, antiplatelet, antipyretic, antiulcer, antiviral, cardioprotective, cytoprotective, cytotoxic, gastroprotective, hepatoprotective, neuroprotective, ovicidal, larvicidal[26]
Trayamana	*Gentiana kurroo* Royle	Root	*Jwarahara, Shulahara*	anti-inflammatory, antiviral, immunomodulatory, antipyretic[45]
Sugandha Bala	*Pavonia odorata* Willd.	Root	*Dipana, Pachana, Jwara, Daha, Hrllasa*	antimicrobial, antioxidant, carminative, demulcent, anti pyretic[46]
Pushk aramoola	*Inula racemosa* Hook. f.	Root	*Jwara, Aruchi, Shwasa*	analgesic, antimicrobial, antiallergic, anti-asthmatic, antioxidant, carminative, expectorant, bronchodilator, anti inflammatory[47]
Nimba	*Azadirachta indica* A. Juss.	Stem bark	*Jwara, Kasa, Aruchi, Hrllasa*	anti-inflammatory, antipyretic, hypoglycemic, antigastric ulcer, antifungal, antibacterial, analgesic, immunomodulatory[48]
Ajwain	*Trachyspermum ammi* (L.) Sprague	Seed	*Dipana, Pachana, Ajirna, Adhmana*	antifungal, antioxidant, antimicrobial, bronchodilator, anti-pyretic[49]
Indrayava	*Holarrhena antidysenterica* (Roth) Wall. ex A. DC.	Seeds	*Jwaraghna, Agnidipaka, Shwasahara*	antimicrobial, antioxidant, antibacterial[43]
Bharangi	*Clerodendrum serratum* (L.) Moon	Root	*Dipana, Gulma, Shwasa, Kasa, Jwara*	antiallergic, antioxidant, anti-asthmatic anti-inflammatory and antipyretic[50]
Shigru	*Moringa oleifera* Lam.	Stem bark	*Dipana, Rochana, Shodha, Gulma*	antipyretic, antiepileptic, anti-inflammatory, antiulcer, antispasmodic, diuretic, anti-hypertensive, cholesterol-lowering, antioxidant, antidiabetic, hepatoprotective, antibacterial and antifungal activities[51]
Vacha	*Acorus calamus* L.	Rhizome	*Shwasa, Kasa, KandhaRoga, Jwara*	anti-inflammatory, immunomodulatory, neuroprotective, cardioprotective[52]
Dalchini	*Cinnamomum zeylanicum* Blume	Stem bark	*Dipana, Pachana, Mukhashosha, Trishna*	antibacterial, antifungal, antipyretic, antidiabetic, anti-inflammatory, antioxidant[53]

Table 3. Continued...

Drug	Botanical Name	Useful part	*Ayurveda* Uses[12]	Proven actions
Padmaka	*Prunus cerasoides* Buch.-Ham. ex D. Don	Heartwood	*Jwara, Chardi, Rakta Stambhaka*	anti-inflammatory, antipyretic, diuretic, expectorant, antimicrobial, antioxidant[54]
Shweta Chandana	*Santalum album* L.	Heartwood	*Jwara, Raktapitta, Trishna, Daha*	anti-inflammatory, antimicrobial[55]
Ativisha	*Aconitum heterophyllum* Wall. ex Royle	Root	*Deepana, Pachana, Jwarahara, Kasahara*	anti-helminthic, anti-inflammatory, antipyretic, analgesic[31]
Bala	*Sida cordifolia* L.	Root	*Jwara, Vata Vikara, Rakta Pitta*	anti-pyretic antioxidant, anti-inflammatory, antibacterial[56]
Shalaparni	*Desmodium gangeticum* (L.) DC.	Whole plant	*Jwara, Swasa, Kasa*	immunomodulatory, anti-inflammatory, antipyretic, analgesic, cardioprotective[57]
Prishnaparni	*Uraria picta* (Jacq.) DC.	Whole plant	*Jwara, Swasa, Kasa Trishna*	anti-inflammatory, antipyretic[16]
Vidanga	*Embelia ribes* Burm. f.	Seed	*Dipana, Pachana, Krimi, Shwasa, Vatanulomaka*	antipyretic, antioxidant, anti-inflammatory, analgesic[58]
Tagara	*Valeriana wallichii* DC.	Root	*Jwara, Vatanulomaka, Shwasa*	antispasmodic, analgesic, antibacterial, antiviral, anti-inflammatory, antioxidant[59]
Chitrakmoola	*Plumbago zeylanica* L.	Root	*Agnivardhaka, Pachaka, Jwara, Sweda Janaka, Kasa*	antimicrobial, hepatoprotective, anticancer, antifertility, antiulcer, antifungal, rejuvenator, useful in chronic cough and cold anti- inflammatory[60]
Devdaru	*Cedrus deodara* (Roxb. ex D. Don) G. Don	Heart wood	*Jwra, Pinasa, Ama, Shirashula*	antimicrobial, antifungal, analgesic, anti-inflammatory, antiasthmatic[61]
Chavya	*Piper chaba* Hunter	Fruit	*Pachaka, Kasa, Shula Adhmana*	anti-inflammatory, analgesic, and antipyretic[62]
Patola	*Trichosanthes dioica* Roxb.	Fruit	*Jwarahara, Daha, Rechaka, Kasa*	antioxidant, anti-inflammatory and antipyretic[63]
Kamala	*Nymphaea lotus* L.	Flower	*Trishna, Daha, Jwara*	antioxidant, anti-inflammatory[64]
Kakoli	*Roscoea purpurea* Sm.	Tuberous root	*Jwarahara*	galactagogue, expectorant, aphrodisiac, diuretic, antipyretic and a revitalizing tonic[65]
Jivaka	*Malaxis acuminata* D. Don	Bulb	*Jwarahara*	antioxidant, antiaging, anti-inflammatory, antiproliferative, antimicrobial activities, immunomodulatory[66]
Rishbhak	*Malaxis muscifera* (Lindl.) Kuntze	Bulb	*Jwarahara*	antipyretic[67]
Ushira	*Vetiveria zizanioides* (L.) Nash	Root	*Jwara, Trishna, Daha, Mutrakrichra*	antipyretic, antibacterial, anti-inflammatory, antioxidant[68]
Lavanga	*Syzygium aromaticum* (L.) Merr. and L. M. Perr	Flower bud	*Dipana, Pachana, Trishna, Kasa, Shwasa, Ajirna*	analgesic, antioxidant, anticancer, antiseptic, anti-depressant, antispasmodic, anti-inflammatory, antiviral[69]

Table 3. Continued...

Drug	Botanical Name	Useful part	*Ayurveda* Uses[12]	Proven actions
Vanshlochana	*Bambusa bambos* Dduco.	Dried resin	*Jwara, Kasa,Trishna, Shwasa, Kasa*	anti-inflammatory, antiulcer, anti-oxidant, anthelmintic, antibacterial, insectisidal[70]
Tejpatra	*Cinnamomum tamala* (Buch.-Ham.) T. Nees and Eberm.	Leaf	*Dipana, Sweda Janana, Hrillasa, Aruchi, Pinasa*	anti-inflammatory, analgesic and antipyretic[71]
Javitri	*Myristica fragrans* Houtt.	Seed	*Dipana, Jwara, Kasa, Shwasa, Trishna*	antipyretic, anti-allergy, anti-inflammatory remedies[72]
Talispatra	*Abies webbiana* (Wall. ex D. Don) Lindl.	Leaf	*Dipana, Pachana, JirnaShwasa, Kasa, Aruchi, Swarabhanga*	expectorant, carminative[73]
Kiratatikta	*Swertia chirata* Buch. -Ham. ex Wall.	Whole plant	*Jwara, Shwasa, Kasa, Daha*	antipyretic[74]

COVID 19[75]. The major ingredients of the polyherbal formulations are *Swertia chirata* Buch.-Ham. Ex Wall and *Tinospora cordifolia* (Willd.) Miers respectively which possesses diverse proven actions in various diseases[76]. The important proven activities of *Swertia chirata* are immunomodulatory, antibacterial, antimalarial, antimicrobial, antiviral, antifungal, anti-inflammatory, antileishmanial, topoisomerase inhibitor, anticancer, anti-diabetic, gastroprotective, CNS depressant, anticholinergic, anti-hepatitis, cardio-protective, anti-atherosclerotic, anti-arthritic, antitumor, anti-HIV, antioxidant, chemopreventive, antiatherosclerotic, hepatoprotective and others[77]. *Tinospora cordifolia*, the main ingredient in *Amritarista* possesses immunomodulatory, anti-inflammatory, anti-oxidant, anti-spasmodic, anti-stress, anti-diabetic, anti-periodic, anti-arthritic, anti-allergic, anti-leprotic, anti-malarial, hepatoprotective, anti-neoplastic activities and others. Studies have reported the potential of *Tinospora cordifolia* to fight against microbial infections. *Tinospora cordifolia* has been proven effective in increasing humoral immunity by increasing IgG and IgA. It is also currently used as an adjuvant for various immunological treatments[78]. It has been found effective against *Klebsiella pneumoniae, Salmonella paratyphi, Staphylococcus aureus, Escherichia coli, Enterobacter aerogene, Proteus vulgaris, Salmonella typhi, Shigella flexneri, Salmonella typhimurium, Pseudomonas aeruginosa* and *Serratia marcesenses* (Gram-positive bacteria). It has also proved to be effective in increasing the immunostimulant properties of macrophages, enhancing the phagocytic activity of polymorphonuclear cells, clearing the bacteria and improving the phagocytic and intracellular bactericidal capacities of neutrophils[79]. Studies show that *Sudarshana churna* possesses antioxidants, reduced oxidative stress, antipyretic, anti-inflammatory, analgesic effect, antihistamine and others[80]. Both these polyherbal combinations contain many ingredients and most of them possess immunomodulatory, antibacterial, antiviral, antifungal, antimicrobial, antipyretic, anti-inflammatory, antispasmodic antiprotozoal, tonic, antioxidant, cardiotonic and antimalarial properties[81]. Due to the above said properties of the drugs present in the polyherbal combination this will help increase immunity and thereby prevent the various infections arising in the monsoon season.

5. Conclusion

Infectious diseases are a cause of concern in India, especially during the monsoons. It is in practice in our institute to provide *Ayurveda* pre-monsoon prophylaxis to all interested staff and students to boost their immunity against infections since 2014. The current study showed a highly significant ($p<0.001$) reduction in the episodes and severity of fever, cough and cold. However, 1.02%, 2.03% and 1.52% of participants have shown an increase in the frequency of episodes of fever cough and cold respectively. Our study shows that *Ayurveda* formulations like *sudarshana ghanavati* and

amritarista can be effectively used to boost immunity and thereby prevent infections arising during the monsoons. So, it may be inferred that *Ayurveda* pre-monsoon prophylaxis is an effective practice to enhance overall health and thereby boost the immunity of individuals.

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