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Herbal and traditional medicine utilization survey: a cross-sectional study assessing potential interactions and safety concerns with concurrent use of allopathic medications

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ABSTRACT:
Background: Herbal and traditional medicines are widely utilized in India due to cultural acceptance and the perception that natural products are inherently safe. However, their concurrent use with allopathic medications may result in herb- drug interactions, adverse effects, or reduced therapeutic efficacy. Limited patient awareness and underreporting to healthcare professionals further increase safety concerns. **Aim:** To assess the prevalence of herbal and traditional medicine utilization and to evaluate potential interactions and safety concerns associated with their concurrent use with allopathic medications. **Methods:** A cross-sectional survey was conducted using a structured questionnaire among participants receiving allopathic treatment. Data collected included demographic details, types of herbal products used, frequency and duration of use, indications, and disclosure to healthcare professionals. The collected data were analysed using descriptive statistical methods to identify utilization patterns and potential interaction risks. **Results:** The findings revealed that a substantial proportion of participants reported concurrent use of herbal and allopathic medicines, particularly among individuals with chronic conditions such as diabetes and hypertension. Most users were unaware of possible herb- drug interactions and did not inform their healthcare providers about herbal consumption. The primary reasons for herbal use included cultural beliefs, affordability, accessibility, and perceived safety. **Conclusion:** The study highlights the need for improved patient education, enhanced pharmacovigilance, and proactive involvement of healthcare professionals, especially pharmacists, to ensure safe and rational use of herbal and allopathic medications concurrently.

KEYWORDS: Herb- drug interaction, allopathic medication, pharmacovigilance, herbal medicine, traditional medicine.

I. INTRODUCTION

Herbal medicine:

Herbal medicine is the therapeutic use of plants, plant parts, or plant-derived substances to treat disease and enhance general health. It is the oldest form of healthcare, with archaeological evidence dating back roughly 60,000 years. Unlike conventional medicine which often targets specific symptoms, traditional herbalism frequently focuses on the overall condition of the individual. Approximately 25% of all modern prescription drugs are derived from plants.

Famous examples include:

- Aspirin: Originally derived from willow bark.
- Digitalis (Heart Medicine): Derived from the foxglove plant.
- Quinine (Antimalarial): Derived from cinchona bark.

“Natural” is not always safe. Herbs can have potent side effects and interact dangerously with prescription medications. Thus, it should be taken cautiously.

Traditional medicine:

Traditional medicine refers to the knowledge, skills, and practices based on theories, beliefs, and experiences indigenous to different cultures. It is used for centuries before the advent of modern biomedicine, these systems focus on maintaining health and treating physical and mental illness through holistic and nature-based remedies.

- Ayurveda (India): One of the oldest systems, it is based on balancing three "doshas"

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(Vata, Pitta, Kapha) derived from five elements (earth, water, fire, air, and space).

- Homeopathy: Homeopathy is a major system of alternative medicine developed in Germany. It is widely practiced globally, particularly in India. It follows several fundamental principles such as "like cures like".
- Unani (Greco-Arabic): Originating in Greece and developed by Arab physicians, it focuses on the balance of four humors (blood, phlegm, yellow bile, and black bile).
- Siddha (South India): Attributed to the sage Agasthya, it emphasizes the use of metals and minerals alongside herbs to achieve longevity and health.

Background and context:

India has a rich heritage in traditional medicine systems, with an estimated 80% of the world's population relying on traditional medicine for primary healthcare needs. Tamil Nadu, particularly through the Siddha system, represents a crucial hub for traditional medicine practice, with 295 Ayush hospitals and 1,238 dispensaries currently functional across the state. The districts of Erode and Namakkal in Tamil Nadu possess significant ethnobotanical diversity, with documented usage of traditional medicinal plants among tribal communities including Urali, Irula, and Hindu Malaiyali tribes.

Recent studies indicate a global prevalence of herbal medicine use ranging from 30-70%, with usage particularly high during health crises such as the COVID-19 pandemic, where prevalence reached 51.7% in certain populations. In India, traditional medicine market was valued at USD 416.28 million in 2024 and is projected to reach USD 707.85 million by 2030, with a CAGR of 9.21%. South India, including Tamil Nadu, Karnataka, and Kerala, represents the largest regional market for traditional medicine in the country.

Problem statement:

The concurrent use of herbal medicines with allopathic medications presents significant safety concerns due to potential herb-drug interactions (HDIs). These interactions can occur through pharmacokinetic mechanisms (affecting drug absorption, distribution, metabolism, or excretion) or pharmacodynamic pathways (producing antagonistic, additive, or synergistic effects). Common herbal medicines such as St. John's Wort, ginkgo biloba, garlic, and ginseng have been documented to interact with immunosuppressants, anticoagulants, antidepressants, and antiretrovirals.

Despite high prevalence of herbal medicine use, significant knowledge gaps exist:

- Less than 40% of patients inform their healthcare providers about herbal supplement usage
- Approximately 61.35% of users are unaware of potential herb-drug interactions
- Only 18.9% of concurrent users disclose this information to their treating physicians
- Adverse drug reactions (ADRs) remain significantly underreported, with India's Pharmacovigilance Programme recording only 23.4-28.1% serious ADR reporting rates.

No comprehensive utilization survey has been conducted specifically in Erode and Namakkal districts documenting the patterns, prevalence, and safety concerns of concurrent herbal and allopathic medicine use.

Rationale and significance:

This study is critically important for several reasons:

1. Public Health Significance:
   - Growing integration of traditional and modern medicine systems in Tamil Nadu healthcare infrastructure.
   - High prevalence of self-medication practices in rural and semi-urban India.
   - Need for evidence-based pharmacovigilance systems for herbal medicines.
2. Clinical Relevance:
   - Identification of vulnerable populations using narrow therapeutic index drugs concurrently with herbal medicines.
   - Documentation of actual adverse events and interactions in real-world settings.
   - Enhancement of patient safety through improved healthcare provider awareness.
3. Regional Specificity:
   - Rich ethnobotanical heritage of Erode and Namakkal districts with documented traditional healing practices.
   - Integration of Siddha system into mainstream healthcare in Tamil Nadu.
   - Lack of region-specific data on herb-drug interaction prevalence.
4. Research Gap:
   - Limited cross-sectional surveys documenting herbal medicine utilization patterns in South India.
   - Insufficient data on concurrent use patterns in Indian populations.

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- Need for validated assessment tools adapted to Indian traditional medicine context.

II. METHODOLOGY

Study design:

Type: Descriptive cross-sectional observational survey study.

Study setting:

Geographic location:

Erode District: Sathyamangalam, Gobichettipalayam, and Anthiyur taluks (selected for rich ethnobotanical diversity and tribal populations)

Namakkal District: Rasipuram, Tiruchengode, and Namakkal taluks (selected for traditional medicine heritage and diverse population)

Study sites:

Participant's home.

Government and private allopathic hospitals outpatient departments.

Study duration: 3 months (12 weeks)

Weeks 1-2: Pilot testing and training of field investigators.

Weeks 3-11: Data collection phase.

Week 12: Data verification, cleaning, and preliminary analysis

Study population:

Target Population:

Adult residents (≥18 years of age) residing in Erode and Namakkal districts of Tamil Nadu who have used any form of healthcare (traditional, allopathic, or both) in the past 12 months.

Inclusion Criteria:

- Age ≥18 years (both male and female)
- Permanent or temporary residents of Erode or Namakkal districts for at least 6 months
- Able to provide informed consent
- Willing to participate voluntarily in the study
- Able to communicate in Tamil or English
- Have used any healthcare service (traditional, herbal, allopathic, or self-medication) in the past 12 months

Exclusion Criteria:

- Age <18 years
- Cognitive impairment or psychiatric illness affecting ability to provide informed consent
- Critically ill patients requiring emergency care
- Pregnant women (due to specific herb-drug interaction considerations requiring separate dedicated study)
- Individuals unwilling or unable to provide complete information
- Healthcare professionals (doctors, pharmacists, nurses) who may have biased knowledge compared to general population
- Previous participation in the same study (to avoid duplicate entries)

Sample size calculation:

Formula for Cross-Sectional Prevalence Studies:

For estimating prevalence with desired precision:

$$n = \frac{Z^2 \times P \times (1\text{-}P)}{d^2}$$

Where:

n = required sample size.

Z = Z-statistic for desired confidence level (1.96 for 95% Cl).

P = expected prevalence of herbal medicine use.

d = precision (absolute margin of error).

Sample size calculation steps:

Step 1: Determine Expected Prevalence (P)

Based on literature review:

- Global herbal medicine use: 30-70%
- Indian studies: 50-55% prevalence in urban settings
- Regional South India studies: ~50%
- Selected P value: 0.55 (55%) as conservative estimate for South Indian population

Step 2: Select Precision (d)

For prevalence of 55%, selecting precision of 5% (0.05) is appropriate as it balances accuracy with feasibility.

Step 3: Calculate Sample Size

$$n = \frac{(1.96)^2 \times 0.55 \times (1\text{-}0.55)}{(0.05)^2}$$

$$n = \frac{3.8416 \times 0.55 \times 0.45}{0.0025}$$

$$n = \frac{0.9502}{0.0025}$$

$$n = 380.08 \approx 380$$

Step 4: Adjust for non-response rate

Assuming 15% non-response/incomplete data rate:

$$n_{adjusted} = \frac{380}{1\text{-}0.15} = \frac{380}{0.85} = 447.06 \approx 447$$

Final sample size: 450 participants (Rounded to convenient number for equal distribution across districts)

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Sample distribution:

- Erode District: 225 participants
  Rural areas: 135 (60%)
  Urban/semi-urban areas: 90 (40%)
- Namakkal District: 225 participants
  Rural areas: 135 (60%)
  Urban/semi-urban areas: 90 (40%)

This distribution reflects the predominantly rural character of both districts while ensuring adequate urban representation.

Sampling technique:

Primary Sampling Method: Multistage stratified random sampling

Stage 1: District Selection (Purposive selection of Erode and Namakkal districts based on):

- Rich ethnobotanical heritage
- Traditional medicine infrastructure
- Accessibility for research team
- Diverse population (tribal, rural, urban)

Stage 2: Taluk Selection

- Erode District: Random selection of 3 taluks from 7 available
- Namakkal District: Random selection of 3 taluks from 5 available

Stage 3: Village/Ward Selection

- Random selection of 5 villages from each selected taluk (rural)
- Random selection of 3 wards from each selected town (urban)

Stage 4: Household/Individual Selection

- Systematic random sampling within selected villages/wards
- Starting from central location (panchayat office, healthcare facility)
- Selecting every 5th household in rural areas
- Selecting every 10th household in urban areas
- If household has multiple eligible members, selecting one using Kish grid method

Stage 5: Healthcare Facility-Based Sampling

- Convenience sampling at outpatient departments of selected healthcare facilities
- Recruitment on specific survey days (2-3 days per week)
- Screening for eligibility and consent

Data collection tools and instruments:

1. Primary Data Collection Instrument:

Structured questionnaire

The questionnaire will be developed based on validated tools from previous herbal medicine utilization surveys and adapted to Indian traditional medicine context.

Questionnaire components

Section A: Socio-Demographic Information

- Age, gender, education level, occupation, income

Section B: Medical History and Health Status

- Chronic diseases, current medications (prescription and over the counter)

Section C: Herbal and Traditional Medicine Use

- Current and past herbal medicine use (dose, frequency, duration, route of administration)
- Types of herbal products used (single herbs, polyherbal formulations, proprietary medicines)
- Method of preparation (decoction, powder, paste, juice, pills, capsules)
- Information sources (family tradition, friends, media, healthcare provider, internet)
- Disease conditions treated with herbal medicines

Section D: Concurrent Use with Allopathic Medications

- Concurrent use patterns (simultaneous, sequential, alternating)
- Time gap between allopathic and herbal medicine administration

Section E: Knowledge Assessment (Adapted from validated scales)

- Awareness of herb-drug interactions (Yes/No/Don't know)
- Belief about herbal medicine safety ("natural = safe" misconception)
- Knowledge of potential adverse effects

Section F: Attitudes toward Herbal Medicine (Likert scale: Strongly Disagree to Strongly Agree)

- "Herbal medicines are safer than allopathic medicines"
- "Natural products have no side effects"

Section G: Practices Related to Herbal Medicine Use

- Disclosure to healthcare providers (Yes/No)
- Seeking medical help if adverse effects occur

Section H: Adverse Events and Safety Concerns

- Experienced adverse effects (type, severity, duration)
- Hospitalization required (Yes/No)
- Outcome of adverse event (recovered, recovering, permanent damage, fatal)

2. Secondary Data Collection Tools:

Herb-Drug Interaction Assessment:

- Natural Medicines Database interaction checker (online tool)
- Drugs.com Interaction Checker (includes herbal supplements)
- Medscape Drug Interaction Checker

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- WHO Uppsala Monitoring Centre VigiBase reference for documented Interactions

Data collection procedure:
Main Data Collection Phase:
Duration: 9 weeks (Weeks 3-11 of study period)
Data Collection Schedule:

- 50 participants per week (25 per district)
- 8-10 participants per day
- 5-6 days per week (excluding major holidays)

Interview Setting:

- Participant's home (if comfortable and private space available).
- Community halls during health camps

Quality Control Measures:

- Daily supervision: Review of 10% of completed questionnaires.
- Weekly meetings: Research team discussion of challenges and solutions.
- Completeness check: Same-day verification of all questionnaire sections.
- Standardization: Use of standard operating procedures (SOPs) for all processes.
- Documentation: Maintaining field notes and daily logs

Statistical analysis:
The data obtained was entered in the MS Excel. Descriptive Statistics can be used to describe the data. Categorical variables and percentages were used for the research.

III. OBSERVATION AND RESULTS

Table: 6.1 Gender of Participants

Gender of the participants	No. of participants n = 450	Percentage (%)
Male	253	56
Female	197	44

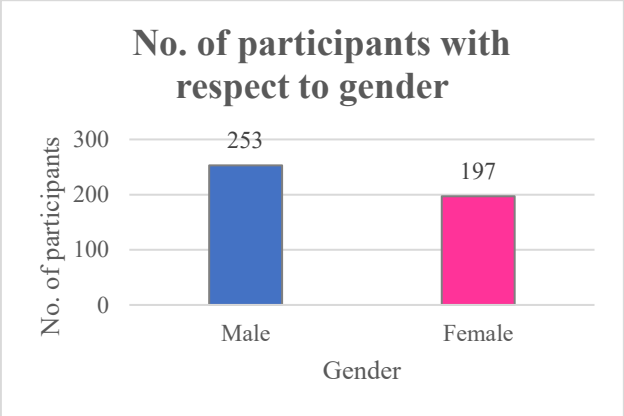

Figure:6.1 Gender of participants

From this study, it is observed that males contribute (56%) more to the study as compared to the females (44%).

Table: 6.2 Place of the participants

Place of the participants	No. of participants n = 450	Percentage (%)
Erode	225	50
Namakkal	225	50

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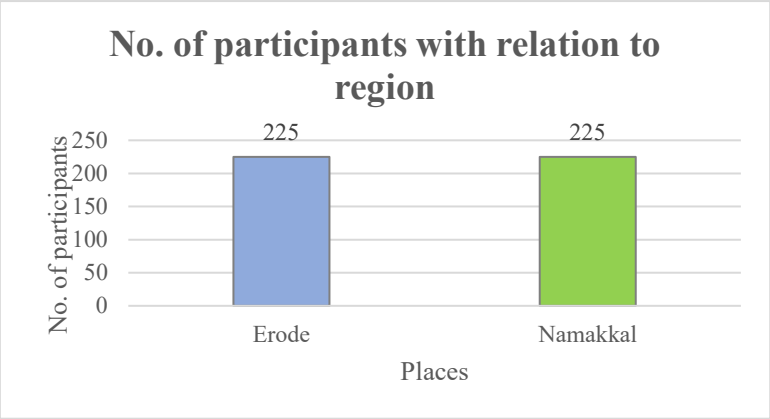

Figure:6.2 Place of participants

From this study, it is observed that equal no. of participants from each district (Erode and Namakkal) contribute to the study.

Table: 6.3 Education of the participants

Education of the participants	No. of participants n = 450	Percentage (%)
Uneducated	42	9
Non-graduate	143	32
Graduate	265	59

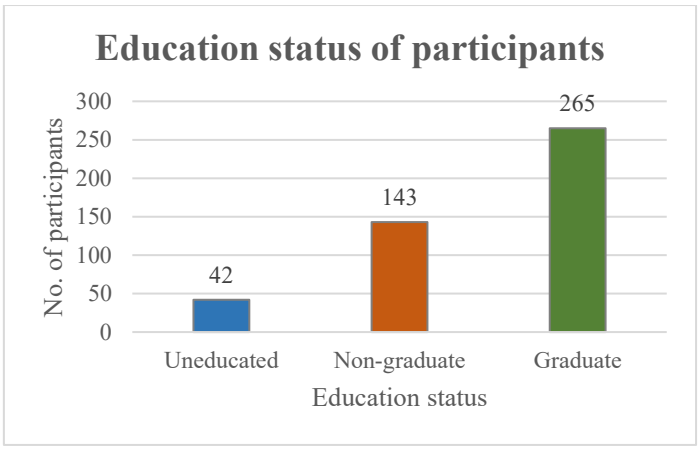

Figure:6.3 Education status of participants

From this study, it is observed that most of the participants are graduated including 265 out of 450 participants. Particularly most of them are non-graduates including 143 out of 450 participants. Fewer participants are uneducated including 42 out of 450 participants.

Table: 6.4 Occupation of the participants

Occupation of the participants	No. of participants n = 450	Percentage (%)
Un-employed	75	17
Employed	375	83

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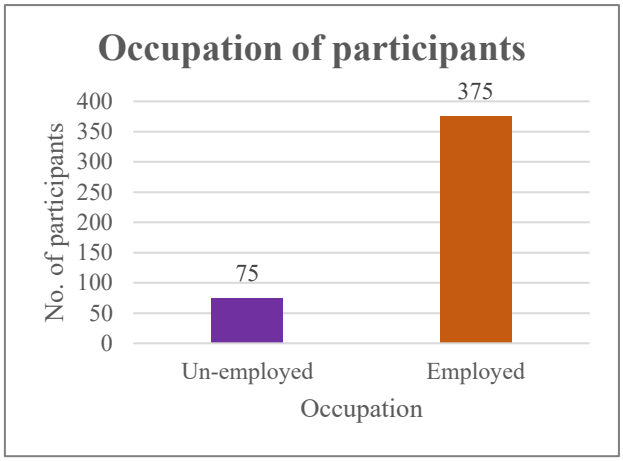

Figure:6.4 Occupation of participants

From this study, it is observed that 75 out of 450 participants are un-employed and 375 out of 450 participants who are employed contribute to the study.

Table: 6.5 No. of participants taking medications

Types of medications	No. of participants n = 450	Percentage (%)
Allopathic medicine	443	58
Traditional medicine	187	25
Herbal medicine	133	17

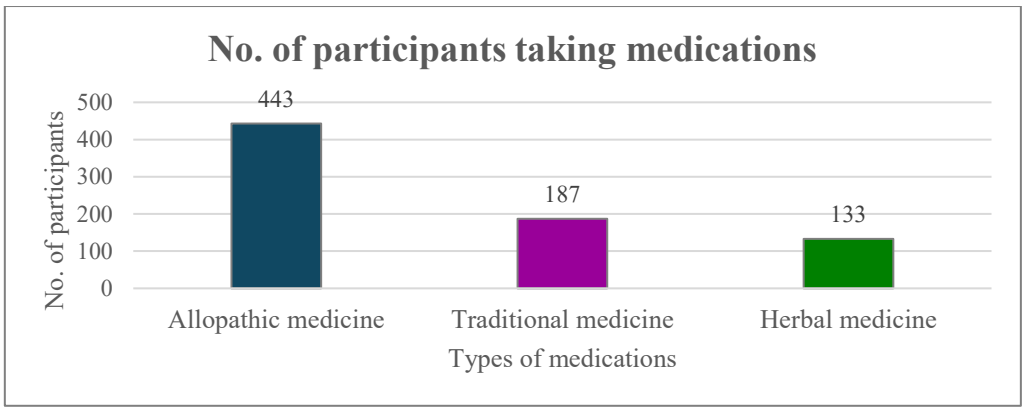

Figure:6.5 No. of participants taking different types of medications

From this study, it is concluded that most of the participants consume allopathic medicines including 443 out of 450, some of the participants consume traditional medicine including 187 out of 450 and few participants consume herbal medicines including 133 out of 450 participants.

Table: 6.5.1 No. of participants taking allopathic medicines

Response	No. of participants n = 450	Percentage (%)
Yes	443	98
No	7	2

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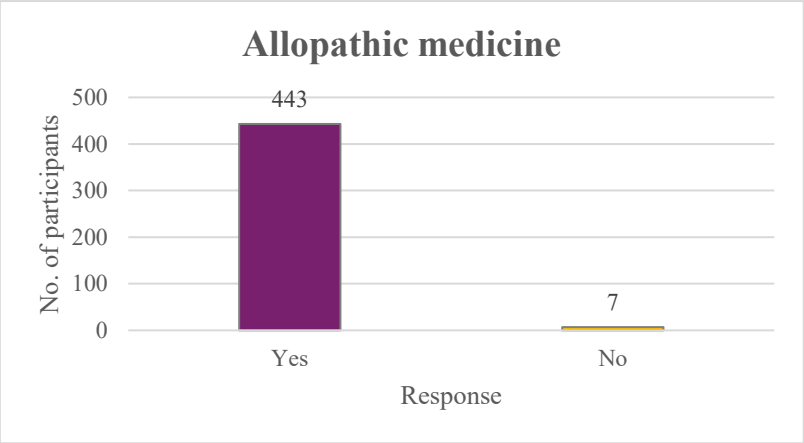

Figure:6.5.1 No. of participants taking allopathic medicine

From this study, it concludes that 443 out of 450 participants consume allopathic medicines.

Table: 6.5.2 Participants consuming traditional medicine

Traditional medicine	No. of participants n = 450	Percentage (%)
Ayurveda	58	31
Homeopathy	58	31
Unani	14	8
Siddha	57	30

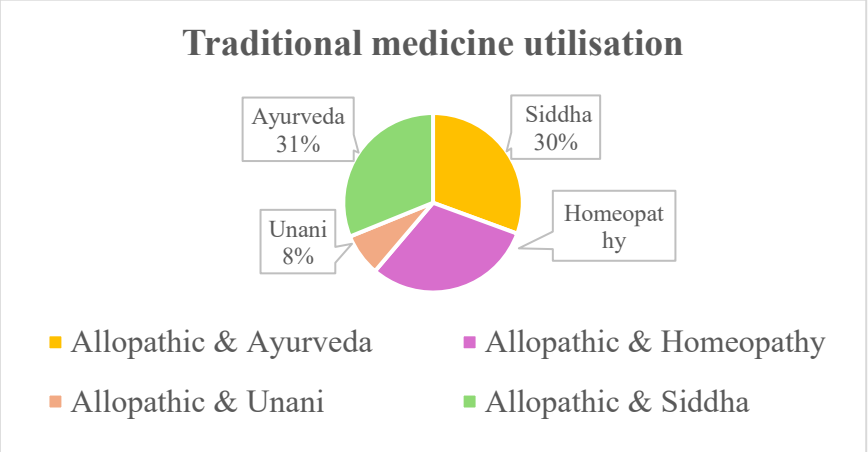

Figure:6.5.2 No. of participants consuming traditional medicine

From this study, it is concluded that majority of the participants consume ayurvedic and homeopathic medicines each including 58 out of 450 participants, while 57 out of 450 participants consume siddha medicine and only few participants consume unani medicine including 14 out of 450 participants.

Table: 6.5.3 No. of participants consuming herbal medicine

Response	No. of participants n = 450	Percentage (%)
Yes	133	30
No	317	70

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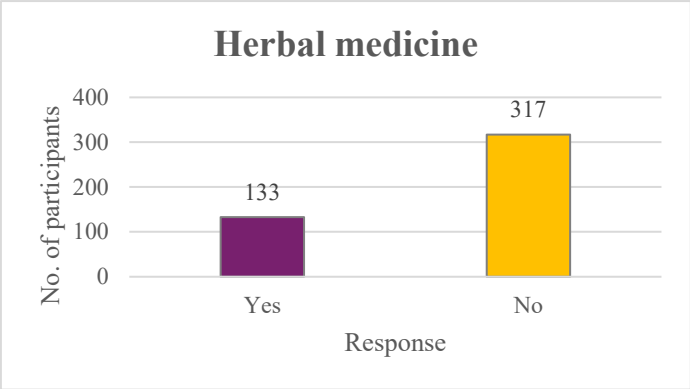

Figure:6.5.3 No. of participants consuming herbal medicine

From this study, it is concluded that 133 out of 450 participants consume herbal medicines.

Table: 6.6 No. of participants consuming concurrent medications

Concurrent medications	No. of participants n = 450	Percentage (%)
Allopathic and ayurvedic	56	18
Allopathic and homeopathic	56	18
Allopathic and unani	14	5
Allopathic and siddha	57	18
Allopathic and home remedies	127	41

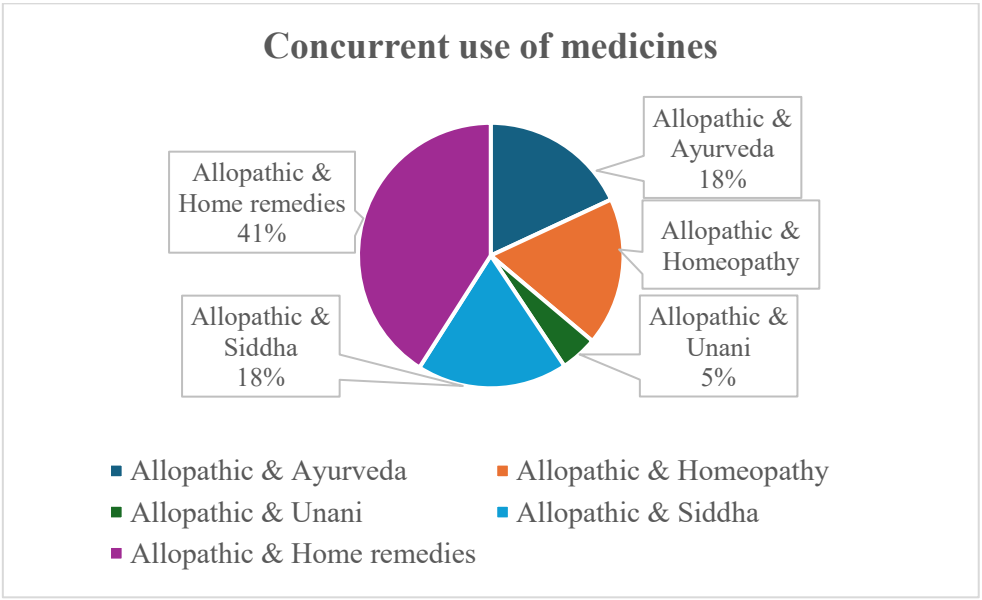

Figure:6.6 No. of participants consuming concurrent medications

From this study, it is concluded that most participants concurrently use allopathic medicines with home remedies including 127 out of 450 participants, majority of participants use siddha medicine including 57 out of 450 participants and some participants use Ayurveda and homeopathic medicines including 56 out of 450 participants while few participants use unani medicine including 14 out of 450 participants.

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Table: 6.7 No. of participants knowing herb-drug interaction

Response	No. of participants n = 450	Percentage (%)
Yes	174	39
No	276	61

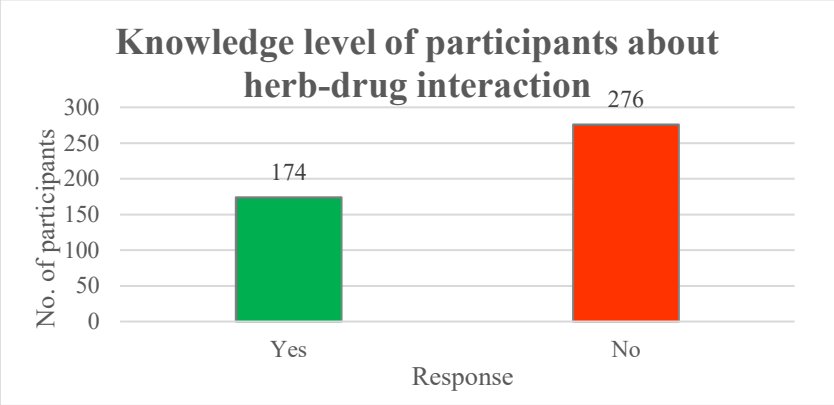

Figure:6.7 No. of participants knowing herb-drug interaction

From this study, it is concluded that 174 out of 450 participants know about herb-drug interaction.

Table: 6.8 No. of participants believing all herbs or naturally derived products are completely safe

Response	No. of participants n = 450	Percentage (%)
Yes	317	70
No	133	30

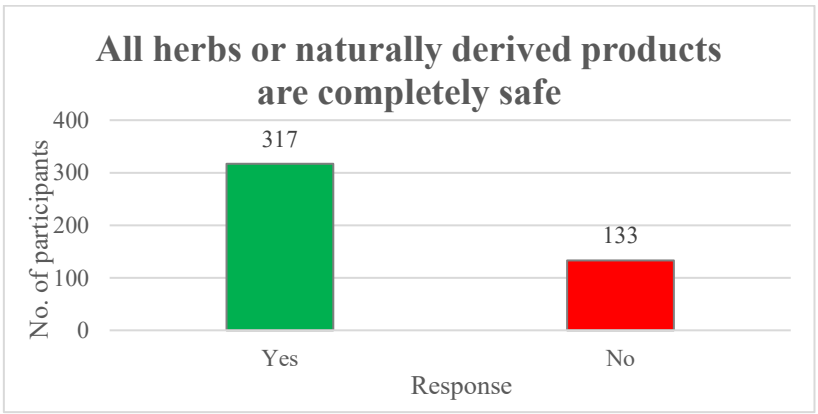

Figure:6.8 No. of participants believing all herbs or naturally derived products are completely safe

From this study, it is concluded that 317 out of 450 participants believe that all herbs or naturally derived products are completely safe.

Table: 6.9 No. of participants believing herbal medicines are safer than allopathic medicines

Response	No. of participants n = 450	Percentage (%)
Yes	317	70
No	133	30

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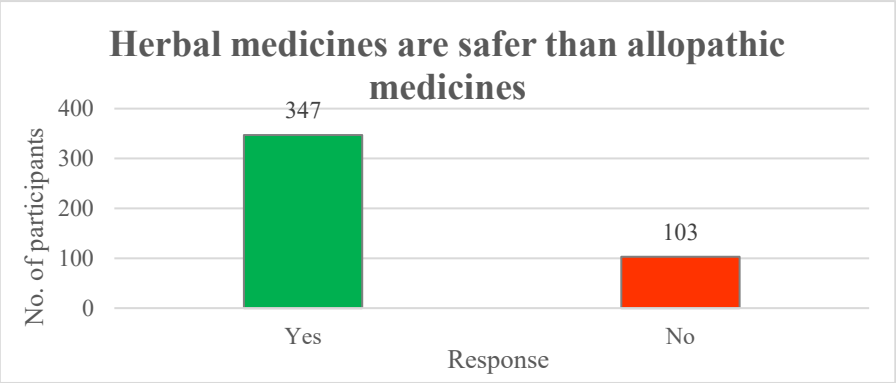

Figure:6.9 No. of participants believing herbal medicines are safer than allopathic medicines

From this study, it is concluded that 347 out of 450 participants believe that herbal medicines are safer than allopathic medicines.

Table: 6.10 No. of participants believing herbal medicines can be taken without doctor's consultation

Response	No. of participants n = 450	Percentage (%)
Yes	317	70
No	133	30

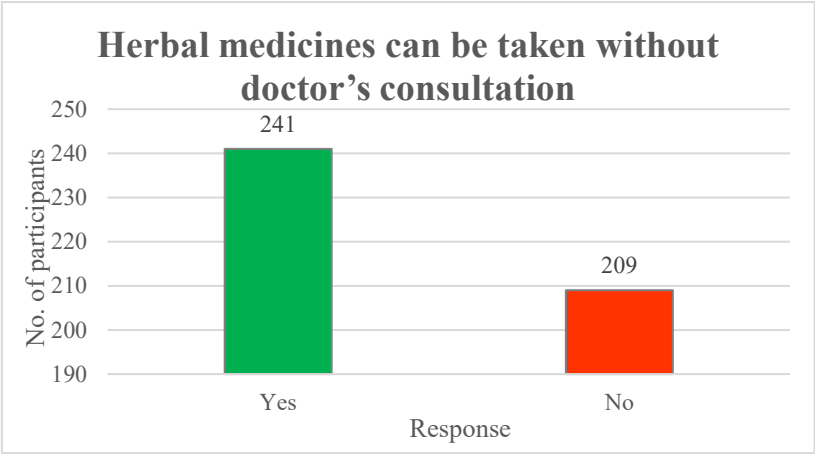

Figure:6.10 No. of participants believing herbal medicines can be taken without doctor's consultation

From this study, it is concluded that 241 out of 450 participants believe that herbal medicines can be taken without doctor's consultation.

Table: 6.11 No. of participants conveying about taking herbal medicines to their physician

Response	No. of participants n = 450	Percentage (%)
Yes	164	36
No	286	64

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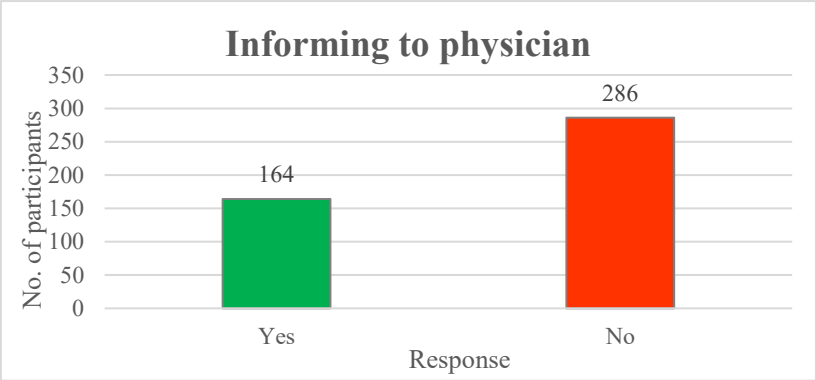

Figure:6.11 No. of participants conveying about taking herbal medicines to their physician

From this study, it is concluded that 164 out of 450 participants convey about taking herbal medicine to their physician.

IV. DISCUSSION

This study is carried out in various places of Erode and Namakkal district of Tamil Nadu. This study focusses on preventing the common people from potential drug interactions caused by concurrent use of Allopathic medicines with herbal and traditional medicines by collecting their allopathic, traditional and herbal medicines intake patterns.

The study is carried out for 3 months. The total number of people who participated in the survey are 450. Among these 450 participants, 225 participants are chosen from each of Erode and Namakkal districts.

From the collected data, males contribute about 56% to the survey and females contribute about 44% to the survey. Adults who aged 35- 45 years are the maximum to take part in the survey.

From the participants most of the people are graduated (59%) and employed (83%).

The survey is conducted in patients who have chronic disease for at least past 3 months and who take any one of allopathic, traditional or herbal medicine regularly. Majority of the patients consume allopathic medicine, but along with this people also consume either traditional or herbal medicine concurrently.

Concurrent consumption of medicines causes adverse effects which may also be life threatening or fatal.

From this study, it is observed that most people prefer allopathic medicines (58%), some people prefer traditional medicine (25%) and few people prefer home remedies (17%).

It is concluded that, 28% people consume allopathic and herbal medicine concurrently, 12% people consume allopathic medicine with Ayurveda or homeopathy or siddha medicines, 1% people consume allopathic medicine concurrently with unani medicine.

We can also say that most people (61%) don't even know about herb-drug interaction and majority of people (70%) believe that all herbs and naturally derived products are completely safe.

Out of these 450 participants majority of people (70%) believe that herbal medicines are safer than allopathic medicines.

They believe that herbal medicines can be taken without the physician's consultation. 70% of the participants accept this statement. 64% of the participants don't even convey taking concurrent medicines to their physician.

V. CONCLUSION

Allopathic medicines when taken concurrently with herbal or traditional medicine causes adverse effects with various severity. Therefore, the study emphasizes the necessity of consulting the physician before taking concurrent medications. This study creates awareness to people about herb- drug interaction and prevent people from harmful reactions. This study contributes significantly to the scientific literature on herbal medicine safety, support evidence-based regulation of traditional medicine products, and ultimately improve health outcomes for populations utilizing both traditional and allopathic healthcare systems. The uniqueness of this study lies in its comprehensive approach combining utilization assessment, safety evaluation, knowledge-attitude-practice analysis, and regulatory compliance verification in a geographically and culturally specific context.

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